FISCHER-CLIFFORD THEORY FOR SPLIT AND NON-SPLIT GROUP EXTENSIONS

by

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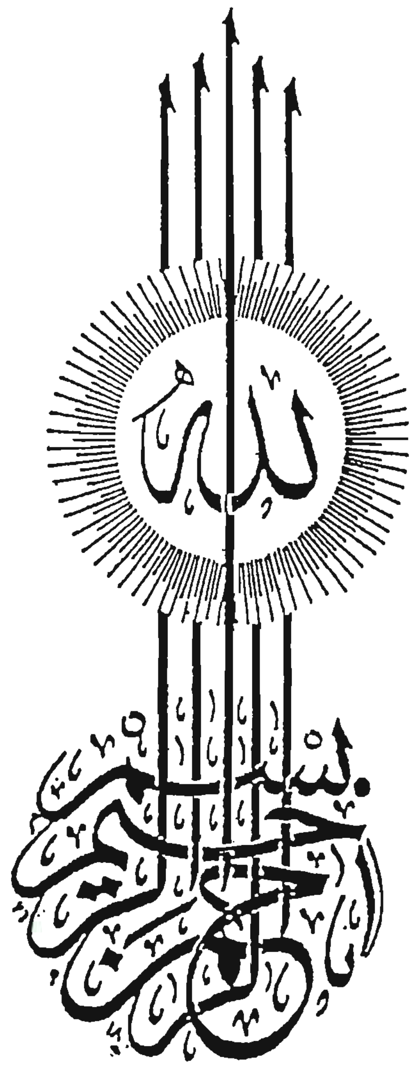

In the name of Allah, the Beneficent, the Merciful.

Abstract

The character table of a finite group provides considerable amount of information about the group, and hence is of great importance in Mathematics as well as in Physical Sciences. Most of the maximal subgroups of the finite simple groups and their automorphisms are of extensions of elementary abelian groups, so methods have been developed for calculating the character tables of extensions of elementary abelian groups. Character tables of finite groups can be constructed using various techniques. However *Bernd Fischer* presented a powerful and interesting technique for calculating the character tables of group extensions. This technique, which is known as the technique of the *Fischer-Clifford* matrices, derives its fundamentals from the Clifford theory. If $\bar{G} = N.G$ is an appropriate extension of N by G, the method involves the construction of a nonsingular matrix for each conjugacy class of $\bar{G}/N \cong G$. The character table of $\bar{G}$ can then be determined from these Fischer-Clifford matrices and the character table of certain subgroups of G, called *inertia factor* groups.

In this dissertation, we described the Fischer-Clifford theory and apply it to both split and non-split group extensions. First we apply the technique to the split extensions $2^7{:}Sp_6(2)$ and $2^8{:}Sp_6(2)$ which are maximal subgroups of $Sp_8(2)$ and $2^8{:}O_8^+(2)$ respectively. This technique has also been discussed and used by many other researchers, but applied only to split extensions or to the case when every irreducible character of N can be extended to an irreducible character of its *inertia* group in $\bar{G}$. However the same method can not be used to construct character tables of certain non-split group extensions. In particular, it can not be applied to the non-split extensions of the forms $3^7{\cdot}O_7(3)$ and $3^7{\cdot}(O_7(3){:}2)$ which are maximal subgroups of Fischer's largest sporadic simple group Fi_{24}' and its automorphism group Fi_{24} respectively. In an attempt to generalize these methods to such type of non-split group extensions, we need to consider the *projective* representations and characters. We have shown that how the technique of Fischer-Clifford matrices can be applied to any such type of non-split extensions. However in order to apply this technique, the projective characters of the inertia factors must be known and these can be difficult to determine for some groups. We successfully applied the technique of Fischer-Clifford matrices and determined the Fischer-Clifford matrices and hence the character tables of the non-split extensions $3^7{\cdot}O_7(3)$ and $3^7{\cdot}(O_7(3){:}2)$.

The character tables computed in this thesis have been accepted for incorporation into GAP and will be available in the latest versions.

Preface

The work described in this thesis was carried out under the supervision and direction of Professor Jamshid Moori, School of Mathematics, Statistics and Information Technology, University of Natal, Pietermaritzburg, from March 1996 to December 1996 and from February 1998 to July 2001.

The thesis represents original work by the author and has not otherwise been submitted in any form for any degree or diploma to any other University. Where use has been made of the work of others it is duly acknowledged in the text.

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Contents

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Notation and conventions

Throughout this thesis all groups will be assumed to be finite, unless otherwise stated. We will use the notation and terminology from the ATLAS [19] and [58].

$\mathbb{N}$	natural numbers
$\mathbb{Z}$	integers
$\mathbb{Q}$	rational numbers
$\mathbb{R}$	real numbers
$\mathbb{C}$	complex numbers
G, N, H, K	groups
1_G	the identity element of G
$H \leq G$	H is a subgroup of G
$H \cong G$	H is isomorphic to G
$\mathbb{F}$	a field
$\mathbb{F}^*$	$\mathbb{F} - \{0\}$
$\langle x, y \rangle$	the subgroup generated by x and y
$N.G$	an extention of N by G
$N{:}G$	a split extention of N by G
$N{\cdot}G$	a non-split extention of N by G
h^g	conjugation of h by g
nX	a general conjugacy class of G with representatives of order n
$g_1 \sim g_2$	g_1 is conjugate to g_2
$o(g)$	order of $g \in G$

$C_G(g)$	the centralizer of g in G
$[g]$	a conjugacy class of G with representative g
$N_G(H)$	the normalizer of the subgroup H in G
Hg	the right coset of H in G
X, Y, Ω	sets
$\|\Omega\|$	the cardinality of the set Ω
$1^\alpha 2^\beta 3^\gamma \dots$	cycle structure of a permutation
$Irr(G)$	the set of ordinary irreducible characters of G
I_G	the identity character of G
$\chi(G\|H)$	the permutation character of G on H
χ_H	the restriction of the character χ of G to the subgroup H
ψ^G	the induction of the character ψ of subgroup H to G
na, nb, ...	irreducible characters of G of degree n
$\langle \chi_i, \chi_j \rangle$	the inner product of the characters χ_i and χ_j
$dim(V)$	the dimension of a vector space V
D_n	diheral group of order $2n$
S_n	the symmetric group on n symbols
$GF(q)$	the Galois field of q elements
$V(n,q)$	a vector space of dimension n over $GF(q)$
$Sp_{2n}(q)$	symplectic group of dimension $2n$ over $GF(q)$
$O^+_{2n}(q)$	the full orthogonal group leaving the form f^+ on $V = V(2n,q)$ invariant
$O^-_{2n}(q)$	the full orthogonal group leaving the form f^- on $V = V(2n,q)$ invariant
$O^+_8(2)$	the full orthogonal group (simple) of dimension 8 over $GF(2)$, $\|O^+_8(2)\| = 2^{12} \times 3^5 \times 5^2 \times 7$
$O^-_6(2)$	the full orthogonal group of dimension 6 over $GF(2)$, $\|O^-_6(2)\| = 2^7 \times 3^4 \times 5$, ATLAS [19]: $U_4(2){:}2$
2^n	an elementary abelian group of order 2^n
3^n	an elementary abelian group of order 3^n

Chapter 1

Introduction

The classification of finite simple groups is a landmark of tremendous importance in the development of finite group theory. It states that each finite simple group is isomorphic to exactly one of the following:

- A cyclic group of prime order,
- An alternating group A_n of degree at least 5,
- A group of Lie type,
- One of twenty-six sporadic simple groups.

The form of this result, and in particular the existence of the twenty-six sporadic groups, raises many questions. Subsequent work has focused on attempts to understand these groups, their maximal subgroups and automorphism groups. The study of maximal subgroups of the sporadic groups is very important to reveal the structure of the sporadic groups themselves.

A group G is called a 3-*transposition group* if it is generated by a conjugacy class D of involutions in G such that $o(de) \leq 3$ for all d and e in D. The conjugacy class D is called a class of conjugate 3-transpositions. *Bernd Fischer* in [28] introduced and investigated the 3-transposition groups. Fischer classified all finite 3-transposition groups with no non-trivial normal soluble subgroups. In the process of classifying the 3-transposition groups, Fischer discovered three new groups Fi_{22}, Fi_{23} and Fi_{24} with 3510, 31671 and 306936 transpositions respectively. Of these, the first two groups are simple, while the third contains a simple normal subgroup Fi_{24}' of index 2 (consisting of the products of evenly many transpositions). In recent years serval people have studied the classification problem by removing some or all of the Fischer conditions. For more information on 3-transposition groups, readers are encouraged to consult [3], [21], [28], [29], [76], [77] and many other relevant sources.

In [66] Linton and Wilson classified all the maximal subgroups of Fi_{24}' and its automorphism group Fi_{24}.

Theorem 1.0.1 *The simple group Fi_{24}' has exactly 25 conjugacy classes of maximal subgroups as follows:*

Fi_{23}	$2{\cdot}Fi_{22}{:}2$
$2_+^{1+12}{\cdot}3U_4(3).2_2$	$2^2{\cdot}U_6(2){:}S_3$
$(A_4 \times O_8^+(2){:}3){:}2$	$2^{3+12}.(L_3(2) \times A_6)$
$2^{6+8}.(S_3 \times A_8)$	$2^{11}{\cdot}M_{24}$
$(3 \times O_8^+(3){:}3){:}2$	$3_+^{1+10}{:}U_5(2){:}2$
$3^2.3^4.3^8.(A_5 \times 2A_4).2$	$(3^2{:}2 \times G_2(3)).2$
$3^3.[3^{10}].GL_3(3)$	$7{:}6 \times A_7$
$3^7{\cdot}O_7(3)$	$29{:}14$
$O_{10}^-(2)$	$He{:}2$ *(2 copies)*
$(A_5 \times A_9){:}2$	$U_3(3){:}2$ *(2 copies)*
$A_6 \times L_2(8){:}3$	$L_2(13){:}2$ *(2 copies)*

Proof. See [66]. □

Theorem 1.0.2 *Fi_{24} has exactly 21 conjugacy classes of maximal subgroups as follows:*

Fi_{24}'	$Fi_{23} \times 2$
$(2 \times 2{\cdot}Fi_{22}).2$	$2_+^{1+12}{\cdot}3U_4(3).(2^2)_122$
$(2 \times 2^2{\cdot}U_6(2)){:}S_3$	$(S_4 \times O_8^+(2){:}S_3)$
$2^{3+12}.(L_3(2) \times S_6)$	$2^{6+8}.(S_3 \times A_8)$
$2^{12}{\cdot}M_{24}$	$S_3 \times O_8^+(3){:}S_3$
$3_+^{1+10}{:}(2 \times U_5(2){:}2)$	$3^2.3^4.3^8.(S_5 \times 2S_4))$
$(S_3 \times S_3 \times G_2(3)).2$	$3^3.[3^{10}].(GL_3(3) \times 2)$
$3^7{\cdot}O_7(3){:}2$	$7{:}6 \times S_7$
$29{:}28$	$O_{10}^-(2){:}2$
$7_+^{1+2}{:}(6 \times S_3).2$	$S_5 \times S_9$
$S_6 \times L_2(8){:}3$	

Proof. See [66]. □

Since the classification of all finite simple groups, more recent work in group theory has involved methods of calculating character tables of maximal subgroups of finite simple groups. The character tables of the all maximal subgroups of simple groups have not yet been known. Most of these maximal subgroups are of extensions of elementary abelian groups, so methods have been developed for calculating the character tables of extensions of elementary abelian groups. A knowledge of character table of a group provides considerable information about the group, and hence it is of importance in the physical sciences as well as in pure mathematics. Character tables of finite groups can be constructed using various techniques. For example, the Schreier-Sims algorithm, Todd-Coxeter coset enumeration method, the Burnside-Dixon algorithm and various other techniques. However *Bernd Fischer* presented a powerful and interesting technique for calculating the character tables of group extensions. This technique, which is known as the technique of the *Fischer-Clifford* matrices, derives its fundamentals from the Clifford theory. If $\bar{G} = N.G$ is an appropriate extension of N by G, the method involves the construction of a nonsingular matrix for each conjugacy class of $\bar{G}/N$. In this dissertation, we apply the Fischer-Clifford theory to both split and non-split extensions. First we apply the technique to the split extensions $2^7{:}Sp_6(2)$ and $2^8{:}Sp_6(2)$ which are maximal subgroups of $Sp_8(2)$ and $2^8{:}O_8^+(2)$ respectively. This technique has also been discussed and used by many other researchers, but applied only to split extensions or to the case when every irreducible character of N can be extended to an irreducible character of its *inertia group* in $\bar{G}$. For example see Almestady [1], Darafsheh and Iranmanesh ([22], [23]), Fischer ([30], [32], [33]), List [68], List and Mohammed [69], Moori and Mpono ([81], [82], [83]), Mpono [88], Pahlings [92], Saleh [101], Schiffer [102] and Whitely [109].

However the same method can not be used to construct character tables of certain non-split group extensions. In particular, it can not be applied to the non-split extensions of the forms $3^7{\cdot}O_7(3)$ and $3^7{\cdot}(O_7(3){:}2)$ which are maximal subgroups of Fischer's largest sporadic simple group Fi_{24}' and its automorphism group Fi_{24} respectively. In an attempt to generalize these methods to such type of non-split group extensions, we need to consider the *projective representations* and characters. We have shown that how the technique of Fischer-Clifford matrices can be applied to any such type of non-split extensions. However in order to apply this technique, the projective characters of the *inertia factors* must be known and these can be difficult to determine for some groups. We successfully have applied the technique of Fischer-Clifford matrices and determined the Fischer-Clifford matrices and hence the character tables of the non-split extensions $3^7{\cdot}O_7(3)$ and $3^7{\cdot}(O_7(3){:}2)$.

In Chapter 2 we give some preliminary results on group extensions and group characters that will be required in the subsequent chapters. In Section 2.1 we define group extensions and discuss some basic results. In Section 2.2 we discuss the conjugacy classes of group extensions. We briefly discuss the technique of *coset analysis* for computing the conjugacy classes of group extension $\bar{G}$ of N by G where N is an abelian normal subgroup of $\bar{G}$. This technique was developed and first used by Moori in [72], [73] and has since been widely used for computing the conjugacy classes of group extensions. We also develop two programmes in MAGMA [10] which we call Programmes A and B. These are analogues to the programmes developed by Mpono in [88] for CAYLEY [15], which have been applied to compute the conjugacy classes of the groups $2^7{:}Sp_6(2)$ and $2^8{:}Sp_6(2)$ that have been studied in this dissertation in Chapters 6 and 7 respectively. In Section 2.3 we present some basic theory on group representations and characters of groups. In Section 2.4 we are concerned with the relationship between characters of G and the characters of a subgroup H of G. We first discuss restriction of characters and then we go on to study induced characters. In Section 2.5 we shall discuss permutation characters. For further readings on group extensions, representations and characters of groups, readers are encouraged to consult [2], [4], [7], [8], [11], [17], [18], [26], [44], [50], [54], [55], [56], [57], [65], [67], [89], [94], [99], [107], [108].

In Chapter 3 we discuss the projective representations and projective characters. Since the first step in obtaining the projective representations of a group G is to compute its *Schur multiplier*, We have therefore devoted Section 3.1 to the study of Schur multipliers. In Section 3.2 we shall concentrate on the projective representations of G. We proved that for a projective representation P with factor set α of degree n, the $o([\alpha])$ divides n. We showed that how projective representations of G can be obtained from the ordinary representations of a so called representation group of G. We also discuss that how projective representations of a group G can be constructed using three different approaches. In Section 3.3 we study projective characters of G. For further readings on projective representations and projective characters readers are referred to [8], [43], [45], [49], [52], [54], [60], [84], [85], [86], [87], [89], [96], [97], [98].

Chapter 4 is devoted to the study of Clifford theory for ordinary and projective representations of a group $\bar{G}$ and its related consequences which will be required to describe the Fischer-Clifford matrices in the next chapter. In Section 4.1 we study the relationship between characters of a group $\bar{G}$ and its normal subgroup N. We present various sufficient conditions for the extendibility of an irreducible character θ of N to its inertia group $\bar{H}$ in $\bar{G}$. In Section 4.2 we study the Clifford theory for projective representations. We give a result which shows that how it is always possible to extend θ to a projective character of $\bar{H}$ in $\bar{G}$. In Section 4.3 we discuss the number of irreducible constituents of induced characters and the number of conjugacy classes of $\bar{G}$. We study a result from [36] which asserts that if χ is a $\bar{G}$-invariant irreducible character of a normal subgroup N of $\bar{G}$, then the number of distinct irreducible constituents of $\chi^{\bar{G}}$ is equal to the number of χ-regular conjugacy classes of $\bar{G}/N$. We also state a result from [36] that the number of irreducible constituents of $\chi^{\bar{G}}$ is equal to the number of conjugacy classes of $\bar{G}/N$ if and only if χ extends to a character of each subgroup $N{<}x,y{>}$ of $\bar{G}$ with $[x,y] \in N$. For more information on Clifford theory and its related consequences reader are encouraged to consults [8], [36], [52], [54], [60], [61], [89].

In Chapter 5 we describe the theory of the Fischer-Clifford matrices. If $\bar{G} = N.G$ is an appropriate group extension of N by G, the technique involves the construction of a non-singular matrix for each conjugacy class of $\bar{G}/N \cong G$. Then by using these matrices together with the fusion maps and character tables of some subgroups of G which are inertia factors of the inertia groups in $\bar{G}$, we are able to construct the complete character table of $\bar{G}$. In this dissertation we apply this technique to both split and non-split group extensions. This technique has been discussed and used (mainly to split extensions) in Almestady [1], Darafsheh and Iranmanesh ([22], [23]), Fischer ([30], [31], [32]), [33], List [68], List and Mohammed [69], Moori and Mpono ([81], [82], [83]), Mpono [88], Pahlings [92], Saleh [101], Schiffer [102] and Whitely [109]. In Section 5.1 we define Fischer-Clifford matrices in general. Subsection 5.1.1 deals with the properties of the Fischer-Clifford matrices which are helpful in their computations. In Subsection 5.1.2 we study a special case of Fischer-Clifford matrices of an extension $\bar{G} = N.G$ with the property that every irreducible character of N can be extended to an irreducible character of its inertia group in $\bar{G}$. In Section 5.2 we study the split cosets and we prove that if the extension splits then every coset is a split coset. In Section 5.3 we are concerned with non-split extensions and in Section 5.4 we discuss how the Fischer-Clifford matrices can be constructed using GAP [103]. We also develop a programme to determine the column weights of a coset. In Section 5.5 we give an example of the non-split extension $2^6{\cdot}U_4(2)$, which is maximal subgroup of the Harda-Norton group HN. We show that how the technique of Fischer-Clifford matrices can be applied to determine the Fischer-Clifford matrices and the conjugacy classes of $2^6{\cdot}U_4(2)$. We also show how the complete character table of $2^6{\cdot}U_4(2)$ can be computed using the Fischer-Clifford matrices.

The subgroups of the symplectic groups which fix a non-zero vector of the underlying symplectic space are called *affine subgroups.* In Chapter 6 we shall study the group $A(4) \cong 2^7{:}Sp_6(2)$, as an affine subgroup of $Sp_8(2)$ of index 255. We construct the character table of $A(4)$ using the technique of Fischer-Clifford matrices. We use the properties of the Fischer-Clifford matrices which are discussed in Subsection 5.1.1 and Section 5.2 of Chapter 5 to compute their entries. Sections 6.1 and 6.2 deal with symplectic groups and their affine subgroups respectively. In Section 6.3 we construct the affine subgroup $A(4)$ as the stabilizer of e_1 in $Sp_8(2)$, where $e_1 = (1,0,0,0,0,0,0,0)$. Sections 6.4, 6.5 and 6.6 deal with conjugacy classes of $A(4)$, the inertia groups of $A(4)$ and the fusion of inertia factors into $Sp_6(2)$ respectively. In Section 6.7 we determine the Fischer-Clifford matrices of $A(4)$. For each conjugacy class $[g]$ of $Sp_6(2)$ with representative $g \in Sp_6(2)$ we construct the corresponding Fischer-Clifford matrix $M(g)$. In Section 6.8 we obtain the fusion map of $A(4)$ into $Sp_8(2)$.

In Chapter 7 we are dealing with the group $2^8{:}Sp_6(2)$, which sits maximally inside the group $2^8{:}O_8^+(2)$. Let $\bar{G} = 2^8{:}Sp_6(2)$ be the split extension of $N = 2^8$ by $G = Sp_6(2)$, where N is the vector space of dimension 8 over $GF(2)$ on which G acts irreducibly. We determine the Fischer-Clifford matrices and hence construct its character table. The complete fusion of $\bar{G}$ into $2^8{:}O_8^+(2)$ will be fully determined.

In Chapter 8 we study a maximal subgroup of the largest sporadic simple Fischer group Fi'_{24}. From the work of Wilson [111], we obtain that there are six classes of maximal 3-local subgroups of Fi'_{24}. In this chapter we determine the Fischer-Clifford matrices and conjugacy classes of one of these maximal 3-local subgroups, namely the subgroup $3^7{\cdot}O_7(3)$ of index 125168046080. Let $\bar{G} = 3^7{\cdot}O_7(3)$ be the non-split extension of $N = 3^7$ by $G = O_7(3)$ where N is the vector space of dimension 7 over $GF(3)$ on which G acts naturally. We apply the technique of Fischer-Clifford matrices which was developed in Chapter 5 to determine the Fischer-Clifford matrices and conjugacy classes of $3^7{\cdot}O_7(3)$. In Section 8.1 we discuss the action of G on N and Section 8.2 deals with the inertia groups of $\bar{G}$. We also compute the projective characters of one of the inertia factors corresponding to the factor set α of order 3, which will be required in Section 8.4. The fusions of the inertia factors into G are obtained in Section 8.3. In Section 8.4 we determine the Fischer-Clifford matrices and the conjugacy classes of $3^7{\cdot}O_7(3)$.

Finally in Chapter 9 we study a maximal subgroup of the largest 3-transposition sporadic Fischer group Fi_{24}. The character tables of the maximal subgroups of Fi_{24} are not yet known. It was proved in [64] that there exists at most one non-split extension of $O_7(3)$ by its natural module. Recently Kitazume in [62] using Moufang loop constructed the non-split extension $3^7{\cdot}(O_7(3){:}2)$ and from [40] we deduce that such a group is realized as a maximal subgroup of the Fischer group Fi_{24}. In this chapter we construct the character table of the the non-split extension $3^7{\cdot}(O_7(3){:}2)$ which is a maximal 3-local subgroup of Fi_{24} of index 125168046080. Let $\bar{G} = N{\cdot}G$ be the non-split extension of $N = 3^7$ by $G = O_7(3){:}2$, where N is the vector space of dimension 7 over $GF(3)$ on which G acts naturally. We apply the technique of Fischer-Clifford matrices to construct the character table of $\bar{G}$. We use the properties of Fischer-Clifford matrices given in Subsection 5.1.1, Sections 5.2, 5.3 and 5.4 to compute the entries of the Fischer-Clifford matrices of $\bar{G}$. The fusion of $\bar{G}$ to Fi_{24} together with the restriction of characters of Fi_{24} to $\bar{G}$ forces the signs of the Fischer-Clifford matrices and orders of the elements of the conjugacy classes of $\bar{G}$. In Section 9.1 we study the action of $O_7(3){:}2$ on N. In Sections 9.2 and 9.3 we are concerned with the inertia groups of $\bar{G}$ and the fusions of inertia factors into $O_7(3){:}2$. In Section 9.4 we determine the Fischer-Clifford matrices and conjugacy classes of $\bar{G}$. The Fischer-Clifford matrices and conjugacy classes of $\bar{G}$ are given in Tables 9.6 and 9.7 in Chapter 9. Finally in Section 9.8 we discuss the fusions of $\bar{G}$ into Fi_{24}. However the fusion map of $3^7{\cdot}O_7(3)$ into $\bar{G}$ will be crucial in determining the fusion map of $\bar{G}$ into Fi_{24}. This will help to determine those classes of the elements of $\bar{G}$ that fuse into Fi'_{24}. Those conjugacy classes of elements of $\bar{G}$ which contain classes of $3^7{\cdot}O_7(3)$ will fuse into Fi'_{24} and others will fuse into $Fi_{24} - Fi'_{24}$. The fusion map of $\bar{G}$ into Fi_{24} will be fully determined.

For notation on the conjugacy classes of elements and permutation characters, we follow the notation used in the ATLAS [19] and the ATLAS of Brauer Characters [58]. All our groups and sets are finite unless otherwise specified. All the computations were carried out with the aid of MAGMA [10], GAP Version 3.5 [103] and GAP Version 4.2 [104] running on a SUN GX2 computer. Programmes A for $2^7{:}Sp_6(2)$ and $2^8{:}Sp_6(2)$, that have been used to compute the conjugacy classes of of these groups, will be given in the Appendix A. In Appendix B we give the character tables of the groups $3^5{:}U_4(2){:}2$ and $L_4(3){:}2$, listed in Tables 1 and 2 respectively, which we used in Chapter 9 to compute the character table of the non-split extension $3^7{:}(O_7(3){:}2)$. All the character tables computed in this thesis have been accepted for incorporation into GAP. The character table of $2^8{:}Sp_6(2)$ has already been incorporated into GAP Version 4.2 while the other character tables will be available in the latest versions. The consistency and accuracy of these character tables have been verified by the GAP team at Aachen.

Chapter 2

Preliminaries

In this chapter we give preliminary results on group extensions and group characters that will be required in later chapters. In Section 2.1 we present definitions and some basic results on group extensions. In Section 2.2 we discuss the conjugacy classes of elements of group extensions. We describe the technique of *coset analysis* for computing the conjugacy classes of group extension $\bar{G}$ of N by G where N is an abelian normal subgroup of $\bar{G}$. This technique was developed and first used by Moori in [72], [73] and has since been widely used for computing the conjugacy classes of group extensions in all cases where it is applicable. For example, it has been used in Saleh [101], Mpono [88] and Whitely [109]. We also develop two MAGMA Programmes A and B (analogous to the programmes developed by Mpono [88] for CAYLEY) to compute the conjugacy classes and the orders of the class representatives for the split extensions $\bar{G} = N{:}G$ where N is an elementary abelian p-group. We used these programmes to compute the conjugacy classes of the group extensions $2^7{:}Sp_6(2)$ and $2^8{:}Sp_6(2)$ which will be studied in Chapters 6 and 7 respectively. In Section 2.3 we present some theory on representations and characters of groups by concentrating on those results which would be useful in later chapters. Section 2.4 deals with the relationship between the characters of a group G and the characters of a subgroup H of G. In this section we will first study restriction of characters and then go on to study induced characters. Finally in Section 2.5 we give some results on permutation characters. For further information and readings on group extensions, group representations and group characters readers are encouraged to consult [2], [4], [7], [8], [11], [17], [18], [26], [44], [50], [54], [55], [56], [57], [65], [67], [89], [94], [99], [107], [108] and many other relevant sources.

2.1 Group Extensions

Definition 2.1.1 *Let N and G be groups. An* extension *of N by G is a group $\bar{G}$ that satisfies the following properties* *(i)* $N \trianglelefteq \bar{G}$,

(ii) $\bar{G}/N \cong G$.

We say that $\bar{G}$ *is a* split extension *of* N *by* G *if* $\bar{G}$ *contains subgroups* N *and* G_1 *with* $G_1 \cong G$ *such that*

(i) $N \trianglelefteq \bar{G}$,

(ii) $NG_1 = \bar{G}$,

(iii) $N \cap G_1 = \{1_{\bar{G}}\}$.

In this case $\bar{G}$ *is also called a* semi-direct product *of* N *and* G, *and identify* G_1 *and* G.

Following ATLAS [19], we denote an arbitrary extension of N by G by $N.G$. A split extension is denoted by $N{:}G$ and a case of $N.G$ that is not split is denoted by $N{\cdot}G$.

Definition 2.1.2 *The* automorphism group *of a group* G, *denoted by* $Aut(G)$, *is the set of all automorphisms of* G *under the binary operation of composition.*

For $\bar{G}$ a semidirect product of N by G, then every element in $\bar{G}$ can be expressed uniquely in the form ng, where $n \in N$ and $g \in G$ and the multiplication of elements of $\bar{G}$ is given by

$$(n_1g_1)(n_2g_2) = n_1n_2^{g_1}g_1g_2 \quad ,$$

where $n^g = gng^{-1}$. Also there is a homomorphism $\theta : G \longrightarrow Aut(N)$ given by $\theta(g) = \theta_g$, where $g \in G$, $\theta_g : N \longrightarrow N$ is defined by $\theta_g(n) = gng^{-1}$ and θ_g is an automorphism of N. Hence G acts on N.

Definition 2.1.3 *Let* $\bar{G}$, N *and* G *be as defined above and* $\theta : G \longrightarrow Aut(N)$. *Then the semidirect product* $\bar{G}$ *of* N *by* G *is said to realize* θ *if* $\theta_g(n) = n^g \ \forall\, n \in N, g \in G$.

Remark 2.1.4 For $\bar{G}$ a semidirect product of N by G, then $\bar{G}$ is isomorphic to a semidirect product of N by G that realizes θ for some $\theta : G \longrightarrow Aut(N)$.

If $\bar{G}$ is a split extension of N by G, then $\bar{G} = NG = \bigcup_{g\in G} Ng$ so G may be regarded as a right transversal for N in $\bar{G}$ (that is, a complete set of right coset representatives of N in $\bar{G}$). Now suppose $\bar{G}$ is any extension of N by G, not necessarily split, then since $\bar{G}/N \cong G$, there is an onto homomorphism $\lambda : \bar{G} \longrightarrow G$ with kernel N. For $g \in G$ define a lifting of g to be an element $\bar{g} \in \bar{G}$ such that $\lambda(\bar{g}) = g$. Then choosing a lifting of each element of G, we get the set $\{\bar{g} : g \in G\}$ which is a transversal for N in $\bar{G}$.

We now show that even for a non-split extension of N by G, if N is abelian , G acts on N.

Lemma 2.1.5 *([88],[100],[109]) Let $\bar{G}$ be an extension of N by G where N is abelian. Then there is a homomorphism $\theta : G \longrightarrow Aut(N)$ such that $\theta_g(n) = \bar{g}n(\bar{g})^{-1}, n \in N$ and θ is independent of the choice of liftings $\{\bar{g} \ : \ g \in G\}$.*

Proof. Let $a \in \bar{G}$ and γ_a denote conjugation by a. Since N is a normal subgroup of $\bar{G}$, $(\gamma_a)_N \ \in Aut(N)$ and the function $\mu : \bar{G} \longrightarrow Aut(N)$ defined by $\mu(a) = (\gamma_a)_N$ is a homomorphism. If $a \in N$, then since N is abelian we have $\mu(a) = I_N$. Thus there is a homomorphism $\mu^* : \bar{G}/N \longrightarrow Aut(N)$ which is given by $\mu^*(Na) = \mu(a)$. However $G \cong \bar{G}/N$ and for any lifting $\{\bar{g} \ : \ g \in G\}$, the function $\phi : G \longrightarrow \bar{G}/N$ defined by $\phi(g) = N\bar{g}$ is an isomorphism. If $\{\bar{g}_1 \ : \ g \in G\}$ is another choice of liftings, then $\bar{g}\,\bar{g}_1^{-1} \in N$ for every $g \in G$ and thus $N\bar{g} = N\bar{g}_1$. Therefore the isomorphism ϕ is independent of the choice of liftings. Let $\theta : G \longrightarrow Aut(N)$ be the composition $\mu^* \circ \phi$. For $g \in G$ and $\bar{g}$ a lifting of g, then $\theta(g) = \mu^*(\phi(g)) = \mu^*(N\bar{g}) = \mu(\bar{g}) \in Aut(N)$ and thus for $n \in N$, we have $\theta_g(n) = \mu(\bar{g})(n) = \bar{g}n(\bar{g})^{-1}$. Hence the result. □

Remark 2.1.6 *[109]* Let $\bar{G}$ be an extension of N by G where N is abelian and for each $g \in G$ let $\bar{g}$ be a lifting of g. We identify G with $\bar{G}/N$ under the isomorphism $g \longmapsto N\bar{g}$. Thus $\{\bar{g} \mid g \in G\}$ is a right transversal for N in $\bar{G}$ and thus every $x \in \bar{G}$ has a unique expression of the form $x = n\bar{g}$ where $n \in N$ and $g \in G$.

2.2 Conjugacy Classes of Group Extensions

In this section we discuss the technique of *coset analysis* to determine the conjugacy classes of group extensions but first we state the following two relevant results.

Theorem 2.2.1 *Let G be a finite group*

(i) Suppose that C_1 and C_2 are two conjugacy classes of G such that $C_1 \neq [1_G]$ and $C_1^n = C_2$ for some integer $n \geq 2$, where

$$C_1^n = \{x_1x_2\cdots x_n \mid x_i \in C_1, \ 1 \leq i \leq n\} \ .$$

Then there exists some normal subgroup N of G and $g \in G - N$ such that C_1 is the coset Ng and the map $x \mapsto x^n$ is a bijection from C_1 onto C_2.

(ii) If G has a normal subgroup N and $g \in G - N$ such that the coset Ng is a single conjugacy class of G, and such that for some $n \in \mathbb{Z}$ the map $x \longmapsto x^n$ for $x \in Ng$ is a monomorphism, then Ng^n is a conjugacy class of G and $(Ng)^n = Ng^n$.

Proof. See [9]. □

Proposition 2.2.2 *Let $\bar{G} = N.G$, $\bar{g} \in \bar{G}$ a lifting of $g \in G$, C be the centralizer of $N\bar{g}$ in G and $\bar{C}$ be the complete preimage in $\bar{G}$ of C. Then*

(i) the union of the cosets $N\bar{x}$ which are conjugate in G to $N\bar{g}$, is the union of the conjugacy classes $L_1, L_2, \ldots, L_r$ of $\bar{G}$,

(ii) $\bar{C}$ acts on the coset $N\bar{g}$ by conjugation,

(iii) $\bar{C}$ has r orbits in its action on $N\bar{g}$ and the orbit representatives $\bar{g}_1, \bar{g}_2, \ldots, \bar{g}_r$ are representatives of the conjugacy classes $L_1, L_2, \ldots, L_r$ of $\bar{G}$,

(iv) the centralizer $C_{\bar{G}}(\bar{g}_i)$ for $1 \leq i \leq r$ is the stabilizer of $\bar{g}_i$ in $\bar{C}$ in its action on $N\bar{g}$.

Proof. See [13]. □

We now briefly discuss the technique of *coset analysis* to determine the conjugacy classes of elements of group extensions $\bar{G} = N.G$ where N is an abelian normal subgroup of $\bar{G}$. For detailed information about this technique we encourage readers to consult Moori [72], [73] and Mpono [88].

For each conjugacy class $[g]$ in G with representative $g \in G$, we analyse the coset $N\bar{g}$, where $\bar{g}$ is a lifting of g in $\bar{G}$ and

$$\bar{G} = \bigcup_{g \in G} N\bar{g} \quad .$$

To each class representative $g \in G$ with lifting $\bar{g} \in \bar{G}$, we define

$$C_{\bar{g}} = \{x \in \bar{G} \ : \ x(N\bar{g}) = (N\bar{g})x\} \quad .$$

Then $C_{\bar{g}}$ is the stabilizer of $N\bar{g}$ in $\bar{G}$ under the action by conjugation of $\bar{G}$ on $N\bar{g}$, and hence $C_{\bar{g}}$ is a subgroup of $\bar{G}$.

Remark 2.2.3 It is not difficult to see that N is a normal subgroup of $C_{\bar{g}}$.

Lemma 2.2.4 *[109] $C_{\bar{g}}/N = C_{\bar{G}/N}(N\bar{g})$.*

Proof. Consider Nk, where $k \in \bar{G}$. Then

$$\begin{aligned}
Nk \in C_{\bar{G}/N}(N\bar{g}) &\Leftrightarrow Nk(N\bar{g})(Nk)^{-1} = N\bar{g} \\
&\Leftrightarrow NkN\bar{g}Nk^{-1} = N\bar{g} \\
&\Leftrightarrow NkN\bar{g}k^{-1} = N\bar{g} \\
&\Leftrightarrow NkNn\bar{g}k^{-1} = N\bar{g} \ \forall n \in N \\
&\Leftrightarrow Nkn\bar{g}k^{-1} = N\bar{g} \ , \forall n \in N \\
&\Leftrightarrow kn\bar{g}k^{-1} \in N\bar{g} \ , \forall n \in N \\
&\Leftrightarrow k \in C_{\bar{g}} \\
&\Leftrightarrow Nk \in C_{\bar{g}}/N \ .
\end{aligned}$$

Thus we obtain that $C_{\bar{g}}/N = C_{\bar{G}/N}(N\bar{g})$. □

Remark 2.2.5 Using Remark 2.3.4 and Lemma 2.3.5 we deduce that $C_{\bar{g}} = N.C_{\bar{G}/N}(N\bar{g})$. For $\bar{g}$ a lifting of $g \in G$ in $\bar{G}$, we can identify $C_{\bar{G}/N}(N\bar{g})$ with $C_G(g)$ and write $C_{\bar{g}} = N.C_G(g)$ in general. If $\bar{G} = N{:}G$ then we can identify $C_{\bar{g}}$ with $C_g = \{x \in \bar{G} \ : \ x(Ng) = (Ng)x\}$, where the lifting of g in $\bar{G}$ is g itself since $G \leq \overline{G}$ in the case of a split extension.

Corollary 2.2.6 *If $\bar{G} = N{:}G$, then $C_g = N{:}C_G(g)$.*

Proof. We have that N is a normal subgroup of C_g. Now we show that $C_G(g) \leq C_g$ and that $N \cap C_G(g) = \{1\}$. Let $x \in C_G(g)$. Then we obtain $(Ng)^x = x(Ng)x^{-1} = xNgx^{-1} = Nxgx^{-1} = Ng$. Thus $x \in C_g$ and hence $C_G(g) \leq C_g$. Since $N \cap C_G(g) \leq N \cap G = \{1_G\}$, then we have that $N \cap C_G(g) = \{1_G\}$. Hence the result. □

The conjugacy classes of $\bar{G}$ (where N is abelian) will be determined by the action by conjugation of $C_{\bar{g}}$, for each conjugacy class $[g]$ of G, on the elements of $N\bar{g}$. To act $C_{\bar{g}}$ on the elements of $N\bar{g}$, we first act N and then act $\{\bar{h} \ : \ h \in C_G(g)\}$, where $\bar{h}$ is a lifting of h in $\overline{G}$. We outline this action in two steps as follows:

STEP 1: *The action of N on $N\bar{g}$*: Let $C_N(\bar{g})$ be the stabilizer of $\bar{g}$ in N. Then for any $n \in N$ we have $x \in C_N(n\bar{g}) \Leftrightarrow x \in C_N(\bar{g})$. Thus $C_N(\overline{g})$ fixes every element of $N\bar{g}$. Now let $|C_N(\bar{g})| = k$. Then under the action of N, $N\bar{g}$ splits into k orbits $Q_1, Q_2, \ldots, Q_k$, where

$$|Q_i| = [N : C_N(\bar{g})] = \frac{|N|}{k} \ ,$$

for $i \in \{1, 2, \ldots, k\}$.

STEP 2: *The action of $\{\bar{h} \mid h \in C_G(g)\}$ on $N\bar{g}$*: Since the elements of $N\bar{g}$ are now in the orbits $Q_1, Q_2, \ldots, Q_k$ from Step 1 above, we need only act $\{\bar{h} \mid h \in C_G(g)\}$ on these k orbits. Suppose that under this action f_j of these orbits $Q_1, Q_2, \ldots, Q_k$ fuse together to form one orbit Δ_j, then the f_j's obtained this way must satisfy

$$\sum_j f_j = k$$

and we have

$$|\Delta_j| = f_j \times \frac{|N|}{k} \ .$$

Thus for $x = d_j\overline{g} \in \Delta_j$, we obtain that

$$|[x]_{\bar{G}}| = |\Delta_j| \times |[g]_G| = f_j \times \frac{|\overline{G}|}{k|C_G(g)|}$$

and thus we obtain that

$$|C_{\bar{G}}(x)| = \frac{|\bar{G}|}{|[x]_{\bar{G}}|} = |\bar{G}| \times \frac{k|C_G(g)|}{f_j|\bar{G}|} = \frac{k|C_G(g)|}{f_j} \ .$$

Thus to calculate the conjugacy classes of $\overline{G} = N.G$, we need to find the values of k and the f_j's for each class representative $g \in G$.

Remark 2.2.7 However in the case of $\bar{G} = N{:}G$ a split extension, we analyse the coset Ng instead of $N\bar{g}$ since in this case $G \leq \bar{G}$. Under the action of N on Ng, we always assume that $g \in Q_1$. Also instead of acting $\{\bar{h} \ : \ h \in C_G(g)\}$ on the k orbits $Q_1, Q_2, \ldots, Q_k$ we just act $C_G(g)$ on these orbits. Since $g \in Q_1$, then $C_G(g)$ always fixes Q_1 and thus we will always have $f_1 = 1$. Hence

$$k = \sum_j f_j = 1 + \sum_m f_m \quad ,$$

where the sum is taken over all m such that $g \notin Q_m$.

We now prove and discuss techniques that are useful in the determination of the orders of the elements of $\bar{G} = N{:}G$.

Theorem 2.2.8 *Let $\bar{G} = N{:}G$ and $dg \in \bar{G}$ where $d \in N$ and $g \in G$ such that $o(g) = m$ and $o(dg) = k$. Then m divides k.*

Proof. We have that

$$1_{\bar{G}} = (dg)^k = dd^g d^{g^2} d^{g^3} \ldots d^{g^{k-1}} g^k \quad .$$

Since G acts on N and $d \in N$, we have $d, d^g, d^{g^2}, \ldots, d^{g^{k-1}} \in N$. Hence $dd^g d^{g^2} \ldots d^{g^{k-1}} \in N$. Thus we must have that $dd^g d^{g^2} \ldots d^{g^{k-1}} = 1_N$ and $g^k = 1_G$. Hence m divides k. □

Theorem 2.2.9 *Let $\bar{G} = N{:}G$ such that N is an elementary abelian p-group, where p is prime. Let $dg \in \overline{G}$ where $d \in N$ and $g \in G$ such that $o(g) = m$ and $o(dg) = k$. Then either $k = m$ or $k = pm$.*

Proof. See [88]. □

Remark 2.2.10 Let $\bar{G} = N{:}G$, where N is an elementary abelian p-group. Let $dg \in \bar{G}$ with $d \in N$, $g \in G$ such that $o(g) = m$ and $o(dg) = k$, then we observe that

$$(dg)^m = d.d^g.d^{g^2}.\ldots.d^{g^{m-1}} g^m \quad .$$

Since $g^m = 1_G$, we obtain that $(dg)^m = w$, where $w \in N$ and it is given by

$$w = d.d^g.\ldots.d^{g^{m-1}} \quad .$$

By Theorem 2.2.9 above, we have that if $w = 1_N$ then $k = m$ and if $w \neq 1_N$ then $k = pm$.

We have used the method of coset analysis discussed above (outlined in Steps 1 and 2) together with Theorems 2.2.8 and 2.2.9 and Remark 2.2.10 in developing Programmes A and B in MAGMA [10] (analogous to the programmes developed by Mpono [88] for CAYLEY) which are applied for the computation of conjugacy classes and the orders of the class representatives of the extension $\bar{G} = N{:}G$ where N is an elementary abelian p-group for prime p on which a linear group G acts.

PROGRAMME A

```
V := vectorSpace(FiniteField(q), n);
S < g1, g2 >:= MatrixGroup < n, FiniteField(GF(2)) | generators >;
c := classes(S);
O_0 := Orbit(S, elt < V | α_1, ..., α_n >);
O_1 := Orbit(S, elt < V | β_1, ..., β_n >);
⋮
O_k' := Orbit(S, elt < V | δ_1, ..., δ_n >);
O := O_0 join O_1 join O_2 join ... join O_k';
for i := 1 to n(c) do;
print c[i, 1];
w := elt < V | 0_1, 0_2, ..., 0_n >;
e := { };
while(O diff e) ne { } do
d := { }
for x in O do;
y := {x + w + (x * c[i, 3])};
d := d join y;
end for;
print d;
e := d join e;
if(O diff e) ne { } then
w = Representative( O diff e );
end if;
end while;
r := { };
u := elt < V | 0, 0, ..., 0 >;
while(O diff r) ne { } do;
m := { };
for g in Centralizer(S, c[i, 3]) do
l := {u * g};
m = m join l;
```

```
end for;
print 'A block for the vectors under the action of centralizer :';
print m;
r := m join r;
if (O diff r) ne { } then
u := Representative(O diff r);
end if;
end while;
print '*********************************';
end for;
```

PROGRAMME B

```
V := vectorSpace(FiniteField(q), n);
S < g1, g2 >:= MatrixGroup(n, FiniteField(q) | generators);
c := classes(S);
g = c[i, 1];
d = elt < V |α1, ..., αn);
w = d + d * g + d * (g^2) + d * (g^3) + ... + d * (g^(m-1));
print w;
```

In Programme B we have $o(g) = m$ and $g \in S$ is a class representative, for $1 \leq j \leq n, \alpha_j \in GF(q)$, $d * g = d^g$, and $+$ signifies the operation in V and $dg \in \overline{G}$ is a class representative from the coset Ng.

2.3 Representations and Characters

In this section we give some preliminary results on representations and characters of groups which will be needed in later chapters.

Definition 2.3.1 *Let G be a group, $\mathbb{F}$ a field and $GL(n, \mathbb{F})$ the general linear group which is the multiplicative group of all nonsingular $n \times n$ matrices over F for some integer n. Then a homomorphism $\rho : G \longrightarrow GL(n, \mathbb{F})$ is called a representation of G over $\mathbb{F}$ or simply an $\mathbb{F}$-representation. The representation ρ is said to have degree n. The function $\chi : G \longrightarrow \mathbb{F}$ given by $\chi(g) = trace(\rho(g))$ is called the $\mathbb{F}$-character of G afforded by the F-representation ρ. The degree of χ is the same as that of ρ.*

Two $\mathbb{F}$-representations ρ_1 and ρ_2 of G are said to be *equivalent* if there exists $P \in GL(n, \mathbb{F})$ such that $\rho_1(g) = P\rho_2(g)P^{-1}$ for all $g \in G$. An $\mathbb{F}$-representation ρ of G is said to be *reducible* if it is equivalent to a representation α which is given by

$$\alpha(g) = \begin{pmatrix} \beta(g) & \gamma(g) \\ 0 & \delta(g) \end{pmatrix}$$

for all $g \in G$, where β, γ, δ are $\mathbb{F}$-representations of G. If ρ is not reducible, then it is said to be *irreducible*. Since similar matrices have the same trace, then it follows that equivalent representations afford the same character. The character afforded by an irreducible representation is called an *irreducible* character. Sums and products of characters are themselves characters.

We now give a celebrated result of Schur [105] which provides an assessable approach to group characters.

Theorem 2.3.2 *(**Schur's Lemma**) Let $\rho_1 : G \longrightarrow GL(n, \mathbb{F})$ and $\rho_2 : G \longrightarrow GL(m, \mathbb{F})$ be two irreducible representations of a group G over a field $\mathbb{F}$. Assume that there exists a matrix P such that $P\rho_1(g) = \rho_2(g)P$ for all $g \in G$. Then either P is the zero matrix or P is nonsingular so that $\rho_1(g) = P^{-1}\rho_2(g)P$.*

Proof. See Theorem 1.8 of [80]. □

Corollary 2.3.3 *[80] If $\rho : G \longrightarrow GL(n, \mathbb{F})$ is an irreducible representation of a group G over an algebraically closed field $\mathbb{F}$, then the only matrices which commute with all matrices $\rho(g)$, $g \in G$ are scalar matrices aI_n, where $a \in \mathbb{F}$ and I_n is the $n \times n$ identity matrix.*

Proof. Let P be an $n \times n$ matrix such that $P\rho(g) = \rho(g)P$ for all $g \in G$. Then for any $a \in F$ we have that

$$(aI_n - P)\cdot\rho(g) = \rho(g)\cdot(aI_n - P), \ \forall g \in G \ . \quad (1)$$

Let $m(x) = det(xI_n - P)$ be the characteristic polynomial of P. Since $m(x)$ is a polynomial over F and F is algebraically closed, then there exists $a_1 \in F$ such that $m(a_1) = 0_F$. Hence $det(a_1I_n - P) = 0_F$ and thus $a_1I_n - P$ is singular. Then from relation (1) above and Schur's Lemma, we obtain that $a_1I_n - P = 0$ and hence $a_1I_n = P$. □

Definition 2.3.4 *Let G be a group, $\mathbb{F}$ a field and $\phi : G \longrightarrow \mathbb{F}$ be a function which is constant on conjugacy classes of G. Then ϕ is called a class function of G.*

From the above definition, we observe that every character is a class function. From now on, we will consider representations and characters of a finite group G over the complex field $\mathbb{C}$. We shall use the notation $Irr(G)$ to denote the set of all irreducible characters of the group G. These irreducible characters are presented in a table, called the *character table* of G. In this table, the columns correspond to the conjugacy classes of G and the rows to the irreducible characters, with entry a_{ij} being the value of the i-th irreducible character on an element of the j-th conjugacy class.

We can show that every class function ϕ of G can be uniquely expressed in the form $\phi = \sum_{\chi \in Irr(G)} b_\chi \chi$, where $b_\chi \in \mathbb{C}$. Moreover ϕ is a character if and only if all $b_\chi \in \mathbb{N} \cup \{0\}$ and $\phi \neq 0$. We can also show that the following properties hold:

(i) Two representations of G have the same character if and only if they are equivalent.

(ii) The number of irreducible characters of G is equal to the number of conjugacy classes of elements of G.

(iii) Any character of G can be written as a sum of irreducible characters.

Definition 2.3.5 *Let G be a group, χ be a character of G and $Irr(G) = \{\chi_1, \chi_2, \dots, \chi_r\}$ such that $\chi = \sum_{i=1}^{r} n_i \chi_i$, where $n_i \in \mathbb{N} \cup \{0\}$. Then those χ_i for which $n_i > 0$ are called the irreducible constituents of χ. In general, if ψ is a character of G such that $\chi - \psi$ is a character or is zero, then ψ is a constituent of χ.*

Orthogonality relations for characters are the cornerstone of character theory. Among other applications, they allow us to express an arbitrary class function in terms of irreducible characters and to determine instantanously whether or not a given character is irreducible.

Theorem 2.3.6 *(**Generalized Orthogonality Relation**) Let G be a group and $Irr(G) = \{\chi_1, \chi_2, \dots, \chi_r\}$. Then the following holds for every $h \in G$:*

$$\frac{1}{|G|} \sum_{g \in G} \chi_i(gh)\chi_j(g^{-1}) = \delta_{ij} \frac{\chi_i(h)}{\chi_i(1_G)} \quad .$$

Proof. See Theorem 2.13 of [54]. □

Theorem 2.3.7 *Let χ be a character of G afforded by a representation ρ of degree n. Then for $g \in G$, $\rho(g)$ is similar to a diagonal matrix $diag(\varepsilon_1, \varepsilon_2, \dots, \varepsilon_r)$ where each ε_i is a complex root of unity. Then $\chi(g) = \sum_i^r \varepsilon_i$ and $\chi(g^{-1}) = \overline{\chi(g)}$, where $\overline{\chi(g)}$ is the complex conjugation of $\chi(g)$.*

Proof. This is the Lemma 2.15 in [54]. □

Definition 2.3.8 *Let χ and ψ be class functions of a group G. Then the inner product of χ and ψ is defined by*

$$\langle \chi, \psi \rangle = \frac{1}{|G|} \sum_{g \in G} \chi(g)\overline{\psi(g)} \quad .$$

The following theorems are derived from the generalized orthogonality relation and are called the first and second orthogonality relations respectively.

Theorem 2.3.9 *[54](***First Orthogonality Relation***) Let G be a group and $Irr(G) = \{\chi_1, \chi_2, \dots, \chi_r\}$. Then*

$$\frac{1}{|G|}\sum_{g\in G}\chi_i(g)\overline{\chi_j(g)} = \delta_{ij} = \langle\chi_i, \chi_j\rangle \quad .$$

Proof. Using the generalized orthogonality relation and taking $h = 1_G$, then the result follows immediately. □

Theorem 2.3.10 *[54](***Second Orthogonality Relation***) Let G be a group and $Irr(G) = \{\chi_1, \chi_2, \dots, \chi_r\}$ and $\{g_1, g_2, \dots, g_r\}$ be a set of representatives of the conjugacy classes of elements of G. Then*

$$\sum_{\chi\in Irr(G)}\chi(g_i)\overline{\chi(g_j)} = \delta_{ij}|C_G(g_i)| \quad .$$

Proof. Let X be the character table of G. Then viewed as a matrix, X is an $r\times r$ matrix whose (i,j)-th entry is given by $\chi_i(g_j)$. Let C_i be the conjugacy class which contains g_i and D be the diagonal matrix with entries $\delta_{ij}|C_i|$. Then by the first orthogonality relation, we obtain that

$$|G|\delta_{ij} = \sum_{g\in G}\chi_i(g)\overline{\chi_j(g)} = \sum_{t=1}^{r}|C_t|\chi_i(g_t)\overline{\chi_j(g_t)} \quad .$$

Then we obtain a system of r^2 equations which can be written as a single matrix equation as follows

$$|G|I = XD\overline{X}^T \quad ,$$

where I is the identity $r\times r$ matrix and $\overline{X}^T$ is the transpose of $\overline{X}$. Since X is a nonsingular matrix, then we obtain that

$$|G|I = D\overline{X}^T X \quad .$$

Rewriting the above matrix system as a system of equations yields

$$|G|\delta_{ij} = \sum_{t=1}^{r}|C_i|\overline{\chi_t(g_i)}\chi_t(g_j) \quad .$$

Hence we obtain that

$$\sum_{\chi\in Irr(G)}\chi(g_j)\overline{\chi(g_i)} = |C_G(g_i)|\delta_{ij} \quad .$$

□

Let G be a group and χ be a character of G afforded by a representation ρ. Then we define

$$ker(\chi) = \{g\in G \mid \chi(g) = \chi(1_G)\} \quad .$$

It can be shown that $ker(\chi) = ker(\rho)$ and hence $ker(\chi)$ is a normal subgroup of G. If $Irr(G) = \{\chi_1, \chi_2, \ldots, \chi_r\}$, then every normal subgroup of G is the intersection of some of the $ker(\chi_i)$.

Theorem 2.3.11 *Let G be a group and N be a normal subgroup of G. Then*

(a) If χ is a character of G and $N \subseteq ker(\chi)$, then χ is constant on the cosets of N in G and the function $\hat{\chi}$ defined on G/N by $\hat{\chi}(Ng) = \chi(g)$ is a character of G/N.

(b) If $\hat{\chi}$ is a character of G/N, then the function χ defined by $\chi(g) = \hat{\chi}(Ng)$ is a character of G.

(c) In both (a) and (b) above, $\chi \in Irr(G)$ if and only if $\hat{\chi} \in Irr(G/N)$.

Proof. See Theorem 2.2.2. of [109]. □

If N is a normal subgroup of G and ρ is a representation of G such that $N \subseteq ker(\rho)$, then there exists a unique representation $\hat{\rho}$ of G/N defined by $\hat{\rho}(Ng) = \rho(g)$. Thus knowing ρ, we can obtain $\hat{\rho}$ and vice versa. We also obtain that ρ is irreducible if and only if $\hat{\rho}$ is irreducible. Hence ρ and $\hat{\rho}$ can be identified. If ρ affords a character χ of G, then $\hat{\rho}$ affords a character $\hat{\chi}$ of G/N and also χ and $\hat{\chi}$ can be identified. Under this identification, we obtain that

$$Irr(G/N) = \{\chi \in Irr(G) \mid N \subseteq ker(\chi)\} \quad .$$

Thus the irreducible characters of G/N are precisely those irreducible characters of G which contain N in their kernels.

Definition 2.3.12 *Let G be a group, N a normal subgroup of G and $\hat{\chi}$ be a character of G/N. Then the character χ of G defined by*

$$\chi(g) = \hat{\chi}(Ng)$$

is called a lifting of $\hat{\chi}$ to G.

Thus given characters of G/N, we can obtain some characters of G by the lifting process. The character $\hat{\chi}$ and its lifting χ have the same degree.

2.4 Induced Characters

In this section we look at the ways of relating the representations of a group to the representations of its subgroups.

Definition 2.4.1 *Let G be a finite group and $H \leq G$. If ρ is a representation of G, then the restriction of ρ to H is a representation of H. This representation is denoted by ρ_H. If χ is a character of G afforded by ρ, then the restriction of χ to H is denoted by χ_H and is a character of H afforded by the representation ρ_H such that*

$$\chi_H = \sum_{\psi \in Irr(H)} k_\psi \psi \quad ,$$

where $k_\psi \in \mathbb{N} \cup \{0\}$.

The characters χ_H and χ take on the same values on the elements of H. If χ_H is irreducible, then χ is irreducible in G but the converse is not true in general. Karpilovsky in [61] proves a theorem (Theorem 23.1.4) due to Gallagher that if $H \leq G$, $\chi \in Irr(G)$ such that $\chi(g) \neq 0 \ \forall \ g \in G - H$, then χ_H is irreducible, and for any $g \in G - H$, $\chi(g)$ is a root of unity. We also observe that (see [57]) every irreducible character of H is a constituent of some irreducible character of G restricted to H.

Theorem 2.4.2 *[57] Let G be a group, $H \leq G$, $\chi \in Irr(G)$ and $Irr(H) = \{\psi_1, \psi_2, \ldots, \psi_r\}$. Then*

$$\chi_H = \sum_{i=1}^{r} k_i \psi_i \quad ,$$

where $k_i \in \mathbb{N} \cup \{0\}$ satisfy the following relation

$$\sum_{i=1}^{r} k_i^2 \leq [G : H] \quad .$$

Moreover, equality in the above relation holds if and only if $\chi(g) = 0$ for all $g \in G - H$.

Proof. See [88] □

Theorem 2.4.3 *Let G be a group, H be a normal subgroup of G and $\chi \in Irr(G)$. Then all the constituents of χ_H have the same degree.*

Proof. See Proposition 20.7 of [57]. □

Let G be a group and $H \leq G$ such that the set $\{x_1, x_2, \ldots, x_r\}$ is a transversal for H in G. Let ϕ be a representation of H of degree n. Then we define ϕ^* on G as follows:

$$\phi^*(g) = \begin{pmatrix} \phi(x_1 g x_1^{-1}), \phi(x_1 g x_2^{-1}), \ldots, \phi(x_1 g x_r^{-1}) \\ \phi(x_2 g x_1^{-1}), \phi(x_2 g x_2^{-1}), \ldots, \phi(x_2 g x_r^{-1}) \\ \vdots \\ \phi(x_n g x_1^{-1}), \phi(x_n g x_2^{-1}), \ldots, \phi(x_n g x_r^{-1}) \end{pmatrix}$$

where $\phi(x_i g x_j^{-1})$ are $n \times n$ submatrices of $\phi^*(g)$ satisfying the property that

$$\phi(x_i g x_j^{-1}) = 0_{n \times n} \ \forall \ x_i g x_j^{-1} \notin H \quad .$$

Then we can show that ϕ^* is a representation of G of degree nr.

Definition 2.4.4 *Let G, H, ϕ and ϕ^* be as above. Then the representation ϕ^* is called the representation of G induced from the representation ϕ of H and we denote this by writing $\phi^* = \phi^G$.*

If ψ is a representation of H which is equivalent to ϕ, then it can be shown that ψ^G is equivalent to ϕ^G. Thus the induction process preserves equivalence between representations.

Definition 2.4.5 *Let G be a group and $H \leq G$. Let χ be a class function of H. Then we define χ^G as follows:*

$$\chi^G(g) = \frac{1}{|H|}\sum_{x\in G}\chi^\circ(xgx^{-1}) \quad ,$$

where

$$\chi^\circ(h) = \begin{cases} \chi(h) & \text{if } h \in H \\ 0 & \text{otherwise} \end{cases} .$$

Then χ^G is a class function of G, called the induced class function of G induced from χ. Also we have that $deg(\chi^G) = [G : H]deg(\chi)$.

Theorem 2.4.6 *[54](**Frobenius Reciprocity Theorem**) Let G be a group, $H \leq G$ and suppose that χ is a class function of H and ϕ is a class function of G. Then*

$$\langle \chi, \phi_H \rangle = \langle \chi^G, \phi \rangle$$

Proof. We obtain that

$$\langle \chi^G, \phi \rangle = \frac{1}{|G|}\sum_{g\in G}\chi^G(g)\overline{\phi(g)} = \frac{1}{|G|}\frac{1}{|H|}\sum_{g\in G}\sum_{x\in G}\chi^\circ(xgx^{-1})\overline{\phi(g)} \quad .$$

Putting $y = xgx^{-1}$ and since ϕ is a class function, then we obtain that $\phi(y) = \phi(g)$. Hence we have

$$\begin{aligned} \langle \chi^G, \phi \rangle &= \frac{1}{|G|}\frac{1}{|H|}\sum_{g\in G}\sum_{x\in G}\chi^\circ(xgx^{-1})\overline{\phi(g)} = \frac{1}{|G|}\frac{1}{|H|}\sum_{y\in G}\sum_{x\in G}\chi^\circ(y)\overline{\phi(y)} \\ &= \frac{1}{|H|}\sum_{y\in H}\chi(y)\overline{\phi(y)} = \langle \chi, \phi_H \rangle. \end{aligned}$$

Hence the result. □

Let $H \leq G$ and ϕ be a representation of H that affords a character χ of H. Then χ^G is a character of G afforded by the induced representation ϕ^G of G. The character χ^G is called the *induced character* of G. The induction and restriction processes do not necessarily preserve irreducibility of characters. For further reading on induced characters, readers are encouraged to consult [5], [6], [56], [90] and many other relevant sources.

Theorem 2.4.7 *Let G be a group and $H \leq G$. Let χ be a character of H, $g \in G$ and $\{x_1, x_2, \ldots, x_m\}$ be a set of representatives of the conjugacy classes of elements of H which fuse into $[g]$ in G. Then we obtain that*

$$\chi^G(g) = |C_G(g)| \sum_{i=1}^{m} \frac{\chi(x_i)}{|C_H(x_i)|} \quad ,$$

where we have that $\chi^G(g) = 0$ whenever $H \cap [g] = \emptyset$.

Proof. We have that

$$\chi^G(g) = \frac{1}{|H|} \sum_{x \in G} \chi^\circ(xgx^{-1}) \quad .$$

If $H \cap [g] = \emptyset$, then $xgx^{-1} \notin H$ and thus $\chi^\circ(xgx^{-1}) = 0 \;\; \forall\, x \in G$ and hence $\chi^G(g) = 0$. Now if $H \cap [g] \neq \emptyset$, then let $h \in H \cap [g]$. Then as x runs over elements of G, we have $xgx^{-1} = h$ for exactly $|C_G(g)|$ values of x. Hence we obatin that

$$\chi^G(g) = \frac{1}{|H|} \sum_{x \in G} \chi(xgx^{-1}) = \frac{|C_G(g)|}{|H|} \sum_{h \in H \cap [g]} \chi(h) = |C_G(g)| \sum_{i=1}^{m} \frac{\chi(x_i)}{|C_H(x_i)|} \quad .$$

Hence the result. □

Theorem 2.4.8 *Let G be a group, $K, H \leq G$ such that $K \leq H \leq G$ and χ be a character of K. Then for all $g \in G$ we have*

(i) $(\chi^H)^g = (\chi^g)^{g^{-1}Hg}$

(ii) $(\chi^g)^G = \chi^G$.

Proof. See [61] □

2.5 Permutation Characters

Knowledge of the permutation characters of a group leads to information about the subgroup structure of the group. In this section we discuss permutation characters.

We say that a group G *acts* on a set X if there is a homomorphism $\phi : G \longrightarrow S_X$, where S_X is the symmetric group on X. We say that G acts faithfully on X if ϕ is a monomorphism. In this case G can be identified with a subgroup of S_X and G becomes a *permutation group* on X. In this section we assume that X is a finite set.

Definition 2.5.1 *Let G be a group acting on a set X such that for any two k-tuples $(x_1, x_2, \ldots, x_k)$ and $(y_1, y_2, \ldots, y_k)$ of k distinct elements of X, there exists $g \in G$ for which $x_i^g = y_i$ for $i = 1, 2, \ldots, k$. Then we say that G is k-transitive on X.*

If G is 1-transitive on X, then we say that G is transitive. In this case G has only one orbit on X.

If G acts on X, we define a representation $\pi : G \longrightarrow GL(n, \mathbb{C})$, where $n = |X|$. Let $X = \{x_1, x_2, \ldots, x_n\}$. For each $g \in G$ we define $\pi_g = (a_{ij})$ by

$$a_{ij} = \begin{cases} 1 & \text{if } x_i^g = x_j \\ 0 & \text{otherwise} \end{cases} .$$

Then π_g is a permutation matrix of the action of g. The representation π defined above is called the *permutation representation* of G obtained from the action of G on X.

Definition 2.5.2 *Let G be a group and X be a set such that G acts on X. Then we denote the character afforded by the permutation representation π by $\chi(G|X)$. This character is called the* permutation character *of G associated with the action of G on X. It is not difficult to show that for $g \in G$ we have*

$$\chi(G|X)(g) = |\{x \in X \mid x^g = x\} = \textit{the number of points of } X \textit{ fixed by } g \quad .$$

Suppose that G acts transitively on X and G_x is the stabilizer of $x \in X$. Then the action of G on X is the same as the action of G on the cosets of $H = G_x$. Hence $\forall\, g \in G$, $\chi(G|X)(g)$ also gives the number of cosets of $H = G_x$ that are fixed by $g \in G$ and in this case we denote this number by $\chi(G|H)(g)$. Due to the fact that the action of G on X is the same as the action of G on the cosets of H, then we can write $\chi(G|H) = \chi(G|X)$.

Theorem 2.5.3 *Let G be a group acting transitively on a set X. Let $\alpha \in X$, $H = G_\alpha$ and $\chi(G|H)$ be the permutation character of this action. If I_H is the identity character of H, then $\chi(G|H) = (I_H)^G$.*

Proof. We have that

$$(I_H)^G(g) = \frac{1}{|H|} \sum_{x \in G, xgx^{-1} \in H} I_H(xgx^{-1}) = \frac{1}{|H|} \sum_{x \in G, xgx^{-1} \in H} 1 \quad .$$

Now if $xgx^{-1} \in H$, then $xg \in Hx$. Thus $Hxg = Hx$ and hence Hx is fixed by $g \in G$. However the summation is taken over all $x \in G$ such that $xgx^{-1} \in H$. Hence the summation is taken over all $x \in G$ for which the coset Hx is fixed by $g \in G$. But $\forall\, y \in Hx$, $Hx = Hy$ and thus we obtain that

$$\sum_{x \in G, xgx^{-1} \in H} 1 = |H||\{Hx \mid Hxg = Hx\}|$$

and hence we obtain that

$$(I_H)^G(g) = \frac{1}{|H|}|H||\{Hx \mid Hxg = Hx\}| = |\{Hx \mid Hxg = Hx\}| = \chi(G|H)(g) \quad .$$

Hence the result. $\square$

Theorem 2.5.4 *[54] Let G be a group acting on a set X with $\chi(G|X)$ as the permutation character of the action. If X splits into k orbits under the action of G, then*

$$\langle \chi(G|X), I_G \rangle = k \quad .$$

Proof. Suppose that the k orbits of X under the action of G are $\{X_1, \ldots, X_k\}$. Then we obtain that

$$X = \bigcup_{i=1}^{k} X_i \quad .$$

Let $x_i \in X_i$ and H_i be the stabilizer of $x_i \in X_i$. Also let $\chi_i(G|H_i)$ be the permutation character of G on the cosets of H_i. Then we obtain that

$$\chi(G|X) = \sum_{i=1}^{k} \chi_i(G|H_i) \quad \text{where} \quad \chi_i(G|H_i) = (I_{H_i})^G \quad .$$

By the Frobenius reciprocity theorem, we obtain that

$$\langle \chi_i(G|H_i), I_G \rangle = \langle (I_{H_i})^G, I_G \rangle = \langle I_{H_i}, I_{H_i} \rangle = 1 \quad .$$

Hence we obtain that

$$\langle \chi(G|X), I_G \rangle = \sum_{i=1}^{k} \langle \chi_i(G|H_i), I_G \rangle = \sum_{i=1}^{k} 1 = k \quad .$$

Hence the result. □

The following result will be used in later calculations to determine the conjugacy class fusions of subgroups of G.

Corollary 2.5.5 *Let $H \le G$. Let $g \in G$ and let $x_1, x_2, \ldots, x_m$ be representatives of the conjugacy classes of H that fuse to $[g]$. Then*

$$\chi(G|H)(g) = \sum_{i=1}^{m} \frac{|C_G(g)|}{|C_H(x_i)|} \quad .$$

Proof. This follows from Theorem 2.4.7. □

In the following we present some properties of the permutation characters.

Theorem 2.5.6 *Let G be a group, $H \le G$ and $\chi = \chi(G|H)$.*

(i) $deg(\chi)$ divides $|G|$.

(ii) $\langle \chi, \psi \rangle \le deg(\psi)$ for all $\psi \in Irr(G)$.

(iii) $\langle \chi, I_G \rangle = 1$.

(iv) $\chi(g) \in \mathbb{N} \cup \{0\}$ for all $g \in G$.

(v) $\chi(g) \leq \chi(g^m)$ *for all* $g \in G$ *and* $m \in \mathbb{N} \cup \{0\}$.

(vi) $\chi(g) = 0$ *if* $o(g)$ *does not divide* $|G|/deg(\chi)$.

(vii) $\chi(g)\frac{|[g]|}{deg(\chi)}$ *is an integer for all* $g \in G$.

Proof. This is Theorem 2.5.6 in [109].

Let ϕ be a representation of G and α an automorphism of G. Then ϕ^α is a representation of G given by

$$\phi^\alpha(x) = \phi(x^\alpha) \quad \text{and} \quad \phi^\alpha(xy) = \phi^\alpha(x)\phi^\alpha(y)$$

for $x, y \in G$. If the representation ϕ affords a character χ of G, then the representation ϕ^α affords a character χ^α of G which is given by $\chi^\alpha(x) = \chi(x^\alpha)$ for $x \in G$. Then the representation ϕ^α and the character χ^α are called the *algebraic conjugates* of ϕ and χ respectively induced by the automorphism α. Let $X = (\chi_i(x_j))$ be the character table of G, where $\chi_i \in Irr(G)$, $1 \leq i \leq n$ and x_j, $1 \leq j \leq n$ are representatives of the conjugacy classes of elements of G. Then the automorphism α of G induces a permutation on the conjugacy classes of G and thus induces a permutation on the columns of X. For each $\chi_i \in Irr(G)$, we deduce that $\chi_i^\alpha \in Irr(G)$. Hence α induces a permutation on the irreducible characters χ_i of G and thus induces a permutation on the rows of X. Moreover since $\chi_i^\alpha(x_j) = \chi_i(x_j^\alpha)$, then the matrices obtained from X by these two operations are identical. Hence we obtain the following theorem known as Brauer's Theorem.

Theorem 2.5.7 *[38](***Brauer's Theorem***) Let* G *be a group and* K *be a group of automorphisms of* G. *Then the number of orbits of* K *as a group of permutations on the irreducible characters of* G *is the same as the number of orbits of* K *as a group of permutations on the conjugacy classes of* G.

Proof. Let X be the character table of G. Then as a matrix, X is square and nonsingular. Let α be an automorhism of G such that $\alpha \in K$. Then α induces a permutation on the conjugacy classes of G and thus induces a permutation on the columns of X. Hence K acts on the conjugacy classes of G. Since $\alpha \in K$, then to each character χ of G, we obtain a character χ^α of G such that $\chi^\alpha \in Irr(G)$ whenever $\chi \in Irr(G)$. For $y \in G$, we obtain that $\chi^\alpha(y) = \chi(y^\alpha)$. Thus α induces a permutation on the rows of X. Hence K acts on the irreducible characters of G. Let X^α denote the image of X under α. Then we obtain that

$$P(\alpha)X = X^\alpha = XQ(\alpha) \quad ,$$

where $P(\alpha), Q(\alpha)$ are appropriate permutation matrices which are uniquely determined by $\alpha \in K$. Suppose that $\alpha, \beta \in K$. Then we obtain that $X^{\alpha\beta} = (X^\alpha)^\beta$. Also we have that

$$P(\alpha\beta)X = X^{\alpha\beta} = (X^\alpha)^\beta = (P(\alpha)X)^\beta = P(\beta)P(\alpha)X$$

and hence $P(\alpha\beta) = P(\beta)P(\alpha)$. We also have that $X^{\alpha\beta} = XQ(\alpha\beta)$ and $(X^{\alpha})^{\beta} = (XQ(\alpha))^{\beta} = XQ(\alpha)Q(\beta)$. Since $X^{\alpha\beta} = (X^{\alpha})^{\beta}$, we obtain that $XQ(\alpha\beta) = XQ(\alpha)Q(\beta)$. The nonsingularity of X implies that $Q(\alpha\beta) = Q(\alpha)Q(\beta)$. Define mappings π_1 and π_2 on K by $\pi_1(\alpha) = (P(\alpha))^t$ and $\pi_2(\alpha) = Q(\alpha)$, where t denotes the transpose operation on matrices. Then π_1 and π_2 are permutation representations of K. Let θ_1 and θ_2 be the permutation characters afforded by π_1 and π_2 respectively. Since $X^{-1}P(\alpha)X = Q(\alpha)$, $P(\alpha)$ and $Q(\alpha)$ are similar and thus have the same trace. Since $trace(P(\alpha))^t = trace(P(\alpha))$, we have that $trace(P(\alpha))^t = trace(Q(\alpha))$. Hence $\theta_1 = \theta_2$ and π_1 and π_2 are equivalent. Let d_1, d_2 be the number of orbits of K on the irreducible characters and on the conjugacy classes of G respectively. Thus we observe that d_1 is the number of orbits of $\pi_1(K)$ in its action as a group of permutations. Also d_2 is the number of orbits of $\pi_2(K)$ in its action as a group of permutations. Since θ_1 is the permutation character of K acting on the irreducible characters of G, we obtain that $\langle\theta_1, I_K\rangle = d_1$. Also for θ_2, we obtain that $\langle\theta_2, I_K\rangle = d_2$. However $\theta_1 = \theta_2$ and thus $\langle\theta_1, I_K\rangle = \langle\theta_2, I_K\rangle$ and hence $d_1 = d_2$. Hence the result. □

Chapter 3

Projective Representations and Characters

In this chapter we study the projective representations and characters which will be required in the subsequent chapters. We refer to the group representations and group characters that we defined in Chapter 2 as ordinary representations and ordinary characters respectively. The Schur multiplier of G plays an important role in the study of projective representations of G. We have therefore devoted Section 3.1 to the study of Schur multiplier of G. In Section 3.2 we are dealing with projective representations of G. We study the relationship of projective representations with the ordinary representations. We discuss that how projective representations of G can be constructed using three different approaches. We also show that how projective representations of G can be determined from the ordinary representations of a so-called representation group of G. Finally in Section 3.3 we discuss projective characters and study the orthogonality relations analogous to the ones for ordinary characters. For further readings on projective representations and projective characters readers are referred to [8], [43], [45], [49], [52], [54], [84], [85], [86], [87], [89], [96], [97], [98].

3.1 Schur Multiplier

The first step in obtaining the projective representations of a group G is to compute its Schur multiplier. In this section we discuss results useful in finding the Schur multiplier of a group.

Definition 3.1.1 *A function $\alpha : G \times G \longrightarrow \mathbb{C}^*$ is called a factor set of G if*

$$\alpha(xy, z)\alpha(x, y) = \alpha(x, yz)\alpha(y, z) \quad \textit{for all} \;\; x, y, z \in G.$$

Two factor sets α and α' are said to be equivalent if there exists a function $\rho : G \longrightarrow \mathbb{C}^*$ such that $\alpha'(x,y) = \frac{\rho(x)\rho(y)}{\rho(xy)}\alpha(x,y)$ for all $x, y \in G$. This is an equivalence relation and we denote the equivalence class of the factor set α by $[\alpha]$. For factor sets α and α', let $(\alpha\alpha')(x,y) = \alpha(x,y)\alpha'(x,y)$ for all $x, y \in G$. Then $\alpha\alpha'$ is a factor set, as is α^{-1} defined by $\alpha^{-1}(x,y) = (\alpha(x,y))^{-1}$.

Definition 3.1.2 *The set of all equivalence classes of factor sets forms a group by defining* $[\alpha][\alpha'] = [\alpha\alpha']$. *The identity of this group is* $[1]$ *where* 1 *is the factor set* $1(x,y) = 1$ *for all* $x, y \in G$, *and* $[\alpha]^{-1} = [\alpha^{-1}]$. *This group is called the* Schur multiplier *of* G *and we denote it by* $M(G)$.

Theorem 3.1.3 *(i)* $M(G)$ *is a finite abelian group.*

(ii) If G *is a cyclic group, then* $M(G) = 1$.

Proof. See [89]. □

Lemma 3.1.4 *Suppose that* N *is a normal subgroup of a finite group* G. *If* $M(G) = 1$, *then* $M(G/N) \cong (N \cap G')/[N, G]$. *In general,* $|(N \cap G')/[N, G]|$ *divides* $|M(G/N)|$.

Proof. See [60]. □

Theorem 3.1.5 *Let* G *be a finite group and* H *be a subgroup of index* n. *Then the group* $(M(G))^n$ *of all* n*-th powers of* $M(G)$ *is isomorphic to a subgroup of* $M(H)$.

Proof. See [60]. □

The following theorem describes the Schur multiplier of G in terms of the subgroup structure of G. Schur [105] reduced the problem of finding $M(G)$ to obtaining the Schur multiplier of the Sylow p-subgroups of G.

Theorem 3.1.6 *[105] Let* S *be a Sylow* p*-subgroup of* G. *Then the Sylow* p*-subgroup of* $M(G)$ *is isomorphic to a subgroup of* $M(S)$.

Proof. See [60]. □

Theorem 3.1.7 *A group* G *has trivial Schur multiplier if and only if it has a set of subgroups with trivial Schur multipliers and relatively prime indices.*

Proof. See [60]

3.2 Projective Representations

The notion of projective representation, due to Schur, was suggested by the study of relations between linear representations of a group and its factor groups over a central subgroup.

Definition 3.2.1 *Let G be a group and $\mathbb{F}$ be a field. Consider the map $P : G \longrightarrow GL(n, \mathbb{F})$ such that*

(i) $P(1_G) = I_n$, where I_n is the identity $n \times n$ matrix.

(ii) For all $x, y \in G$, there exists a map $\alpha : G \times G \longrightarrow \mathbb{F}^*$ such that

$$P(x)P(y) = \alpha(x,y)P(xy) \quad \text{where} \quad \alpha(x,y) \in \mathbb{F}^* \ .$$

Then P is called a projective representation of G over $\mathbb{F}$ of degree n. The map α is called the factor set associated with P.

From the above definition, we observe that

$$\alpha(x,y) = P(x)P(y)(P(xy))^{-1} \ .$$

Thus for the factor set α associated with P, if $\alpha(x,y) = 1_F$ for all $x, y \in G$, then we obtain that $P(xy) = P(x)P(y)$ and hence P becomes an ordinary representation of G. Sometimes a pair (P, α) is used to indicate a projective representation P and its associated factor set α.

There is another way of looking at projective representations. The group $PGL_n(\mathbb{F}) = GL_n(\mathbb{F})/Z(GL_n(\mathbb{F}))$ is called the projective general linear group where $Z(GL_n(\mathbb{F}))$ is the centre of $GL_n(\mathbb{F})$ which consists of all non-zero scalar matrices. If P is a projective $\mathbb{F}$-representation of G then the composition of P with the natural homomorphism $G \longrightarrow PGL_n(\mathbb{F})$ is a homomorphism $G \longrightarrow PGL_n(\mathbb{F})$. Conversly, if $\pi : G \longrightarrow PGL_n(\mathbb{F})$ is any homomorphism, a projective representation P of G can be defined by setting $P(g)$ equal to any element of the coset $\pi(g)$ of $Z(GL_n(\mathbb{F}))$ in $GL_n(\mathbb{F})$. Thus the projective $\mathbb{F}$-representations of G can be identified with the homomorphisms of G into the projective general linear group.

We now consider the associated factor sets of the projective representations.

Lemma 3.2.2 *Let α be the associated factor set of a projective representation P of G. Then α satisfies $\alpha(xy,z)\alpha(x,y) = \alpha(x,yz)\alpha(y,z)$ for all $x, y, z \in G$.*

Proof. By associativity we have

$$P(x)P(y)P(z) = \alpha(x,y)P(xy)P(z) = \alpha(x,y)\alpha(xy,z)P(xyz)$$

and

$$P(x)P(y)P(z) = \alpha(y,z)P(x)P(yz) = \alpha(y,z)\alpha(x,yz)P(xyz).$$

Now the result follows since $P(xyz)$ is invertible. □

As with ordinary representations, we now define equivalence and irreducibility of projective representations. We will consider projective representations over the complex field $\mathbb{C}$ from now on.

Definition 3.2.3 *Two projective representations P_1 and P_2 of G are* equivalent *if there is a non-singular matrix T such that for all $g \in G$, $P_1(g) = c(g)TP_2(g)T^{-1}$ for some $c(g) \in \mathbb{C}^*$. If $c(g) = 1$ for all $g \in G$ then P_1 and P_2 are* linearly equivalent. *A projective representation P is* irreducible *if it is not linearly equivalent to a projective representation of the form*

$$\begin{pmatrix} * & * \\ 0 & * \end{pmatrix}.$$

Lemma 3.2.4 *If two projective representations are equivalent then they have equivalent factor sets; if they are linearly equivalent they have equal factor sets.*

Proof. Let P_1 and P_2 be equivalent projective representations with factor sets α_1 and α_2 respectively. Suppose T is a non-singular matrix and $c : G \longrightarrow \mathbb{C}^*$ such that $P_1(g) = c(g)TP_2(g)T^{-1}$ for all $g \in G$. Now for $g, h \in G$,

$$\begin{aligned} \alpha_1(g,h) &= P_1(g)P_1(h)(P_1(gh))^{-1} \\ &= c(g)TP_2(g)T^{-1}c(h)TP_2(h)T^{-1}(c(gh))^{-1}T(P_2(gh))^{-1}T^{-1} \\ &= c(g)c(h)(c(gh))^{-1}TP_2(g)P_2(h)(P_2(gh))^{-1}T^{-1} \\ &= c(g)c(h)(c(gh))^{-1}\alpha_2(g,h), \end{aligned}$$

so α_1 and α_2 are equivalent. If P_1 and P_2 are linearly equivalent, then $c(g) = 1$ for all $g \in G$ in the above expressions, so $\alpha_1 = \alpha_2$. □

Let $F[G,\mathbb{C}]$ be the set of all functions $\lambda : G \longrightarrow \mathbb{C}$. If P is a projective representation of G with factor set α and $\lambda \in F[G,\mathbb{C}]$, then $P' = \lambda P$, where $P'(g) = \lambda(g)P(g)$ for all $g \in G$, is a projective representation of G with factor set α', and

$$\alpha'(x,y) = \lambda(x)\lambda(y)(\lambda(xy))^{-1}\alpha(x,y) \tag{3.1}$$

for all $x, y \in G$.

Remark 3.2.5 *It follows from (3.1) that $\alpha \sim 1$ if and only if there exists $\lambda \in F[G,\mathbb{C}]$ such that for all $x, y \in G$*

$$\alpha(x,y) = \lambda(x)\lambda(y)(\lambda(xy))^{-1}.$$

The following result provides a close connection between the degrees of the irreducible projective characters with factor set α and the $o([\alpha])$.

Lemma 3.2.6 *[8] Let P be a projective representation of G with factor set α and $deg(P) = n$. If $o([\alpha]) = m$ then m divides n.*

Proof. We know that

$$P(x)P(y) = \alpha(x,y)P(xy).$$

Taking determinant we obtain

$$\begin{aligned} det(P(x))det(P(y)) &= det(\alpha(x,y)P(xy)) \\ &= \alpha(x,y)^n det(P(xy)) \end{aligned}$$

which implies

$$\alpha(x,y)^n = det(P(x))det(P(y))(det(P(xy))^{-1}.$$

By Remark 3.2.5 we obtain $[\alpha]^n = 1$. Hence m divides n. □

Projective representations of a group G can be obtained by three different ways. Firstly, we may obtain the projective representations of a group G by considering a central extension of G. Now we show that how the projective representations of a group G can be constructed from the ordinary representations of a so-called representation group of G.

Definition 3.2.7 *A* central extension *of G is a group H together with a homomorphism π of H onto G such that $ker(\pi)$ lies in the centre of H.*

Lemma 3.2.8 *Let (H, π) be a central extension of G with $A = ker(\pi)$. Let X be a set of coset representatives for A in H, and write $X = \{x_g : g \in G\}$, where $\pi(x_g) = g$. Define $\alpha : G \times G \longrightarrow A$ by $x_g x_h = \alpha(g,h)x_{gh}$. Then α is an A-factor set of G and the equivalence class of α is independent of the choice of X.*

Proof. See Issacs [54]. □

Corollary 3.2.9 *Let H be a central extension of G with A, X and α as in the previous lemma. Let T be an ordinary representation of H such that the restriction T_A is the scalar representation λI for some $\lambda \in Hom(A, \mathbb{C}^*)$, that is*

$$T(a) = \begin{pmatrix} \lambda(a) & & & \\ & \lambda(a) & & \\ & & \ddots & \\ & & & \lambda(a) \end{pmatrix}_{n \times n} \quad \forall a \in A,$$

where $n = deg(T)$. Define $P(g) = T(x_g)$ for $g \in G$. Then P is a projective representation of G with factor set $\lambda(\alpha)$, where $\lambda(\alpha)(g,h) = \lambda(\alpha(g,h))$. Furthermore, P is irreducible if and only if T is and the equivalence class of P is independent of the choice of coset representatives X.

Proof. See [54].

Remark 3.2.10 *Note that if T is an ordinary irreducible representation of H then the condition that T_A be scalar representation is satisfied by the Schur's lemma (Theorem 2.3.2), since A lies in the centre of H.*

Definition 3.2.11 *A projective representation of G that can be constructed from an ordinary representation of a central extension H of G as in Corollary 3.2.8 is said to be* lifted *to H. A* representation group *of G is a central extension H of G such that every projective representation of G can be lifted to H.*

Every group has a representation group by the following result which is due to Schur [105].

Theorem 3.2.12 *Let G be a finite group of order n. Then G has at least one representation group H of order mn where $m = |M(G)|$ and the kernel of the extension is isomorphic to the Schur multiplier $M(G)$ of G.*

Proof. See, for example, [54]. □

Secondly, projective representations of G can also be obtained by the generalization of Clifford's method of constructing representations of G using representations of a normal subgroup N of G.

Finally, third approach to obtain projective representations involve a natural generalization of the group algebra which plays such an important role in ordinary representation theory. Interested readers are encouraged to consult Morris [84] and other relevant sources.

The projective representations of a group are often constructed by using a combination of the above mentioned three techniques. Interested readers are referred to a series of articles by Morris ([85], [86], [87]) and Read ([96], [97], [98]).

3.3 Projective Characters

Definition 3.3.1 *Let P be a projective representations of G with factor set α. Define $\xi(g) = Trace(P(g))$ for all $g \in G$. Then ξ is called a* projective character *of G. We say that ξ is* irreducible *if P is, and ξ has factor set α, where α is the factor set of P.*

Definition 3.3.2 *Given a factor set α of G, an element $g \in G$ is said to be α-*regular *if $\alpha(g,x) = \alpha(x,g)$ for all $x \in C_G(g)$.*

If g is α-regular, so is every conjugate of g, and an element g is α-regular if and only if g is α'-regular for every factor set α' equivalent to α. So we can define a conjugacy class of G to be α-regular if each of its elements is α-regular.

An important feature of ordinary characters is that they are class functions. However, this no longer true for projective characters. For projective characters we have

Proposition 3.3.3 *Let ξ be the projective character of G with factor set α. If for any α-regular element x in G and for any y in G, $\alpha(x,y) = \alpha(y, y^{-1}xy)$ then ξ is a class function.*

Proof. This is Proposition 2.2(iii) in [60]. □

Theorem 3.3.4 *Two projective representations P_1 and P_2 with factor set α are linearly equivalent if and only if they have the same projective character.*

Proof. See Theorem 4.4 in [84]. □

The projective characters of G can be determined from the ordinary characters of a representation group (H, π) of G. Let $\pi : H \longrightarrow G$ be defined by the extension H of G, and let $\{x_g : g \in G\}$ be a set of coset representatives for $ker(\pi)$ in H. If P is a projective representation of G with projective character ξ then there is an ordinary representation T of H such that $P(g) = T(x_g)$ for $g \in G$. Let χ be the character of H afforded by T, then $\xi(g) = \chi(x_g)$ for all $g \in G$.

Projective characters also satisfy the usual orthogonality relations. We have analogues to ordinary characters.

Theorem 3.3.5 *(i) The number of irreducible projective characters of G with factor set α is equal to the number of α-regular conjugacy classes of G.*

(ii) Let $\xi_1, \xi_2, \dots, \xi_t$ be the projective characters of G with factor set α, and let $C_1, C_2, \dots, C_t$ be the α-regular conjugacy classes of G with g_i a representative of C_i for $i = 1, 2, \dots, t$. Then

$$\sum_{i=1}^{t} \xi_i(g_j)\overline{\xi_i(g_k)} = \delta_{jk}|C_G(g_i)| \quad \text{for } j,k \in \{1,2,\dots t\}.$$

(iii) An element g of G is α-regular if and only if there is an irreducible projective character ξ of G with factor set α such that $\xi(g) \neq 0$.

Proof. See [43]. □

Let G^0 be the set of all α-regular elements of the group G. Then we have the following.

Theorem 3.3.6 *Let Let $\xi_1, \xi_2, \ldots, \xi_t$ be the projective characters of G with factor set α, and let $C_1, C_2, \ldots, C_t$ be the α-regular conjugacy classes of G with g_i a representative of C_i for $i = 1, 2, \ldots, t$. Then*

$$\sum_{g \in G^0} \xi_i(g)\overline{(\xi_j(g)} = |G|\delta_{ij}.$$

Proof. See [60] □

Haggarty and Humphreys [43] showed that it is possible to determine the projective characters of G with a given factor set without the full representation group G. Suppose α is a factor set of G, with $[\alpha]$ having order e in the Schur multiplier $M(G)$. Let ω be an e^{th} root of unity and let α' be a representative of $[\alpha]$ whose values are powers of ω. For $g, h \in G$ define $\alpha'(g, h)$ by $\alpha'(g, h) = \omega^{a(g,h)}$. Let L be the group generated by an element x of order e and elements $x_g (g \in G)$ with multiplication $x^i x_g x^j x_h = x^{i+j} x^{a(g,h)} x_{gh}$. Then L is a quotient of the representation group H and any projective representation of G with factor set α can be lifted to an ordinary representation of L. Thus the projective characters of G with factor set α can be determined from the ordinary character table of L.

Chapter 4

Clifford Theory

An important method for constructing irreducible projective representations of groups consists in the application of three basic operations:

- Restriction to a subgroup,
- Extension from a subgroup,
- Induction from a subgroup.

The theory attains particular richness when the subgroup is normal. This is the content of the Clifford theory, originally developed by *Clifford* in 1937 [17] for ordinary representations and extended by *Mackey* in 1958 [70] to projective representations. In this chapter, we study the Clifford theory and its related consequences which are required to describe the Fischer-Clifford matrices in the next chapter. In Section 4.1, we study the relation between the characters of a group $\bar{G}$ and its normal subgroup N. We will give various sufficient conditions for the extendibility of an irreducible character θ of N to $\bar{G}$. In Section 4.2, we are dealing with the Clifford theory of projective representations. We will study, how it is always possible to extend an irreducible character of a normal subgroup N to a projective character of its inertia group $\bar{H}$. Finally in Section 4.3, we will study the problem which asserts that if χ is a $\bar{G}$-invariant irreducible character of a normal subgroup N of a finite group $\bar{G}$, then the number of distinct irreducible constituents of $\chi^{\bar{G}}$ is equal to the number of χ-regular conjugacy classes of $\bar{G}/N$. We also show that the number of irreducible constituents of $\chi^{\bar{G}}$ is equal to the number of conjugacy classes of $\bar{G}/N$ if and only if χ extends to a character of each subgroup $N{<}x,y{>}$ of $\bar{G}$ with $[x,y] \in N$.

4.1 Clifford Theory and Normal Subgroups

In this section we study the important connection between characters of group $\bar{G}$ and a normal subgroup N of $\bar{G}$.

Definition 4.1.1 *Let $\bar{G}$ be a group, $N \leq \bar{G}$ and θ be a character of N. Then for $\bar{g} \in \bar{G}$, we define $\theta^{\bar{g}} : \bar{g}^{-1}N\bar{g} \longrightarrow \mathbb{C}$ by $\theta^{\bar{g}}(t) = \theta(\bar{g}t\bar{g}^{-1})$ for all $t \in \bar{g}^{-1}N\bar{g}$. Then $\theta^{\bar{g}}$ is said to be a $\bar{G}$-conjugate of θ. If N is a normal subgroup of $\bar{G}$ and $\theta^{\bar{g}} = \theta$ for all $\bar{g} \in \bar{G}$, then θ is said to be $\bar{G}$-invariant.*

Remark 4.1.2 *If $N \leq \bar{G}$ and $\bar{g} \in \bar{G}$, then $\theta^{\bar{g}}$ is a character of $\bar{g}N\bar{g}^{-1}$. However if N is normal in $\bar{G}$, $\theta^{\bar{g}}$ becomes a character of N.*

Let $\bar{G}$ be a group, N a normal subgroup of $\bar{G}$ and $\theta \in Irr(N)$ then we define

$$Irr(\bar{G}, \theta) = \{\chi \mid \chi \in Irr(\bar{G}), \langle \chi_N, \theta \rangle > 0\} \ .$$

Observe that $\langle \chi_N, \theta \rangle_N = \langle \chi, \theta^{\bar{G}} \rangle_{\bar{G}}$.

Definition 4.1.3 *Let $\bar{G}$ be a group, N a normal subgroup of $\bar{G}$ and $\theta \in Irr(N)$. Then*

$$I_{\bar{G}}(\theta) = \{\bar{g} \in \bar{G} \mid \theta^{\bar{g}} = \theta\}$$

is the inertia group of θ in $\bar{G}$.

Since $I_G(\theta)$ is the stabilizer of θ in the action of $\bar{G}$ on $Irr(N)$, it follows that it is a subgroup and that $I_G(\theta) \supseteq N$.

Lemma 4.1.4 *[52] Let $\bar{G}$ be a group, N a normal subgroup of $\bar{G}$ and $\theta \in Irr(N)$. Then*

(a) For $\bar{g}_1, \bar{g}_2 \in \bar{G}$ we have $\theta^{\bar{g}_1\bar{g}_2} = (\theta^{\bar{g}_1})^{\bar{g}_2}$. In particular $N \leq I_{\bar{G}}(\theta) \leq \bar{G}$. If

$$\bar{G} = \bigcup_{i=1}^{m} I_{\bar{G}}(\theta)\bar{g}_i$$

with $[\bar{G} : I_{\bar{G}}(\theta)] = m$, then $\{\theta^{\bar{g}} | \bar{g} \in \bar{G}\} = \{\theta^{\bar{g}_1}, \theta^{\bar{g}_2}, \ldots, \theta^{\bar{g}_m}\}$, and $\theta^{\bar{g}_1}, \theta^{\bar{g}_2}, \ldots, \theta^{\bar{g}_m}$ are pairwise distinct.

(b) If ψ_1, ψ_2 are any characters of N and $\bar{g} \in \bar{G}$, then $\langle \psi_1^{\bar{g}}, \psi_2^{\bar{g}} \rangle_N = \langle \psi_1, \psi_2 \rangle_N$. In particular $\theta^{\bar{g}} \in Irr(N)$ if $\theta \in Irr(N)$.

(c) If ψ is a character of $\bar{G}$ and θ of N, then $\langle \psi_N, \theta \rangle_N = \langle \psi_N, \theta^{\bar{g}} \rangle_N$ for all $\bar{g} \in \bar{G}$.

Proof. See [52]. □

We now state a fundamental theorem, which is due to Clifford [17] but we give a proof from Huppert [52].

Theorem 4.1.5 *[52]* (Clifford Theorem) *Suppose G is a group, N a normal subgroup of $\bar{G}$, $\theta \in Irr(N)$ and $\chi \in Irr(\bar{G}, \theta)$. Let $\langle \chi_N, \theta \rangle = e > 0$. Assume also that*

$$\bar{G} = \bigcup_{i=1}^{m} I_{\bar{G}}(\theta)\bar{g}_i \quad \text{and} \quad m = [\bar{G} : I_{\bar{G}}(\theta)].$$

Then we have

(a) $(\theta^{\bar{G}})_N = |I_{\bar{G}}(\theta)/N| \sum_{i=1}^{m} \theta^{\bar{g}_i}$.

(b) $\langle \theta^{\bar{G}}, \theta^{\bar{G}} \rangle_{\bar{G}} = |I_{\bar{G}}(\theta)/N|$. *In particular* $\theta^{\bar{G}} \in Irr(\bar{G})$ *if and only if* $I_{\bar{G}}(\theta) = N$.

(c) $\chi_N = e \sum_{i=1}^{m} \theta^{\bar{g}_i}$. *In particular,*

$$\chi(1) = em\theta(1) \quad \text{and} \quad \langle \chi_N, \chi_N \rangle_N = e^2 m.$$

Also

$$e^2 \leq |I_{\bar{G}}(\theta)/N| \quad \text{and} \quad e^2 m \leq |\bar{G}/N|.$$

Proof. (a) For $x \in N$ we have by the previous lemma

$$\theta^{\bar{G}}(x) = \frac{1}{|N|} \sum_{\bar{g} \in \bar{G}} \theta(x^{\bar{g}^{-1}}) = \frac{1}{|N|} \sum_{\bar{g} \in \bar{G}} \theta^{\bar{g}}(x) = \frac{|I_{\bar{G}}(\theta)|}{|N|} \sum_{i=1}^{m} \theta^{\bar{g}_i}(x).$$

(b) By Frobenius reciprocity (Theorem 2.4.6) and part (a) we obtain

$$\langle \theta^{\bar{G}}, \theta^{\bar{G}} \rangle_{\bar{G}} = \langle (\theta^{\bar{G}})_N, \theta \rangle_N = |I_{\bar{G}}(\theta)/N|.$$

(c) For all $\bar{g} \in \bar{G}$, we have by Lemma 4.1.4(c)

$$\langle \chi_N, \theta^{\bar{g}} \rangle_N = \langle \chi_N, \theta \rangle_N = e.$$

Hence

$$\chi_N = e \sum_{i=1}^{m} \theta^{\bar{g}_i} + \psi,$$

where ψ is a character of N or zero. As

$$\langle \theta^{\bar{G}}, \chi \rangle_{\bar{G}} = \langle \theta, \chi_N \rangle_N = e,$$

we obtain

$$\theta^{\bar{G}} = e\chi + \dots.$$

Restriction to N shows by part (a)

$$e\chi_N + \ldots = (\theta^{\bar{G}})_N = |I_{\bar{G}}(\theta)/N| \sum_{i=1}^{m} \theta^{\bar{g}_i}.$$

Hence in χ_N there does not appear any irreducible character of N different from the $\theta^{\bar{g}_j}$. Therefore

$$\chi_N = e \sum_{i=1}^{m} \theta^{\bar{g}_i},$$

which implies immediately

$$\chi(1) = em\theta(1) \quad \text{and} \quad \langle \chi_N, \chi_N \rangle_N = e^2 m.$$

By part (b) we have

$$|I_{\bar{G}}(\theta)/N| = \langle \theta^{\bar{G}}, \theta^{\bar{G}} \rangle_{\bar{G}} = \langle e\chi + \ldots, e\chi + \ldots \rangle_{\bar{G}} \geq e^2$$

and hence

$$|\bar{G}/N| = |\bar{G} : I_{\bar{G}}(\theta)||I_{\bar{G}}(\theta)/N| \geq me^2.$$

□

Remark 4.1.6 *It can be shown that the number e in the above theorem is the degree of an irreducible projective representation of $\bar{G}/N$, hence it divides $|\bar{G}/N|$. See Huppert [52].*

As a consequence of Clifford theorem we have the following result, which is of fundamental importance in the character theory of normal subgroups.

Theorem 4.1.7 *[54] Let $\bar{G}$ be a group, N a normal subgroup of $\bar{G}$, $\theta \in Irr(N)$ and $T = I_{\bar{G}}(\theta)$. Let*

$$A = \{\psi \in Irr(T) \mid \langle \psi_N, \theta \rangle \neq 0\},$$

$$B = \{\chi \in Irr(\bar{G}) \mid \langle \chi_N, \theta \rangle \neq 0\}.$$

Then

(a) If $\psi \in A$, then $\psi^{\bar{G}} \in Irr(\bar{G})$.

(b) If $\psi^{\bar{G}} = \chi$ and $\psi \in A$, then $\langle \psi_N, \theta \rangle = \langle \chi_N, \theta \rangle$.

(c) If $\psi^{\bar{G}} = \chi$ and $\psi \in A$, then ψ is the unique irreducible constituent of χ_T which sits in A.

(d) The map $\psi \longmapsto \psi^{\bar{G}}$ is a bijection of A to B.

Proof. See Issacs [54]. □

Remark 4.1.8 *From the previous theorem we deduce that induction to $\bar{G}$ maps the irreducible characters of T that contain θ in their restriction to N faithfully onto the irreducible characters of $\bar{G}$ that contain θ in their restriction to N.*

An important task of the Clifford theory is to examine when irreducible characters of normal subgroups are extendible to their respective inertia groups.

Definition 4.1.9 *Let $\bar{G}$ be a group, H a subgroup of $\bar{G}$, $\theta \in Irr(H)$ and $\chi \in Irr(\bar{G})$ such that $\chi_H = \theta$. Then θ is said to be extendible to an irreducible character of $\bar{G}$.*

If θ is extendible to an irreducible character of $\bar{G}$, we will simply say that θ is extendible to $\bar{G}$. There are various conditions which have to be satisfied in order that θ can be extended to $\bar{G}$. Readers can also consult [8], [34], [35], [54], [59], [52] for further reading and information on extendibility of characters.

Theorem 4.1.10 *[61] Let N a normal subgroup of $\bar{G}$, $\chi \in Irr(N)$, where χ is $\bar{G}$- invariant and let Γ be a matrix representation of N which affords χ. Then*

(i) there exists a projective representation ρ of $\bar{G}$ such that $\Gamma(n) = \rho(n)$ and $(\rho(\bar{g}))^{o(\bar{g})} = I$, for all $n \in N, \bar{g} \in \bar{G}$ where I is the identity matrix,

(ii) if $\bar{G} = NH$ for some $H \leq \bar{G}$ and if ρ_H is an ordinary representation of H, then χ can be extended to $\bar{G}$.

Proof. (i) Let $\bar{g} \in \bar{G}$. Since χ is $\bar{G}$-invariant, then the representations Γ and $\Gamma^{\bar{g}}$ of N are equivalent. Hence there is an invertible matrix $\theta(\bar{g})$ such that $(\theta(\bar{g}))^{-1}\Gamma(n)\theta(\bar{g}) = \Gamma^{\bar{g}}(n)$, for all $n \in N$. We may assume that $\theta(n) = \Gamma(n)$ for all $n \in N$. We have that $\theta : \bar{G} \longrightarrow GL(k, \mathbb{F})$, where $k = deg(\Gamma)$, and that $\theta_N = \Gamma$. Now let $\bar{g_1}, \bar{g_2} \in \bar{G}$. Then we obtain that

$$\begin{aligned}(\theta(\bar{g_1}\bar{g_2}))^{-1}\Gamma(n)\theta(\bar{g_1}\bar{g_2}) &= \Gamma^{\bar{g_1}\bar{g_2}}(n) = (\Gamma^{\bar{g_1}})^{\bar{g_2}}(n) = (\theta(\bar{g_2}))^{-1}\Gamma^{\bar{g_1}}(n)\theta(\bar{g_2}) \\ &= (\theta(\bar{g_2}))^{-1}(\theta(\bar{g_1}))^{-1}\Gamma(n)\theta(\bar{g_1})\theta(\bar{g_2}).\end{aligned}$$

So that

$$\theta(\bar{g_1})\theta(\bar{g_2})(\theta(\bar{g_1}\bar{g_2}))^{-1}\Gamma(n) = \Gamma(n)\theta(\bar{g_1})\theta(\bar{g_2})(\theta(\bar{g_1}\bar{g_2}))^{-1} \quad .$$

Thus for all $n \in N$, $\theta(\bar{g_1})\theta(\bar{g_2})(\theta(\bar{g_1}\bar{g_2}))^{-1}$ commutes with $\Gamma(n)$ and thus by the Corollary 2.3.3, we can define a function $\alpha : \bar{G} \times \bar{G} \longrightarrow \mathbb{C}^*$ such that $\theta(\bar{g_1})\theta(\bar{g_2}) = \alpha(\bar{g_1}, \bar{g_2})\theta(\bar{g_1}\bar{g_2})$. Since Γ is a representation of N, then we obtain that $\theta(1_N) = \Gamma(1_N) = I$. Hence θ is a projective representation of $\bar{G}$ with associated factor set α. Let $o(\bar{g}) = m$ and if $\bar{g} \in N$, then we obtain that $(\theta(\bar{g}))^m = I$. However if $\bar{g} \in \bar{G} - N$, then since $\theta(\bar{g}^m) = \theta(1_{\bar{G}}) = I$, there exists $\lambda(\bar{g}) \in \mathbb{C}^*$ such that $(\theta(\bar{g}))^m = \lambda(\bar{g})I$. Now let $\mu(\bar{g}) \in \mathbb{C}^*$ such that $(\mu(\bar{g}))^m = (\lambda(\bar{g}))^{-1}$ and let $\mu(n) = 1$ for all $n \in N$. Then the projective representation ρ of $\bar{G}$ given by $\rho(\bar{g}) = \mu(\bar{g})\theta(\bar{g})$ is such that $\rho(n) = \mu(n)\theta(n) = \theta(n) = \Gamma(n)$ for all $n \in N$. Also we have that

$$(\rho(\bar{g}))^m = (\mu(\bar{g})\theta(\bar{g}))^m = (\mu(\bar{g}))^m(\theta(\bar{g}))^m = (\lambda(\bar{g}))^{-1}\lambda(\bar{g})I = I \quad .$$

Hence property (i) is established.

(ii) Let T be a transversal for $N \cap H$ in H containing 1_H. Then every $\bar{g} \in \bar{G}$ has a unique expression of the form $\bar{g} = tn$, where $t \in T, n \in N$. Now let $\bar{g_1} \in \bar{G}$, $\bar{g_1} \neq \bar{g}$ be given by $\bar{g_1} = t_1n_1$, where $t_1 \in T, n_1 \in N$. Since $t, t_1 \in T$, then $t, t_1 \in H$ and hence $tt_1 \in H$. Now let $tt_1 = t_2n_2$, where $t_2 \in T$ and $n_2 \in N \cap H$. Define ψ on $\bar{G}$ by $\psi(\bar{g}) = \rho(t)\rho(n)$. Since $n_2t_1^{-1}nt_1n_1 \in N$, we obtain that

$$\psi(\bar{g}\bar{g_1}) = \psi(tnt_1n_1) = \psi(tt_1t_1^{-1}nt_1n_1) = \psi(t_2n_2t_1^{-1}nt_1n_1) = \rho(t_2)\rho(n_2t_1^{-1}nt_1n_1) \quad .$$

Also we have

$$\begin{aligned}
\psi(\bar{g})\psi(\bar{g_1}) &= \rho(t)\rho(n)\rho(t_1)\rho(n_1) = \rho(t)\rho(t_1)(\rho(t_1))^{-1}\rho(n)\rho(t_1)\rho(n_1) \\
&= \rho(t)\rho(t_1)[(\rho(t_1))^{-1}\rho(n)\rho(t_1)]\rho(n_1).
\end{aligned}$$

However from the proof of part(i) above we have that $(\rho(\bar{g}))^{-1}\Gamma(n)\rho(\bar{g}) = \Gamma^{\bar{g}}(n)$ and $\rho(n) = \Gamma(n)$ for all $n \in N, \bar{g} \in \bar{G}$. Since $t_1^{-1}nt_1 \in N$, then we obtain that

$$\rho(t_1^{-1}nt_1) = \Gamma(t_1^{-1}nt_1) = \Gamma^{t_1}(n) = (\rho(t_1))^{-1}\Gamma(n)\rho(t_1) = (\rho(t_1))^{-1}\rho(n)\rho(t_1) \quad .$$

Since by the assumption ρ is an ordinary representation on H we have $\rho(tt_1) = \rho(t)\rho(t_1)$ since $tt_1 \in H$. We deduce that

$$\begin{aligned}
\psi(\bar{g})\psi(\bar{g_1}) &= \rho(t)\rho(n)\rho(t_1)\rho(n_1) = \rho(t)\rho(t_1)(\rho(t_1))^{-1}\rho(n)\rho(t_1)\rho(n_1) \\
&= \rho(t)\rho(t_1)[(\rho(t_1))^{-1}\rho(n)\rho(t_1)]\rho(n_1) \\
&= \rho(t)\rho(t_1)\rho(t_1^{-1}nt_1)\rho(n_1) = \rho(tt_1)\rho(t_1^{-1}nt_1)\rho(n_1) \\
&= \rho(t_2n_2)\rho(t_1^{-1}nt_1)\rho(n_1) = \rho(t_2)\rho(n_2t_1^{-1}nt_1n_1).
\end{aligned}$$

Hence we obtain that $\psi(\bar{g}\bar{g_1}) = \psi(\bar{g})\psi(\bar{g_1})$. Therefore ψ is an ordinary representation of $\bar{G}$. However $\forall\, n \in N$, we obtain that $\psi(n) = \rho(n) = \Gamma(n)$ and thus the character afforded by the representation ψ of $\bar{G}$, extends χ to $\bar{G}$. Hence the result. □

Theorem 4.1.11 *[61] Let $\bar{G} = NG$ where N is a normal subgroup of $\bar{G}$, and $G \leq \bar{G}$ such that $N \cap G \subseteq N'$. If θ is an irreducible $\bar{G}$-invariant character of N such that $(deg(\theta), |G|) = 1$, then θ can be extended to $\bar{G}$.*

Proof. For a detailed proof which uses the previous theorem, see Corollary 27.1.2 of [61]
□

Theorem 4.1.12 *([20],[109],[88])* (**Mackey's Theorem**) *Let N be a normal subgroup of $\bar{G}$ and θ be a $\bar{G}$-invariant irreducible character of N. If N is abelian and $\bar{G}$ splits over N, then θ can be extended to $\bar{G}$.*

Proof. Let $\bar{G} = N{:}G$. Since $\bar{G}$ is a semidirect product of N by G, then any $x \in \bar{G}$ can be expressed uniquely as $x = ng$, where $n \in N, g \in G$. Define χ on $\bar{G}$ by $\chi(ng) = \theta(n)$. Since N is abelian, θ has degree 1 and thus is linear. The invariance of θ in $\bar{G}$ implies that $\theta(n) = \theta(xnx^{-1})$ for all $x \in \bar{G}$. Now let $x_1 = n_1g_1, x_2 = n_2g_2$ be elements of $\bar{G}$. Then we obtain that

$$\begin{aligned}\chi(x_1x_2) &= \chi(n_1g_1n_2g_2) = \chi(n_1n_2^{g_1}g_1g_2) = \theta(n_1n_2^{g_1}) \\ &= \theta(n_1)\theta(n_2^{g_1}) = \theta(n_1)\theta(n_2) = \chi(x_1)\chi(x_2).\end{aligned}$$

Therefore χ is a linear character of $\bar{G}$ such that $\chi_N = \theta$. □

Remark 4.1.13 Mackey*'s theorem has been proved differently in Mpono [88] by applying Theorem 4.1.11.*

Theorem 4.1.14 *Let N be a normal subgroup of a finite group $\bar{G}$ and θ be an irreducible character of N which is invariant in $\bar{G}$, then θ is extendible to a character of $\bar{G}$ if* $([\bar{G} : N], \frac{|N|}{deg(\theta)}) = 1$.

Proof. See [34]. □

Theorem 4.1.15 *Suppose $\bar{G}$ is a splitting extension of a normal subgroup N, then any linear character $\theta \in Irr(N)$ can be extended to its inertia group $I_{\bar{G}}(\theta)$.*

Proof. See [88]. □

Note that Mackey's theorem is reinforced by the Theorem 4.1.15 since for N abelian, all its irreducible characters are linear and hence are extendible to their respective inertia groups.

Theorem 4.1.16 *([35],[53],[109])*(**Gallagher's Theorem**) *Let N a normal subgroup of $\bar{G}$, $\theta \in Irr(N)$ and $\bar{H} = I_{\bar{G}}(\theta)$. If θ can be extended to $\psi \in Irr(\bar{H})$ then as β ranges over all the irreducible characters of $\bar{H}$ which contain N in their kernels, $\beta\psi$ ranges over all the irreducible characters of $\bar{H}$ which contain θ in their restriction to N.*

Proof. Since $\bar{H} = I_{\bar{G}}(\theta)$, then θ is self-conjugate in $\bar{H}$ and thus by Clifford's theorem we obtain that $(\theta^{\bar{H}})_N = f\theta$ for some positive integer f. Comparing degrees we have $(\theta^{\bar{H}})_N = [\bar{H} : N]\theta$ and so $\langle\theta^{\bar{H}}, \theta^{\bar{H}}\rangle = \langle\theta, (\theta^{\bar{H}})_N\rangle = [\bar{H} : N]$. Now we claim that $\theta^{\bar{H}} =$

$\sum_\beta \beta(1_{\bar{G}})\beta\psi$, where β ranges over all the irreducible characters of $\bar{H}$ that contain N in their kernels. Both $\theta^{\bar{H}}$ and $\sum_\beta \beta(1_{\bar{G}})\beta\psi$ are zero off N since for $g \notin N, xgx^{-1} \notin N$ for all $x \in \bar{G}$ and thus $\theta^{\bar{H}}(g) = 0$. Also for $g \notin N$, by the orthogonality of the columns of the character table of $\bar{H}/N$ we have that $\sum_\beta \beta(1_{\bar{G}})(\beta\psi)(g) = [\sum_\beta \beta(1_{\bar{G}})\beta(g)]\psi(g) = 0$. We also have that $(\theta^{\bar{H}})_N = [\bar{H} : N]\theta = (\sum_\beta \beta(1_{\bar{G}})\beta\psi)_N$ since for $g \in N$, $\sum_\beta \beta(1_{\bar{G}})\beta(g)\psi(g) = \sum_\beta(\beta(1_{\bar{G}}))^2\psi(g) = [\bar{H} : N]\psi(g) = [\bar{H} : N]\theta(g)$. Hence we obtain that $\theta^{\bar{H}} = \sum_\beta \beta(1_{\bar{G}})\beta\psi$. So we have

$$[\bar{H} : N] = \langle\theta^{\bar{H}}, \theta^{\bar{H}}\rangle = \langle\sum_\beta \beta(1_{\bar{G}})\beta\psi, \sum_\tau \tau(1_{\bar{G}})\tau\psi\rangle = \sum_{\beta,\tau} \beta(1_{\bar{G}})\tau(1_{\bar{G}})\langle\beta\psi, \tau\psi\rangle \quad .$$

The diagonal terms contribute at least $\sum(\beta(1_{\bar{G}}))^2 = [\bar{H} : N]$, so the $\beta\psi$ are irreducible and distinct, and are all the irreducible constituents of $\theta^{\bar{H}}$ and so are all the irreducible characters of $\bar{H}$ that contain θ in their restriction to N. For $\phi \in Irr(\bar{H})$ such that $\langle\phi_N, \theta\rangle \neq 0$, we obtain that $\langle\phi_N, \theta\rangle = \langle\phi, \theta^{\bar{H}}\rangle$ which implies that ϕ is an irreducible constituent of $\theta^{\bar{H}}$ and hence is of the form $\beta\psi$. □

Remark 4.1.17 *Let $\bar{G}$ be an extension of N by G. If every irreducible character of N can be extended to its inertia group in $\bar{G}$, then by application of Theorem 4.1.7 and Remark 4.1.8, the characters of $\bar{G}$ can be obtained as follows:*

Let $\theta_1, \theta_2, \ldots, \theta_t$ be representatives of the orbits of $\bar{G}$ on $Irr(N)$. For each i, let $\bar{H}_i = I_{\bar{G}}(\theta_i)$ and let $\psi_i \in Irr(\bar{H}_i)$ with $(\psi_i)_N = \theta_i$. Now each irreducible character of $\bar{G}$ contains some θ_i in its restriction to N by Clifford's theorem. So by Theorem 4.1.7 and Remark 4.1.8 we have

$$Irr(\bar{G}) = \bigcup_{i=1}^{t} \{(\beta\psi_i)^{\bar{G}} : \beta \in Irr(\bar{H}_i), N \subset ker(\beta)\}.$$

Hence the characters of $\bar{G}$ fall into t blocks, with each block corresponding to an inertia group.

Finally in this section, we give a result due to *Issacs* about the value of an extension χ of θ to G. For $N \trianglelefteq G$, $\theta \in Irr(N)$ has an extension χ to G if $I_G(\theta) = G$. We prove that the values of χ are equally distributed over the cosets of N.

Theorem 4.1.18 *Suppose $N \trianglelefteq G$, $\chi \in Irr(G)$ with $\chi_N \in Irr(N)$. Then*

$$\frac{1}{|N|} \sum_{y \in Ng} |\chi(y)|^2 = 1$$

for all $g \in G$.

Proof. See Theorem 21.5 of [52]. □

4.2 Clifford Theory and Projective Representations

The projective representations of a group are closely related to Clifford theory. In this section we study the Clifford theory for projective representations.

Definition 4.2.1 *Let $N \trianglelefteq \bar{G}$. If Y is an irreducible (ordinary) representation of N then for $\bar{g} \in \bar{G}$, $Y^{\bar{g}}$ defined by $Y^{\bar{g}}(n) = Y(\bar{g}n\bar{g}^{-1})$, $n \in N$, is a representation of N, called a* conjugate *of Y. The* inertia group *of Y, $T(Y)$, is the set of all $\bar{g} \in \bar{G}$ such that Y is equivalent to $Y^{\bar{g}}$. Note that $T(Y) = I_{\bar{G}}(\theta)$ where θ is the character of N afforded by Y.*

Now let Y be an irreducible representation of N, where $N \trianglelefteq \bar{G}$ and let $\bar{H} = T(Y)$, so Y is equivalent to all its conjugates in $\bar{H}$. The following theorem shows that Y can always be extended to a projective representation of $\bar{H}$ and gives a necessary and sufficient condition for Y to be extendible to an ordinary representation of $\bar{H}$.

Theorem 4.2.2 *Let $N \trianglelefteq \bar{G}$, Y an irreducible representation of N and $\bar{H}$ be as above. Then Y extends to a projective representation X of $\bar{H}$ with factor set $\bar{\alpha}$ such that $\bar{\alpha}$ is constant on cosets of N in $\bar{H}$. Therefore $\bar{\alpha}$ can be regarded as a factor set α of $H = \bar{H}/N$ defined by $\alpha(Nh, Nk) = \bar{\alpha}(h,k)$. Also, α satisfies $\alpha^{d|N|} \sim 1$ where d is the degree of Y. Furthermore, Y extends to a linear representation of $\bar{H}$ if and only if $\alpha \sim 1$. In particular, if $H^2(\bar{G}, \mathbb{C}^*) = 1$, then Y always extends to a linear representation of G.*

Proof. See Nagao and Tsushima [89]. □

Theorem 4.2.3 *Let $N \trianglelefteq \bar{G}$, Y be an irreducible representation of N with $\bar{H} = T(Y)$ and $H = \bar{H}/N$. Extend Y to a projective representation X of $\bar{H}$ as in Theorem 4.2.2 with factor set $\bar{\alpha}$. Then*

1. *If W is an irreducible representation of H that has Y as one of its irreducible constituents in its restriction to N then there exists an irreducible projective representation Z of H with factor set α^{-1} such that W is equivalent to the representation $\bar{Z} \otimes X$ of $\bar{H}$, where α is the factor set of H obtained from $\bar{\alpha}$, and $\bar{Z}$ is the representation of $\bar{H}$ obtained naturally from Z.*

2. *If, conversely, Z is any irreducible projective representation of H with factor set α^{-1}, then $\bar{Z} \otimes X$ is an irreducible representation of $\bar{H}$ which is equivalent to some representation that contains Y in its restriction to N.*

Proof. See Nagao and Tsushima [89]. □

Theorem 4.2.4 *[102] Let $N \lhd \bar{H}$, $\varphi \in Irr(N)$ be invariant under $\bar{H}$ and let $\bar{\varphi}$ be an projective extension of φ to $\bar{H}$ with factor set α. Then*

$$Irr(\bar{H},\varphi) = \{\bar{\varphi}\psi \mid \psi \quad \text{is an irreducible } \alpha^{-1}\text{−projective character of} \quad \bar{H}/N\}.$$

In particular, the number of irreducible α^{-1}- projective characters of $\bar{H}/N$ is equal to the number of α- regular classes of $\bar{H}$.

Proof. See [102]. □

Now we restate the results from Theorems 4.2.2 and 4.2.3 in the form in which we will be using them, in terms of projective and ordinary characters.

Corollary 4.2.5 *[73] Let $\bar{G} = N{\cdot}G$, where $N \trianglelefteq \bar{G}$ and $\bar{G}/N \cong G$. Let $\theta \in Irr(N)$ and $\bar{H} = I_{\bar{G}}(\theta)$.*

(i) There exists a projective character φ of $\bar{H}$ with factor set $\bar{\alpha}$ such that $\varphi_N = \theta$ and $\bar{\alpha}$ is constant on cosets of N, so $\bar{\alpha}$ can be regarded as a factor set α of $H = \bar{H}/N$.

(ii) If $\theta(1_N) = d$, then $\alpha^{d|N|} \sim 1$.

(iii) If η runs over all the irreducible projective characters of H with factor set α^{-1}, then $\varphi\bar{\eta}$ runs over all irreducible characters of $\bar{H}$ that contains θ in their restrictions to N where $\bar{\eta}$ is the projective character of $\bar{H}$ obtained naturally from η.

Proof. See [73]. □

Remark 4.2.6 *In the above theorem, if θ extends to an ordinary character of $\bar{H}$, then we show that $\alpha \sim 1$. In this case η's are the ordinary irreducible characters of H. Hence Theorem 4.1.16 is a special case of the above corollary.*

Remark 4.2.7 *Now by Remark 4.1.8 and Corollary 4.2.5, the characters of $\bar{G} = N{\cdot}G$ can be obtained as follows:*

Let $\theta_1, \theta_2, \ldots, \theta_t$ be the representatives of the orbits of $\bar{G}$ on the set $Irr(N)$. Let $\bar{H}_i = I_{\bar{G}}(\theta_i)$, φ_i be a projective character of $\bar{H}_i$ with factor set α_i such that $\theta_i = \varphi_N$. Then

$$Irr(\bar{G}) = \bigcup_{i=1}^{t}\{(\eta\varphi_i)^{\bar{G}} \mid \eta \in IrrProj(\bar{H}_i), \text{ with factor set } \quad \alpha_i^{-1}\},$$

where α_i is obtained from $\bar{\alpha}_i$ as in Corollary 4.2.5.

Hence the characters table of $\bar{G}$ is partitioned into t blocks $\triangle_1, \triangle_2, \ldots, \triangle_t$ where $\triangle_i$ is produced from the inertia subgroup $\bar{H}_i$.

4.3 Irreducible Constituents and Conjugacy Classes

This section treats two topics. The first concerns the number of irreducible constituents of induced characters, and the second the number of conjugacy classes. Using some properties of extensions of characters, we will study the problem which asserts that if χ is a $\bar{G}$-invariant irreducible character of a normal subgroup N of a finite group $\bar{G}$, then the number of distinct irreducible constituents of $\chi^{\bar{G}}$ is equal to the number of χ-regular conjugacy classes of $\bar{G}/N$. We also show that the number of irreducible constituents of $\chi^{\bar{G}}$ is equal to the number of conjugacy classes of $\bar{G}/N$ if and only if χ extends to a character of each subgroup $N<x,y>$ of $\bar{G}$ with $[x,y] \in N$.

Most of the results in this section are from *Gallagher* [36] but we give proofs from [61].

Lemma 4.3.1 *Let N be a normal subgroup of $\bar{G}$ such that $\bar{G}/N$ is cyclic of order n. If χ is $\bar{G}$-invariant irreducible characters of N, then there exists precisely n irreducible characters of $\bar{G}$ extending χ and their sum is $\chi^{\bar{G}}$.*

Proof. See Lemma 23.3.2 of [61]. □

Let N be a normal subgroup of a group $\bar{G}$ and, for each $\bar{g} \in \bar{G}$, let the group $C_{\bar{g}}$ containing N be defined by

$$C_{\bar{g}}/N = C_{\bar{G}/N}(N\bar{g}) .$$

Let χ be a $\bar{G}$-invariant irreducible character of N. From the proof of Lemma 4.3.1, χ extends to a character $\chi_{\bar{g}}$ of the subgroup $N<\bar{g}>$ with $\bar{g} \in \bar{G}$. We say that $\bar{g}$ is *χ-regular* if $(\chi_{\bar{g}})^x = \chi_{\bar{g}}$ for all $x \in C_{\bar{g}}$. Note that Gallagher [36] uses the term *goodness* instead of χ-regular.

Remark 4.3.2 *In [61] it was proved that the notion of χ -regularity is independent of the choice of $\chi_{\bar{g}}$ and depends only on χ and the conjugacy class of $N\bar{g}$ in $\bar{G}/N$.*

We say that the conjugacy class of $N\bar{g}$ in $\bar{G}/N$ is χ-regular if $\bar{g}$ is χ-regular. By the above Remark, this notion is well defined.

Theorem 4.3.3 *[36]. Let N be a normal subgroup of a group $\bar{G}$ and let χ be a $\bar{G}$-invariant irreducible character of N. Then the number of distinct irreducible constituents of $\chi^{\bar{G}}$ is equal the number of χ-regular conjugacy classes of $\bar{G}/N$.*

Proof. See [61]. □

Corollary 4.3.4 *[36] Let N be a normal subgroup of a group $\bar{G}$ and let χ be a $\bar{G}$-invariant irreducible character of N. Then the number of distinct irreducible constituents of $\chi^{\bar{G}}$ is* *at most the number of conjugacy classes of $\bar{G}/N$ with equality if and only if χ extends to a character of each subgroup $N\langle x,y\rangle$ with $[x,y] \in N$.*

Proof. See [61]. □

Now we provide some information on the number of conjugacy classes of G by using certain character-theoretic facts. In what follows $r(G)$ denotes the number of conjugacy classes of G. Then $r(G)$ is also the number of irreducible complex characters of G.

Lemma 4.3.5 *[61] The following formula holds:*

$$r(G) = \frac{1}{|G|} \sum_{g \in G} |C_G(g)|.$$

Proof. The group G acts on itself by conjugation. If χ is the corresponding permutation character, then

$$\chi(g) = |C_G(g)| \quad \text{for all} \quad g \in G$$

and the G-orbits are precisely the conjugacy classes of G. Hence,

$$r(G) = \langle \chi, 1_G \rangle = \frac{1}{|G|} \sum_{g \in G} \chi(g) = \frac{1}{|G|} \sum_{g \in G} |C_G(g)|,$$

as desired. □

Theorem 4.3.6 *[36]. Let N be a normal subgroup of $\bar{G}$. Then*

(i) $r(\bar{G}) \leq r(\bar{G}/N) r(N)$;

(ii) The following conditions are equivalent:

(a) $r(\bar{G}) = r(\bar{G}/N) r(N)$,

(b) $C_{\bar{g}} = C_{\bar{G}}(\bar{g})N$ *for all* $\bar{g} \in \bar{G}$,

(c) each irreducible character of N extends to a character of each subgroup $N\langle x,y\rangle$ with $[x,y] \in \bar{G}$.

Proof. See Theorem 28.2.3 of [61]. □

Chapter 5

The Fischer-Clifford Matrices

The character table of a group provides considerable information about the group, and hence it is of importance in the physical sciences as well as in pure mathematics. Character tables of finite groups can be constructed using various techniques. For example, the Schreier-Sims algorithm, Todd-Coxeter coset enumeration method, the Burnside-Dixion algorithm and various other techniques. However *Bernd Fischer* studied a technique for constructing the character tables of group extensions. This technique, which is known as the technique of *Fischer-Clifford Matrices*, derives its fundamentals from the Clifford theory and provides very powerful information for constructing character tables. If $\bar{G} = N.G$ is an appropriate extension of N by G, the method involves the construction of a nonsingular matrix for each conjugacy class of $\bar{G}/N$. In this dissertation we apply this technique to both split and non-split extensions. This technique has also been discussed and used (mainly to split extensions) in Almestady [1], Darafsheh and Iranmanesh ([22], [23]), Fischer ([30], [31], [32], [33]), List [68], List and Mohammed [69], Moori and Mpono ([81], [82], [83]), Mpono [88], Pahlings [92], Saleh [101], Schiffer [102] and Whitely [109]. For the Fischer-Clifford matrices and its properties, we shall follow the work of Mpono [88], Schiffer [102] and Whitely [109] very closely.

In Section 5.1 we define Fischer-Clifford matrices in general. In Subsection 5.1.1 we shall discuss the properties of the Fischer-Clifford matrices which are helpful in their computation. In Subsection 5.1.2 we study a special case of Fischer-Clifford matrices of a $\bar{G} = N.G$ with the property that every irreducible character of N can be extended to an irreducible character of its inertia group in $\bar{G}$. Sctions 5.2 and 5.3 deal with the Fischer-Clifford matrices for the split cosets and non-split extensions respectively. Section 5.4 is devoted to the study of Fischer-Clifford matrices using GAP [103]. Finally in Section 5.5 we consider the group $2^6{\cdot}U_4(2)$ (non-split) and we compute its Fischer-Clifford matrices.

5.1 Definition and General Theory

Let $\bar{G} = N{\cdot}G$ be an extension of N by G, where N is normal subgroup of $\bar{G}$ and $\bar{G}/N \cong G$. Let $\bar{g} \in \bar{G}$ be a lifting of $g \in G$ under the natural homomorphism $\bar{G} \longrightarrow G$ and $[g]$ be a conjugacy class of elements of G with representative g. Let $X(g) = \{x_1, x_2, \ldots, x_{c(g)}\}$ be a set of representatives of the conjugacy classes of $\bar{G}$ from the coset $N\bar{g}$ whose images under the natural homomorphism $\bar{G} \longrightarrow G$ are in $[g]$ and we take $x_1 = \bar{g}$. Let $\{\theta_1, \theta_2, \ldots, \theta_t\}$ be a set of representatives of the orbits of $\bar{G}$ on $Irr(N)$ such that for $1 \leq i \leq t$, we have $\bar{H}_i = I_{\bar{G}}(\theta_i)$ with the corresponding inertia factors H_i and let ψ_i be a projective character of $\bar{H}_i$ with factor set $\bar{\alpha}_i$ such that $(\psi_i)_N = \theta_i$. By Remark 4.2.5 we have

$$Irr(\bar{G}) = \bigcup_{i=1}^{t} \{(\psi_i\bar{\beta})^{\bar{G}} \mid \beta \in IrrProj(H_i), \text{ with factor set } \alpha_i^{-1}\},$$

where α_i is obtained from $\bar{\alpha}_i$ and $\bar{\beta}$ from β as in Remark 4.2.5. Without loss of generality suppose that $\theta_1 = 1_N$ is the identity character of N. Then $\bar{H}_1 = \bar{G}$ and $H_1 = G$. Now choose $y_1, y_2, \ldots, y_r$ to be the representatives of the α_i^{-1}-conjugacy classes of elements of H_i that fuse to $[g]$ in G. Since $y_k \in H_i$ for $1 \leq k \leq r$, then we define $y_{l_k} \in \bar{H}_i$ such that y_{l_k} ranges over all representatives of the conjugacy classes of elements of $\bar{H}_i$ which map to y_k under the homomorphism $\bar{H}_i \longrightarrow H_i$ whose kernel is N. Now by using the formula for induced characters given in Theorem 2.4.7, we have

$$\begin{aligned}
(\psi_i\bar{\beta})^{\bar{G}}(x_j) &= \sum_{1\leq k\leq r}\sum_{\ell}{}' \frac{|C_{\bar{G}}(x_j)|}{|C_{\bar{H}_i}(y_{\ell_k})|}\psi_i\bar{\beta}(y_{\ell_k}) \\
&= \sum_{1\leq k\leq r}\sum_{\ell}{}' \frac{|C_{\bar{G}}(x_j)|}{|C_{\bar{H}_i}(y_{\ell_k})|}\psi_i(y_{\ell_k})\bar{\beta}(y_{\ell_k}) \\
&= \sum_{1\leq k\leq r}\Big(\sum_{\ell}{}' \frac{|C_{\bar{G}}(x_j)|}{|C_{\bar{H}_i}(y_{\ell_k})|}\psi_i(y_{\ell_k})\Big)\beta(y_k)
\end{aligned}$$

where $\sum_{\ell}'$ is the summation over all ℓ for which $y_{\ell_k} \sim x_j$ in $\overline{G}$. Now we define a matrix $M_i(g)$ by $M_i(g) = (a_{uv})$, where $1 \leq u \leq r$ and $1 \leq v \leq c(g)$, and

$$a_{uv} = \sum_{\ell}{}' \frac{|C_{\overline{G}}(x_j)|}{|C_{\overline{H}_i}(y_{\ell_k})|}\psi_i(y_{\ell_k}) \quad .$$

Then we obtain that

$$(\psi_i\beta)^{\overline{G}}(x_j) = \sum_{1\leq k\leq r} a_{uv}\hat{\beta}(y_k) \quad .$$

By doing so for all $1 \leq i \leq t$ such that H_i contains an element in $[g]$ we obtain the matrix $M(g)$ given by

$$M(g) = \begin{bmatrix} M_1(g) \\ M_2(g) \\ \vdots \\ M_t(g) \end{bmatrix},$$

where $M_i(g)$ is the submatrix corresponding to the inertia group $\bar{H}i$ and its inertia factor H_i. If $H_i \cap [g] = \emptyset$, then $M_i(g)$ will not exist and $M(g)$ does not contain $M_i(g)$. The size of the matrix $M(g)$ is $l \times c(g)$ where l is the number of α_i^{-1}-regular conjugacy classes of elements of the inertia factors H_i's for $1 \leq i \leq t$ which fuse into $[g]$ in G and $c(g)$ is the number of conjugacy classes of elements of $\bar{G}$ which correspond to the coset $\bar{g}N$. Then $M(g)$ is the *Fischer-Clifford matrix* of $\bar{G}$ corresponding to the coset $\bar{g}N$. We will see later that $M(g)$ is a $c(g) \times c(g)$ nonsingular matrix. Let

$$R(g) = \{(i, y_k) \mid 1 \leq i \leq t\ ,\ H_i \cap [g] \neq \emptyset\ ,\ 1 \leq k \leq r\}$$

and we note that y_k runs over representatives of the α_i^{-1}-conjugacy classes of elements of H_i which fuse into $[g]$ in G. Following the notation used in Fischer [29], Mpono [88] and Whitely [109] we denote $M(g)$ by writing $M(g) = Cl(N\bar{g}) = (a_j^{(i,y_k)})$, where

$$a_j^{(i,y_k)} = \sum_{\ell}{}' \frac{|C_{\bar{G}}(x_j)|}{|C_{\bar{H}i}(y_{\ell_k})|}\psi_i(y_{\ell_k}) \quad ,$$

with columns indexed by $X(g)$ and rows indexed by $R(g)$. Then the partial character table of $\bar{G}$ on the classes $\{x_1, x_2, \ldots, x_{c(g)}\}$ is given by

$$\begin{bmatrix} C_1(g)M_1(g) \\ C_2(g)M_2(g) \\ \vdots \\ C_t(g)M_t(g) \end{bmatrix}$$

where the Fischer-Clifford matrix $M(g)$ is divided into blocks with each block corresponding to an inertia group $\bar{H}_i$ and $C_i(g)$ is the partial projective character table of H_i with factor set α_i^{-1} consisting of the columns corresponding to the α_i^{-1}-regular classes that fuse into $[g]$ in G. We obtain the characters of $\bar{G}$ by multiplying the relevant columns of the projective characters of H_i with factor set α_i^{-1} by the rows of $M(g)$. We can also observe that the number of irreducible characters of $\bar{G}$ is the sum of numbers of projective characters of the inertia factors H_i's with factor set α_i^{-1}, for all i, $1 \leq i \leq t$.

5.1.1 Properties of Fischer-Clifford Matrices

In this section we shall discuss some properties of the Fischer-Clifford matrices which are useful in their computation. These properties have been discussed in [22], [23], [31], [32], [68], [69], [81], [82], [83], [88], [101] and [109].

Let K be a group and $A \leq Aut(K)$. Then by Brauer's theorem (Theorem 2.5.7) A acts on the conjugacy classes of elements of K and on the irreducible characters of K resulting in the same number of orbits.

Lemma 5.1.1 *Suppose we have the following matrix describing the above actions:*

$$\begin{array}{c} \\ s_1 \\ s_2 \\ \vdots \\ s_i \\ \vdots \\ s_t \end{array} \begin{array}{c} \begin{array}{ccccccc} 1=l_1 & l_2 & \cdots & l_j & \cdots & l_t \end{array} \\ \begin{pmatrix} 1 & 1 & \cdots & 1 & \cdots & 1 \\ a_{21} & a_{22} & \cdots & a_{2j} & \cdots & a_{2t} \\ \vdots & \vdots & & \vdots & & \vdots \\ a_{i1} & a_{i2} & \cdots & a_{ij} & \cdots & a_{it} \\ \vdots & \vdots & & \vdots & & \vdots \\ a_{t1} & a_{t2} & \cdots & a_{tj} & \cdots & a_{tt} \end{pmatrix} \end{array}$$

where $a_{1j} = 1$ for $j \in \{1, 2, \dots, t\}$, l_j's are lengths of orbits of A on the conjugacy classes of K, s_i's are lengths of orbits of A on $Irr(K)$ and a_{ij} is the sum of s_i irreducible characters of K on the element x_j, where x_j is an element of the orbit of length l_j. Then the following relation holds for $i, i' \in \{1, 2, \dots, t\}$:
$\sum_{j=1}^{t} a_{ij}\overline{a_{i'j}}l_j = |K|s_i\delta_{ii'}$.

Proof. This result has been proved as Lemma 2.2.2 in [101] and as Lemma 4.2.2 in [109]. □

For arithmetical properties weights are important. We present $M(g)$ with corresponding *weights*. Let $x_j \in X(g)$. For a fixed coset $X = \bar{g}N \in \bar{G}/N$, we define $m_j = [N_{\bar{G}}(X) : C_{\bar{G}}(x_j)]$.

The Fischer-Clifford matrix $M(g)$ is partitioned row-wise into blocks, where each block corresponds to an inertia group. The columns of $M(g)$ are indexed by $X(g)$ and for each $x_j \in X(g)$, at the top of the columns of $M(g)$, we write $|C_{\bar{G}}(x_j)|$ and at the bottom we write m_j. The rows of $M(g)$ are indexed by $R(g)$ and on the left of each row we write $|C_{H_i}(y_k)|$, where y_k fuses into $[g]$ in G. Then in general we can write $M(g)$ with corresponding weights for rows and columns as follows, where blocks corresponding to the inertia groups are separated by horizontal lines.

Table 5.1

$$
\begin{array}{c}
\\ |C_G(g)| \\ \\ |C_{H_2}(y_1)| \\ |C_{H_2}(y_2)| \\ \vdots \\ \\ |C_{H_i}(y_1)| \\ |C_{H_i}(y_2)| \\ \vdots \\ \\ |C_{H_t}(y_1)| \\ |C_{H_t}(y_2)| \\ \vdots \\ \\ \\
\end{array}
\begin{array}{c}
\begin{array}{cccc} |C_{\overline{G}}(x_1)| & |C_{\overline{G}}(x_2)| & \cdots & |C_{\overline{G}}(x_{c(g)})| \end{array} \\
\left(\begin{array}{cccc}
a_1^{(1,g)} & a_2^{(1,g)} & \dots & a_{c(g)}^{(1,g)} \\
\hline
a_1^{(2,y_1)} & a_2^{(2,y_1)} & \dots & a_{c(g)}^{(2,y_1)} \\
a_1^{(2,y_2)} & a_2^{(2,y_2)} & \dots & a_{c(g)}^{(2,y_2)} \\
\vdots & \vdots & \vdots & \vdots \\
\hline
a_1^{(i,y_1)} & a_2^{(i,y_1)} & \dots & a_{c(g)}^{(i,y_1)} \\
a_1^{(i,y_2)} & a_2^{(i,y_2)} & \dots & a_{c(g)}^{(i,y_2)} \\
\vdots & \vdots & \vdots & \vdots \\
\hline
a_1^{(t,y_1)} & a_2^{(t,y_1)} & \dots & a_{c(g)}^{(t,y_1)} \\
a_1^{(t,y_2)} & a_2^{(t,y_2)} & \dots & a_{c(g)}^{(t,y_2)} \\
\vdots & \vdots & \vdots & \vdots \\
\hline
\end{array}\right) \\
\begin{array}{cccc} m_1 & m_2 & \dots & m_{c(g)} \end{array}
\end{array}
$$

Remark 5.1.2 Fischer [32] has shown that the Fischer-Clifford matrix $M(g)$ satisfies complex conjugation.

The following result gives the orthogonality relation for $M(g)$. Its proof was obtained from Whitley [109], Proposition 4.2.3.

Proposition 5.1.3 *([109][88])(*Column orthogonality*) Let $\overline{G} = N{\cdot}G$, then*

$$\sum_{(i,y_k)\in R(g)} |C_{H_i}(y_k)| a_j^{(i,y_k)} \overline{a_{j'}^{(i,y_k)}} = \delta_{jj'} |C_{\overline{G}}(x_j)| \quad .$$

Proof. The partial character table of $\overline{G}$ at classes $x_1, \dots, x_{c(g)}$ is given by

$$\begin{bmatrix} C_1(g)M_1(g) \\ C_2(g)M_2(g) \\ \vdots \\ C_t(g)M_t(g) \end{bmatrix}.$$

By column orthogonality of the character table of $\overline{G}$, we have

$$|C_{\overline{G}}(x_j)|\delta_{jj'} = \sum_{i=1}^{t} \sum_{\beta_i \in IrrProj(H_i)} (\sum_{y_k:(i,y_k)\in R(g)} a_j^{(i,y_k)} \beta_i(y_k)) \overline{(\sum_{y'_k:(i,y'_k)\in R(g)} a_{j'}^{(i,y'_k)} \beta_i(y'_k))}$$

$$
\begin{aligned}
&= \sum_{i=1}^{t} \sum_{\beta_i \in IrrProj(H_i)} \Big(\sum_{y_k} a_j^{(i,y_k)} \overline{a_{j'}^{(i,y_k')}} \beta_i(y_k)\overline{\beta_i(y_k)} \ + \\
&\quad \sum_{y_k} \sum_{y_k' \neq y_k} a_j^{(i,y_k)} \overline{a_{j'}^{(i,y_k')}} \beta_i(y_k)\overline{\beta_i(y_k')}\Big) \\
&= \sum_{i=1}^{t} \Big(\sum_{y_k} a_j^{(i,y_k)} \overline{a_{j'}^{(i,y_k)}} \sum_{\beta_i \in IrrProj(H_i)} \beta_i(y_k)\overline{\beta_i(y_k)} \ + \\
&\quad \sum_{y_k} \sum_{y_k' \neq y_k} a_j^{(i,y_k)} \overline{a_{j'}^{(i,y_k')}} \sum_{\beta_i \in IrrProj(H_i)} \beta_i(y_k)\overline{\beta_i(y_k')}\Big) \\
&= \sum_{i=1}^{t} \Big(\sum_{y_k} a_j^{(i,y_k)} \overline{a_{j'}^{(i,y_k)}} |C_{H_i}(y_k)| \ + \ 0\Big) \\
&= \sum_{(i,y_k) \in R(g)} a_j^{(i,y_k)} \overline{a_{j'}^{(i,y_k)}} |C_{H_i}(y_k)|.
\end{aligned}
$$

□

Theorem 5.1.4 $a_j^{(1,g)} = 1$ *for all* $j \in \{1, 2, \ldots, c(g)\}$

Proof. For $y_{\ell_k} \sim x_j$ in $\overline{G}$, we have $|C_{\overline{G}}(x_j)| = |C_{\overline{H}_1}(y_{\ell_k})|$. Thus we obtain that

$$
a_j^{(1,g)} = \sum_{\ell}{}' \frac{|C_{\overline{G}}(x_j)|}{|C_{\overline{H}_1}(y_{\ell_k})|} \psi_1(y_{\ell_k}) = \sum_{\ell}{}' 1 = 1 \quad .
$$

Hence the result. □

Proposition 5.1.5 *([68], [109]) The matrix* $M(1_G)$ *is the matrix with rows equal to the orbit sums of the action of* $\overline{G}$ *on* $Irr(N)$ *with duplicate columns discarded. For this matrix we have* $a_j^{(i,1_G)} = [G : H_i]$*, and an orthogonality relation for rows:*

$$
\sum_{j=1}^{t} \frac{1}{|C_{\overline{G}}(x_j)|} a_j^{(i,1_G)} a_j^{(i',1_G)} = \frac{1}{|C_{H_i}(1_G)|} \delta_{ii'} = \frac{1}{|H_i|} \delta_{ii'} \quad .
$$

Proof. See [88]. □

As a consequence of Lemma 5.2.1, Proposition 5.2.3 and from Fischer [32], we have the following properties:

(a) $|X(g)| = |R(g)|$,

(b) $\sum_{j=1}^{c(g)} m_j a_j^{(i,y_k)} \overline{a_j^{(i',y_k')}} = \delta_{(i,y_k),(i',y_k')} \frac{|C_G(g)|}{|C_{H_i}(y_k)|} |N|$,

(c) $\sum_{(i,y_k) \in R(g)} a_j^{(i,y_k)} \overline{a_{j'}^{(i,y_k)}} |C_{H_i}(y_k)| = \delta_{jj'} |C_{\overline{G}}(x_j)|$,

(d) $M(g)$ is square and nonsingular.

5.1.2 Fischer-Clifford Matrices (Special Case)

Let $\bar{G} = N.G$ be an extension of N by G such that every irreducible character θ of N can be extended to its inertia group $\bar{H} = I_{\bar{G}}(\theta)$. Now we define the Fischer-Clifford matrices in the same way as the general case. Let $\bar{g} \in \bar{G}$ be a lifting of $g \in G$ under the natural homomorphism $\bar{G} \longrightarrow G$ and $[g]$ be a conjugacy class of elements of G with representative g. Let $X(g) = \{x_1, x_2, \ldots, x_{c(g)}\}$ be a set of representatives of the conjugacy classes of $\bar{G}$ from the coset $N\bar{g}$ whose images under the natural homomorphism $\bar{G} \longrightarrow G$ are in $[g]$ and we take $x_1 = \bar{g}$. Let $\{\theta_1, \theta_2, \ldots, \theta_t\}$ be a set of representatives of the orbits of $\bar{G}$ on $Irr(N)$ such that for $1 \leq i \leq t$, we have $\overline{H}_i = I_{\bar{G}}(\theta_i)$ with $H_i = \bar{H}i/N \leq G$ and that $\psi_i \in Irr(\bar{H}i)$ is an extension of θ_i to $\bar{H}i$. Then without loss of generality suppose that $\theta_1 = I_N$ is the identity character of N. Then $\bar{H}_1 = \bar{G}$ and $H_1 = G$. Now choose $y_1, y_2, \ldots, y_r$ to be the representatives of the conjugacy classes of elements of H_i which fuse into $[g]$ in G. Since $y_k \in H_i$ for $1 \leq k \leq r$, then we define $y_{\ell_k} \in \bar{H}i$ such that y_{ℓ_k} ranges over all the representatives of the conjugacy classes of elements of $\bar{H}i$ which map to y_k under the homomorphism $\bar{H}i \longrightarrow H_i$ whose kernel is N. Let $\beta \in Irr(\bar{H}i)$ such that $N \subseteq ker(\beta)$. Then β is a lifting of $\hat{\beta} \in Irr(H_i)$ such that $\beta(y_{\ell_k}) = \hat{\beta}(y_k)$ for any lifting $y_{\ell_k} \in \bar{H}i$ of $y_k \in H_i$. Now by using Theorem 2.4.7, as in the general case, we obtain that

$$(\psi_i\beta)^{\bar{G}}(x_j) \quad = \quad \sum_{1 \leq k \leq r} (\sum_{\ell}{}' \frac{|C_{\bar{G}}(x_j)|}{|C_{\bar{H}i}(y_{\ell_k})|}\psi_i(y_{\ell_k}))\hat{\beta}(y_k)$$

where $\sum_{\ell}{}'$ is the summation over all ℓ for which $y_{\ell_k} \sim x_j$ in $\overline{G}$. We define a matrix $M_i(g)$ by $M_i(g) = (a_{uv})$, where $1 \leq u \leq r$ and $1 \leq v \leq c(g)$, and

$$a_{uv} = \sum_{\ell}{}' \frac{|C_{\overline{G}}(x_j)|}{|C_{\overline{H}_i}(y_{\ell_k})|}\psi_i(y_{\ell_k}) \quad .$$

Then we obtain that

$$(\psi_i\beta)^{\overline{G}}(x_j) = \sum_{1 \leq k \leq r} a_{uv}\hat{\beta}(y_k) \quad .$$

By doing so for all $1 \leq i \leq t$ such that H_i contains an element in $[g]$ we obtain the matrix $M(g)$ given by

$$M(g) = \begin{bmatrix} M_1(g) \\ M_2(g) \\ \vdots \\ M_t(g) \end{bmatrix} ,$$

where $M_i(g)$ is the submatrix corresponding to the inertia group $\bar{H}i$ and its inertia factor H_i. Then as in the previous section, $M(g)$ is the *Fischer-Clifford matrix* of $\overline{G}$ corresponding to the coset $\bar{g}N$. Let

$$R(g) = \{(i, y_k) \mid 1 \leq i \leq t \ , \ H_i \cap [g] \neq \emptyset \ , \ 1 \leq k \leq r\}$$

and we note that y_k runs over representatives of the conjugacy classes of elements of H_i which fuse into $[g]$ in G. Again we denote $M(g)$ by writing $M(g) = (a_j^{(i,y_k)})$, where

$$a_j^{(i,y_k)} = \sum_{\ell}{}' \frac{|C_{\bar{G}}(x_j)|}{|C_{\bar{H}i}(y_{\ell_k})|}\psi_i(y_{\ell_k}) \quad ,$$

with columns indexed by $X(g)$ and rows indexed by $R(g)$. Then we obtain the irreducible characters of $\bar{G}$ by multiplying the relevant columns of the irreducibles characters of H_i by the rows $M(g)$.

Remark 5.1.6 *All our results of Section 5.1.1 are applicable with irreducible projective characters are replaced by ordinary irreducible characters.*

5.2 Split Cosets

From now on suppose that N is an elementary abelian normal p-subgroup of $\bar{G}$ and $\bar{g}N = X$ is a fixed coset of $\bar{G}/N \cong G$. Let $M = C_{\bar{g}} = N_{\bar{G}}(X)$. We define

$$N_{\bar{g}} := < [\bar{g}, n],\ n \in N > .$$

With these notations we have the following lemma.

Lemma 5.2.1 *(i)* $N_x = N_{\bar{g}}$ *for all* $x \in X$ *and* $[\bar{g}, u_1].[\bar{g}, u_2] = [\bar{g}, u_1u_2]$ *for all* $u_1, u_2 \in N$.

(ii) $N_{\bar{g}} \lhd M$ *and* $N_{\bar{g}} \leq N$.

(iii) If $\varphi \in Irr(N)$, *then* $N_{\bar{g}} \leq ker(\varphi)$ *or* $I_{\bar{G}}(\varphi) \cap \bar{g}N = \emptyset$.

Proof.

(i) Let $x = \bar{g}n \in \bar{g}N$ and $u \in N$, then

$$\begin{aligned}[x, u] &= [\bar{g}n, u] = n^{-1}(u^{-1})^{\bar{g}}nu \\ &= (u^{-1})^{\bar{g}}u \qquad \text{since } N \text{ is abelian} \\ &= \bar{g}^{-1}u^{-1}\bar{g}u = [\bar{g}, u]\end{aligned}$$

which implies that

$$N_x = N_{\bar{g}} \quad \text{for all} \quad x \in \bar{g}N.$$

Also since N is abelian, we obtain for all $u_1, u_2 \in N$

$$\begin{aligned}[\bar{g}, u_1].[\bar{g}, u_2] &= (u_1^{-1})^{\bar{g}}u_1(u_2^{-1})^{\bar{g}}u_2 \\ &= (u_1^{-1}u_2^{-1})^{\bar{g}}u_1u_2 \\ &= [\bar{g}, u_1u_2] .\end{aligned}$$

Hence

$$[\bar{g}, u_1].[\bar{g}, u_2] = [\bar{g}, u_1u_2] \quad \text{for} \quad u_1, u_2 \in N.$$

(ii) Since $[\bar{g}, u] = (u^{-1})^{\bar{g}}u \in N$, we obtain $N_{\bar{g}} \leq N \leq M$. Conversly, let $m \in M$ then

$$\begin{aligned} [\bar{g}, u]^m &= m^{-1}[\bar{g}, u]m \\ &= (\bar{g}^{-1})^m(u^{-1})^m\bar{g}^m u^m \\ &= (\bar{g}^m)^{-1}(u^m)^{-1}\bar{g}^m u^m \\ &= [\bar{g}^m, u^m] \in N_{\bar{g}} \,. \end{aligned}$$

Hence $N_{\bar{g}} \lhd M$.

(iii) Let $\varphi \in Irr(N)$ be fixed. Then

$$\begin{aligned} N_{\bar{g}} \leq Ker(\varphi) &\Leftrightarrow \varphi([\bar{g}, u]) = \varphi(1) = 1 \quad \text{for all} \quad u \in N \\ &\Leftrightarrow \varphi(\bar{g}^{-1}u^{-1}\bar{g}u) = \varphi((u^{-1})^{\bar{g}}u) = 1 \\ &\Leftrightarrow \varphi((u^{-1})^{\bar{g}}) = (\varphi(u))^{-1} = \varphi(u^{-1}) \\ &\Leftrightarrow \varphi^{\bar{g}}(u^{-1}) = \varphi(u^{-1}) \\ &\Leftrightarrow \varphi^{\bar{g}} = \varphi \\ &\Leftrightarrow \bar{g}N \subseteq I_{\bar{G}}(\varphi) \\ &\Leftrightarrow \bar{g}N \cup I_{\bar{G}}(\varphi) \neq \emptyset \,. \end{aligned}$$

□

Remark 5.2.2 *We can easily show that* $<X>/N_{\bar{g}}$ *is abelian and* $X/N_{\bar{g}}$ *is a coset of* $<X>/N_{\bar{g}}$.

Lemma 5.2.3 *[32] The rows of the Fischer-Clifford matrix* $Cl(X)$ *can be identified with restrictions of* M*-invariant characters of* $<X>/N_{\bar{g}}$ *to* $X/N_{\bar{g}}$.

Proof. This is Lemma 5.2 in [32]. □

Remark 5.2.4 *In the above lemma, the rows of* $Cl(X)$ *will be an independent set of orbit sums, under the action of* M *on* $<X>/N_{\bar{g}}$. *This observation was first given in Fischer [30].*

Definition 5.2.5 *A coset* X *is said to be a* split coset *if it contains an element* x *such that* $M = N.C_{\bar{G}}(x)$.

Note that we do not require $<x> \cap N = <1>$ in the above definition.

Lemma 5.2.6 *[102] If the extension split, then every coset is a split coset.*

Proof. Let $X = \bar{g}N$ and $h \in C_{\bar{G}}(\bar{g})$ then $h(\bar{g}n)h^{-1} = (h\bar{g}h^{-1})(hnh^{-1}) = \bar{g}hnh^{-1} = \bar{g}n^h \in \bar{g}N$. Now since $N \leq M$ and $C_{\bar{G}}(\bar{g}) \leq M$ then $M \geq N.C_{\bar{G}}(\bar{g})$. Let C be the complement of N in $\bar{G}$ such that $\bar{g} \in C$. Let $m \in M$ then $m = n.k$, for some $k \in C$. Since $M = N_{\bar{G}}(\bar{g}N)$, $(\bar{g}N)^m = \bar{g}N$. Hence

$$\begin{aligned}\bar{g}N &= (\bar{g}N)^m = m(\bar{g}N)m^{-1} \\ &= n(k\bar{g}Nk^{-1})n^{-1} = n(k\bar{g}Nk^{-1})n^{-1} = n(\bar{g}N)^k n^{-1}.\end{aligned}$$

So that $n^{-1}(\bar{g}N)n = (\bar{g}N)^k$ and $n^{-1}\bar{g}N = (\bar{g}N)^k$. Hence $\bar{g}N = (\bar{g}N)^k$. It follows that $\bar{g}N = (\bar{g}N)^k = \bar{g}^k N$, which implies that $\bar{g}^k \in \bar{g}N$. Hence $\bar{g}^k \in C \cap \bar{g}N = \{\bar{g}\}$ and so $k \in C_{\bar{G}}(\bar{g})$, which implies that $m = n.k \in N.C_{\bar{G}}(\bar{g})$ and so $M \leq N.C_{\bar{G}}(\bar{g})$. Thus $M = N.C_{\bar{G}}(\bar{g})$. □

The following result is of fundamental importance and very helpful to fill the entries of Fischer-Clifford matrices.

Lemma 5.2.7 *[32] Let X be a split coset then the rows of $Cl(X)$ can be identified with M-invariant characters of $N/N_{\bar{g}}$ multiplied by a p-th root of unity.*

Proof. See [32] and [102]. □

Lemma 5.2.8 *Let $X = \bar{g}N$ be a split coset and $N_{\bar{G}}(X) = NC_{\bar{G}}(x)$ for $x \in X(g)$. Then we have the following:*

(i) $a_1^{(i,y_k)} = \frac{|C_G(g)|}{|C_{H_i}(y_k)|}$,

(ii) $|a_j^{(i,y_k)}| \leq |a_1^{(i,y_k)}|$ *for all* $1 \leq j \leq r$,

(iii) If $|N| = p^w$, *then* $a_j^{(i,y_k)} \equiv a_1^{(i,y_k)} (mod\, p)$.

Proof. See [102].

5.3 Non-Split Extensions

Let $\bar{G} = N{\cdot}G$ be a non-split extension, where N is an elementary abelian normal p-subgroup of $\bar{G}$. Let $\bar{g}N$ be a conjugacy class representative of $\bar{G}/N$ and φ be a representative of $\bar{G}$-orbit irreducible characters of N with the projective extension $\bar{\varphi}$ to $\bar{G}$. We consider the groups $<\bar{g}>N \leq \bar{G}$ and $<\bar{g}N> \leq \bar{G}/N$.

Lemma 5.3.1

$$<\bar{g}>N/N = <\bar{g}N> .$$

Proof. Let $x \in <\bar{g}>N/N$, then $x = \bar{g}^m nN = \bar{g}^m N$ for some $m \in \mathbb{Z}$. So that $x = (\bar{g}N)^m \in <\bar{g}N>$. Hence $<\bar{g}>N/N \leq <\bar{g}N>$. Conversely, let $x \in <\bar{g}N>$. Then $x = (\bar{g}N)^m = \bar{g}^m N$ for some $m \in \mathbb{Z}$. Hence $x = (\bar{g}^m N) \in <\bar{g}>N/N$. Thus $<\bar{g}N> \leq <\bar{g}>N/N$. Therefore $<\bar{g}>N/N = <\bar{g}N>$. □

Lemma 5.3.2 *With the above notations, we have the following:*

(a) $<\bar{g}>N \leq M$.

(b) $(<\bar{g}>N)' = N_{\bar{g}}$ *where* $(<\bar{g}>N)'$ *denotes the commutator subgroup of* $<\bar{g}>N$.

(c) $<\bar{g}>N \leq I_M(\varphi)$ *where* $\varphi \in Irr(N)$.

(d) Given $\varphi \in Irr(N)$ *there exists an extension* $\eta\beta$ *to* $<\bar{g}>N$ *where* $\eta = (\bar{\varphi})_{<\bar{g}>N}$ *and* β *is a projective character of* $<\bar{g}N>$.

Proof.

(a) Let $x \in <\bar{g}>N$ then $x = \bar{g}^m N$ for some $m \in \mathbb{Z}$. Now

$$\begin{aligned} x(\bar{g}N) &= \bar{g}^m n(\bar{g}N) = \bar{g}^m n\bar{g}N = \bar{g}^m nN\bar{g} \quad (\text{since} \quad N \trianglelefteq \bar{G}) \\ &= \bar{g}^m N\bar{g} = N\bar{g}^{m+1}. \end{aligned}$$

Similarly, $(\bar{g}N)x = N\bar{g}^{m+1}$. Hence $x \in M = N_{\bar{G}}(\bar{g}N)$ and so $<\bar{g}>N \leq M$.

(b) First suppose that $[\bar{g}, n] \in N_{\bar{g}}$ then $[\bar{g}, n] \in (<\bar{g}>N)'$ and thus $N_{\bar{g}} \leq (<\bar{g}>N)'$. Also, for $n \in N$, by the definition of $N_{\bar{g}}$, we have

$$(\bar{g}N_{\bar{g}})(nN_{\bar{g}}) = (nN_{\bar{g}})(\bar{g}N_{\bar{g}}).$$

Therefore $(<\bar{g}>N/N_{\bar{g}})$ is abelian, and hence $(<\bar{g}>N)' \leq N_{\bar{g}}$ and we deduce that $(<\bar{g}>N)' = N_{\bar{g}}$.

(c) Let $\varphi \in Irr(N)$ then $N_{\bar{g}} \leq Ker(\varphi)$. Now by Lemma 5.2.1, we have $\bar{g}N \cap I_M(\varphi) \neq \emptyset$. Therefore $\bar{g}$ lies in $I_M(\varphi)$ and so $<\bar{g}> \leq I_M(\varphi)$. Hence $<\bar{g}>N \leq I_M(\varphi)$.

(d) Notice that by part (c), $W = <\bar{g}>N$ is a subgroup of $I_M(\varphi)$. Hence φ is invariant under W. So we can apply the Theorem 4.2.3 to φ and W (see Theorem 5.8 in [89]). Let $\chi \in Irr(<\bar{g}>N, \varphi)$ then by the Clifford theorem (Theorem 4.2.3) we obtain $\chi = ((\bar{\varphi})_{<\bar{g}>N})\beta = \eta\beta$ where β is an $\bar{\alpha}^{-1}$-projective character of $<\bar{g}>N/N = <\bar{g}N>$ and $\bar{\alpha}$ is the factor set of $<\bar{g}>N \times <\bar{g}>N$ obtained from α. If N is abelian, then χ is linear since $\chi_N = \varphi$ is linear (because $deg(\chi) = deg(\varphi) = 1$).

□

Theorem 5.3.3 *[31] Let $\bar{g} \in \bar{G}$ so that $<\bar{g}>N$ is abelian. Then $<\bar{g}N> \leq Z(\bar{G}/N)$ and the rows of Fischer-Clifford matrix of $\bar{g}N$ for regular classes of the inertia group of φ in $\bar{G}$ can be regarded as restrictions to $\bar{g}N$ of the $\bar{G}$-orbit sums of the (projective) extension $\eta\beta$ to $<\bar{g}>N$ of φ.*

Proof. See [31] and [102]. □

5.4 Fischer-Clifford Matrices Using GAP3

Schiffer [102], using the properties of the Fischer-Clifford matrices which we described in Subsection 5.1.1 and Section 5.2, developed functions in *GAP3* which help to fill the Fischer-Clifford matrices and calculate column weights for split cosets. Column weights are very important for computing the Fischer-Clifford matrices. Since, if we know the column weights we can easily determine the centralizer orders of the elements of $\bar{G}$. In [102], there is a function available, called *Findmi*, to compute the column weights m's of the Fischer-Clifford matrices but this function is restricted only to split cosets. We modify the function to compute the m's so that we can use it for non-split cosets as well.

- *Findmi*(*<size>*, *<sum>*, *<centralizer>*)

where *<size>* is the size of the Fischer-Clifford matrix, *<sum>* is the total sum of the first column of the matrix and *<centralizer>* is the centralizer of the element in G. This function tests the possibilities for the column weights with given total sum *<sum>* and the centralizer order *<centralizer>* of the element. If $m = [m_1, m_2, \ldots, m_{c(g)}]$, then we use this function by assuming an appropriate value for m_1. For example, in the case of a split coset, we always have $m_1 = 1$ and we calculate rest of the m_i's. But for a non-split coset we will be using the function repeatedly by assuming various possible values for m_1.

We give this function in the following Programme:

Programme C

```
Findmi:=function ( size, sum, cent )
   local  i, akt, vec, liste, lastel, ct, p, erg, lerg;
   lastel := sum - size + 1;
   liste := [ 1 ];
   akt := 1;
   for i  in [ 2 .. lastel ]  do
       if cent mod i = 0  then
           akt := akt + 1;
```

```
            liste[akt] := i;
        fi;
    od;
    lastel := liste[akt];
    ct := [ , 0 ];
    akt := 2;
```

vec := [m_1];

```
    erg := [  ];
    lerg := 0;
    while akt > 1  do
        ct[akt] := ct[akt] + 1;
        vec[akt] := liste[ct[akt]];
        for i  in [ akt + 1 .. size ]  do
            vec[i] := vec[akt];
            ct[i] := ct[akt];
        od;
        if Sum( [ 1 .. size ], function ( x )
                    return vec[x];
                end ) = sum  then
            lerg := lerg + 1;
            erg[lerg] := Copy( vec );
        fi;
        akt := size;
        while vec[akt] = lastel and akt $>$ 1  do
            akt := akt - 1;
        od;
    od;
    liste := [  ];
    akt := 0;
    p := Factors( sum )[1];
    if p = 3  then
        for i  in [ 1 .. Length( erg ) ]  do
            if not (erg[i][2] = 1 and erg[i][3] <> 1)  then
                akt := akt + 1;
                liste[akt] := i;
            fi;
        od;
        erg := Sublist( erg, liste );
```

```
    fi;
    return erg;
end;
```

The following functions are available in *GAP3* that helps to complete the entries of the Fischer-Clifford matrices for the split cosets.

Let Ti be the record:

$$\begin{aligned} Ti := rec(grpname &:= \text{Name of group } \bar{G}, \\ tables &:= [tbl_1, tbl_2, \ldots tbl_t], \\ fusions &:= [fus_1, fus_2, \ldots fus_t]), \end{aligned}$$

where $tbl_1, tbl_2, \ldots, tbl_t$ are the character tables of the t inertia factors and $fus_1, fus_2, \ldots, fus_t$ are the fusions of inertia factor groups $tbl_1, tbl_2, \ldots, tbl_t$ into the first inertia factor tbl_1 respectively.

Having the record Ti the following functions are used to compute the Fischer-Clifford matrices.

- clms:= CliffordTable(<*Ti*>)

  This function construct the entries of the first row and the first column of the Fischer-Clifford matrix of the coset $\bar{g}N$ in $\bar{G}/N$. Having obtained the sizes of the Fischer-Clifford matrices for each coset $\bar{g}N$, we can find the number of conjugacy classes of $\bar{G}$ which is be equal to the sum of the sizes of these matrices.

- CompleteClm(<*clms*>[, <*colws*>])

  This function tries to complete columns of the Fischer-Clifford matrix $Cl(X)$ using the column weights and by testing the orthogonality relations given in Subsection 5.1.1. It finds all possible matrices for a given column weight. If there is more than one possibility, the function will return all those matrices, otherwise a record with filled matrix and columnweights will be returned.

- TestCliffordRec(<*clm*>)

  This function tests the orthogonality relations between rows and columns in the matrix and returns *true* if the relations are fulfilled otherwise all pairs of rows or columns not fulfilling the relations are returned.

5.5 An Example

In this section we give a non-split example and we use the method of Fischer-Clifford matrices discussed in Sections 5.1, 5.2, 5.3 and 4.4.

5.5.1 The Group $2^6{\cdot}U_4(2)$

Consider the non-split extension $2^6{\cdot}U_4(2)$, which is a maximal subgroup of the Harda-Norton group HN. Let $\bar{G} = N{\cdot}G$ where $N \cong 2^6$, the vector space of dimension 6 over $GF(2)$ and $G \cong U_4(2)$. We determine the Fischer-Clifford matrices for $\bar{G}$ and then by using these matrices we construct the character table of $\bar{G}$. The character table of G is available in ATLAS [19]. The action of G on N produces three orbits of lengths 1, 27 and 36 with corresponding point stabilizers $U_4(2)$, $2^4{:}A_5$ and S_6 of indices 1, 27 and 36 in $U_4(2)$ respectively. By Brauer's theorem (Theorem 2.5.7), G acting on $Irr(N)$ will also produce the same number of orbits of lengths 1, s and t such that $s + t = 63$. From ATLAS [19], by checking the indices of the maximal subgroups of $U_4(2)$, we obtain that $s = 27$ and $t = 36$. We deduce that there are three inertia groups $\bar{H}_i = 2^6{:}H_i$ of indices 1, 27 and 36 in $\bar{G}$ respectively where $i \in \{1, 2, 3\}$ and $H_i \leq U_4(2)$. We observe that $H_1 = U_4(2)$, $H_2 = 2^4{:}A_5$ and $H_3 = S_6$. We were able to produce δ_1, δ_2, δ_3 and δ_4 in G such that $H_2 = \langle \delta_1, \delta_2 \rangle$ and $H_3 = \langle \delta_3, \delta_4 \rangle$ where

$$\delta_1 = \begin{pmatrix} 0 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 \end{pmatrix} \quad \delta_2 = \begin{pmatrix} 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$\delta_3 = \begin{pmatrix} 1 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 & 1 \\ 1 & 0 & 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 & 0 & 1 \end{pmatrix} \quad \delta_4 = \begin{pmatrix} 0 & 0 & 1 & 0 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 1 & 1 \\ 1 & 1 & 0 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 \end{pmatrix}.$$

Now by using GAP [104] we construct the character table of the inertia group $2^4{:}A_5$, which we give in Table 5.2. The character table of $H_3 \cong S_6$ is available in ATLAS [19].

The groups $H_2 \cong 2^4{:}A_5$ and $H_3 \cong S_6$ are maximal subgroups of $U_4(2)$ of indices 27 and 36 respectively. Using GAP [104] and permutation characters of $U_4(2)$ on $2^4{:}A_5$ and S_6 of degrees 27 and 36 respectively, we obtain the fusions of the inertia factors $2^4{:}A_5$ and S_6 into $U_4(2)$. We give these fusion in Tables 5.3 and 5.4 respectively.

Table 5.2: The character table of $2^4{:}A_5$

$\|C_{2^4:A_5}(h)\|$	960	96	192	16	12	8	16	5	5	12	12	12
$[h]_{2^4:A_5}$	$1A$	$2A$	$2B$	$2C$	$3A$	$4A$	$4B$	$5A$	$5B$	$6A$	$6B$	$6C$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	3	3	3	-1	0	-1	-1	b	c	0	0	0
χ_3	3	3	3	-1	0	-1	-1	c	b	0	0	0
χ_4	4	4	4	0	1	0	0	-1	-1	1	1	1
χ_5	5	5	5	1	-1	1	1	0	0	-1	-1	-1
χ_6	5	1	-3	1	2	-1	1	0	0	0	-2	0
χ_7	5	1	-3	1	-1	-1	1	0	0	a	1	$-a$
χ_8	5	1	-3	1	-1	-1	1	0	0	$-a$	1	a
χ_9	10	-2	2	-2	1	0	2	0	0	-1	1	-1
χ_{10}	10	-2	2	2	1	0	-2	0	0	-1	1	-1
χ_{11}	15	3	-9	-1	0	1	-1	0	0	0	0	0
χ_{12}	20	-4	4	0	-1	0	0	0	0	1	-1	1

$$a = -\sqrt{-3}, \quad b = (1-\sqrt{5})/2, \quad c = (1+\sqrt{5})/2.$$

Table 5.3: The fusion of $2^4{:}A_5$ into $U_4(2)$

$[h]_{2^4:A_5}$	$\longrightarrow$	$[g]_{U_4(2)}$	$[h]_{2^4:A_5}$	$\longrightarrow$	$[g]_{U_4(2)}$	$[h]_{2^4:A_5}$	$\longrightarrow$	$[g]_{U_4(2)}$
$1A$		$1A$	$2A$		$2B$	$2B$		$2A$
$2C$		$2B$	$3A$		$3C$	$4A$		$4B$
$4B$		$4A$	$5A$		$5A$	$5B$		$5A$
$6A$		$6C$	$6B$		$6F$	$6C$		$6D$

Table 5.4: The fusion of S_6 into $U_4(2)$

$[h]_{S_6}$	$\longrightarrow$	$[g]_{U_4(2)}$	$[h]_{S_6}$	$\longrightarrow$	$[g]_{U_4(2)}$	$[h]_{S_6}$	$\longrightarrow$	$[g]_{U_4(2)}$
$1A$		$1A$	$2A$		$2B$	$3A$		$3C$
$3B$		$3D$	$4A$		$4B$	$5A$		$5A$
$2B$		$2B$	$2C$		$2A$	$4B$		$4B$
$6A$		$6F$	$6B$		$6E$			

Having obtained the fusions of the inertia factors $2^4{:}A_5$ and S_6 into $U_4(2)$, we are now able to compute the sizes of the Fischer-Clifford matrices of $\bar{G}$. For the identity coset we obtain Fischer-Clifford matrix of size 3. The coset corresponding to the identity of $U_4(2)$ is a split coset since we have fusions from both inertia factors H_2 and H_3 into $U_4(2)$. Also since the action of $U_4(2)$ on $Irr(N)$ is selfdual, we can easily determine the column weights m's of the identity coset and hence the centralizer orders of the elements of $\bar{G}$. We find the remaining entries of rows 2 and 3 by solving quadratic equations which were obtain using the column orthogonality relation (Proposition 5.1.3). We obtain three conjugacy classes of elements of $\bar{G}$ of orders 1, 2 and 2 respectively corresponding to identity coset. We have the following matrix with corresponding weights attached to rows and columns

$$M(1A) = \begin{array}{r} \\ \mathit{25920} \\ \mathit{960} \\ \mathit{720} \\ \\ \end{array} \begin{array}{c} \begin{array}{ccc} \mathit{1658880} & \mathit{61440} & \mathit{46080} \end{array} \\ \left(\begin{array}{ccc} 1 & 1 & 1 \\ 27 & -5 & 3 \\ 36 & 4 & -4 \end{array} \right) \\ \begin{array}{ccc} \mathit{1} & \mathit{27} & \mathit{36} \end{array} \end{array}.$$

Let $Irr(HN) = \{\psi_i : 1 \leq i \leq 54\}$ as listed in the ATLAS. Then we have

$[x]_{HN}$	$1A$	$2A$	$2B$
ψ_2	133	21	5
ψ_3	133	21	5
ψ_4	760	56	-8
ψ_5	3344	176	16

Let γ_1, γ_2 and γ_3 be the rows of Fischer-Clifford matrix $M(1A)$. Since $\langle(\psi_2)_N, 1_N\rangle = 16$ we have the following decomposition $(\psi_2)_N = 16\gamma_1 + 3\gamma_2 + \gamma_3$. Now by considering the coefficient of γ_3 we deduce that we have a character $\chi \in Irr(\bar{G})$ with $deg(\chi) = 36$. If $[\, x_1 \;\; x_2 \;\; x_3 \;\; \ldots \;\; x_t \,]$ is the transpose of the partial entries for the projective characters of H_3 on $1A$, then $C_3(1A)M_3(1A)$ is a $t \times 3$ matrix with the first entry $36x_1 = 36$. Hence $x_1 = 1$ and this shows that the partial character table of H_3 that we used contains a character of degree 1. Thus the partial character table comes from the ordinary characters of H_3. Using the same type of arguments by checking various possibilities for the decomposition of ψ_3, ψ_4 and ψ_5 into the character table of N corresponding to the identity coset, it can be shown that the partial character table of H_2 that we have to use contains a character of degree 1. Hence the partial character table comes from the ordinary characters of H_2. Therefore we need only to use the ordinary irreducible characters of H_2 and H_3 to obtain the irreducible characters of $\bar{G}$. Observe that this implies that every coset is a split coset. This forces the shape of all the Fischer-Clifford matrices by the results of Subsection 5.1.1. We produce altogether 43 conjugacy classes of elements of $\bar{G}$. The complete list of the conjugacy classes of $\bar{G}$ is given in Table 5.5.

We used the properties of Fischer-Clifford matrices which are given in Subsection 5.1.1 and Section 5.2 and the fusion of $\bar{G}$ to HN to complete the Fischer-Clifford matrices. The fusion of $\bar{G}$ to HN together with the restriction of characters of HN to $\bar{G}$ forces the signs of the Fischer-Clifford matrices and the orders of the elements of the conjugacy classes of $\bar{G}$.

For example consider the conjugacy class $2B$ of $U_4(2)$. Then we have the Fischer-Clifford matrix $M(2B)$ which has the following form with the possibility of change of signs for rows

$$\begin{array}{c} \\ 96 \\ 96 \\ 16 \\ 48 \\ 16 \\ \\ \end{array}\begin{array}{ccccc} \mathit{1536} & k_1 & k_2 & k_3 & k_4 \\ \left(\begin{array}{ccccc} 1 & 1 & 1 & 1 & 1 \\ 1 & a & f & m & w \\ 6 & b & g & n & x \\ 2 & c & h & p & y \\ 6 & d & k & q & z \end{array}\right) \\ \mathit{1} & m_2 & m_3 & m_4 & m_5 \end{array}.$$

Now using the Programme C (Section 5.4) we find the appropriate column weights m_i's and hence the centralizer orders of the relevant classes. We have the matrix in the following shape

$$\begin{array}{c} \\ 96 \\ 96 \\ 16 \\ 48 \\ 16 \\ \\ \end{array}\begin{array}{ccccc} \mathit{1536} & \mathit{1536} & \mathit{512} & \mathit{512} & \mathit{192} \\ \left(\begin{array}{ccccc} 1 & 1 & 1 & 1 & 1 \\ 1 & a & f & m & w \\ 6 & b & g & n & x \\ 2 & c & h & p & y \\ 6 & d & k & q & z \end{array}\right) \\ \mathit{1} & \mathit{1} & \mathit{3} & \mathit{3} & \mathit{8} \end{array}.$$

We find the remaining entries of $M(2B)$ using the properties of Fischer-Clifford matrices discussed in Subsection 5.1.1 and Section 5.2. Note that the signs are forced by the fusion of $\bar{G}$ to HN together with the restriction of irreducible characters of HN. We have

$$M(2B) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & -1 \\ -6 & 6 & 2 & -2 & 0 \\ -2 & 2 & -2 & 2 & 0 \\ 6 & 6 & -2 & -2 & 0 \end{pmatrix}.$$

Hence corresponding to the coset $2B \in U_4(2)$ we produce five classes of $\bar{G}$, namely $2E$, $4B$, $2F$, $4C$ and $4D$ with centralizer orders 1536, 1536, 512, 512 and 192 respectively. We will use the same type of arguments to determine the entries of all other Fischer-Clifford matrices as well. The complete list of Fischer-Clifford matrices and the conjugacy classes of $\bar{G}$ are given in Tables 5.4 and 5.5 respectively.

Table 5.4: The Fischer-Clifford matrices of $2^6{\cdot}U_4(2)$

$M(g)$	$M(g)$
$M(1A) = \begin{pmatrix} 1 & 1 & 1 \\ 27 & -5 & 3 \\ 36 & 4 & -4 \end{pmatrix}$	$M(2A) = \begin{pmatrix} 1 & 1 & 1 \\ 3 & 3 & -1 \\ 12 & -4 & 0 \end{pmatrix}$
$M(2B) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & -1 \\ -6 & 6 & 2 & -2 & 0 \\ -2 & 2 & -2 & 2 & 0 \\ 6 & 6 & -2 & -2 & 0 \end{pmatrix}$	$M(3A) = \begin{pmatrix} 1 \end{pmatrix}$
$M(3B) = \begin{pmatrix} 1 \end{pmatrix}$	$M(3C) = \begin{pmatrix} 1 & 1 & 1 \\ 9 & -3 & 1 \\ 6 & 2 & -2 \end{pmatrix}$
$M(3D) = \begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$	$M(4A) = \begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$
$M(4B) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ -1 & -1 & 1 & 1 \\ 1 & -1 & 1 & -1 \\ -1 & 1 & 1 & -1 \end{pmatrix}$	$M(5A) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & -1 & -1 \\ 1 & -1 & -1 & 1 \\ 1 & -1 & 1 & -1 \end{pmatrix}$
$M(6A) = \begin{pmatrix} 1 \end{pmatrix}$	$M(6B) = \begin{pmatrix} 1 \end{pmatrix}$
$M(6C) = \begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$	$M(6D) = \begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$
$M(6E) = \begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$	$M(6F) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & -1 \\ -2 & 2 & 0 \end{pmatrix}$
$M(9A) = \begin{pmatrix} 1 \end{pmatrix}$	$M(9B) = \begin{pmatrix} 1 \end{pmatrix}$
$M(12A) = \begin{pmatrix} 1 \end{pmatrix}$	$M(12B) = \begin{pmatrix} 1 \end{pmatrix}$

Table 5.5: The conjugacy classes of $2^6{\cdot}U_4(2)$

$[g]_{U_4(2)}$	$[x]_{2^6 \cdot U_4(2)}$	$\lvert C_{2^6 \cdot U_4(2)}(x)\rvert$	$\longrightarrow$ HN
$1A$	$1A$	1658880	$1A$
	$2A$	61440	$2B$
	$2B$	46080	$2A$
$2A$	$2C$	9216	$2B$
	$2D$	3072	$2A$
	$4A$	768	$4A$

Table 5.5: The conjugacy classes of $2^6{\cdot}U_4(2)$ (continued)

$[g]_{U_4(2)}$	$[x]_{2^6 \cdot U_4(2)}$	$\lvert C_{2^6 \cdot U_4(2)}(x)\rvert$	$\longrightarrow$ HN
$2B$	$2E$	1536	$2A$
	$4B$	1536	$4A$
	$2F$	512	$2B$
	$4C$	512	$4A$
	$4D$	192	$4B$
$3A$	$3A$	648	$3B$
$3B$	$3B$	648	$3B$
$3C$	$3C$	1728	$3A$
	$6A$	288	$6A$
	$6B$	192	$6B$
$3D$	$3D$	216	$3A$
	$6C$	72	$6A$
$4A$	$4E$	192	$4C$
	$4F$	64	$4B$
$4B$	$4G$	32	$4A$
	$4H$	32	$4B$
	$8A$	32	$8B$
	$8B$	32	$8B$
$5A$	$5A$	20	$5E$
	$10A$	20	$10G$
	$10B$	20	$10F$
	$10C$	20	$10H$
$6A$	$6D$	72	$6C$
$6B$	$6E$	72	$6C$
$6C$	$6F$	144	$6B$
	$12A$	48	$12B$
$6D$	$6G$	144	$6B$
	$12B$	48	$12B$
$6E$	$6H$	72	$6B$
	$6I$	24	$6A$
$6F$	$6J$	48	$6A$
	$12C$	48	$12B$
	$12D$	24	$12A$
$9A$	$9A$	9	$9A$
$9B$	$9B$	9	$9A$
$12A$	$12E$	12	$12C$
$12B$	$12F$	12	$12C$

The character table of $\bar{G}$ can be obtained as described in Section 5.1.2, by using the above Fischer-Clifford matrices and the character tables of the inertia factors $H_1 = U_4(2)$, $H_2 = 2^4{:}A_5$ and $H_3 = S_6$ together with the fusions of $2^4{:}A_5$ and S_6 into $U_4(2)$ (Tables 5.3

and 5.4). The full character table of $\bar{G}$ is available in GAP [104]. For example we calculate the partial character table of $\bar{G}$ corresponding to the coset of $2B \in U_4(2)$. From $M(2B)$ we get $M_1(2B) = [\ 1\ \ 1\ \ 1\ \ 1\ \ 1\ ]$,

$$M_2(2B) = \begin{bmatrix} 1 & 1 & 1 & 1 & -1 \\ -6 & 6 & 2 & -2 & 0 \end{bmatrix}, \quad M_3(2B) = \begin{bmatrix} -2 & 2 & -2 & 2 & 0 \\ 6 & 6 & -2 & -2 & 0 \end{bmatrix}.$$

Let $C_1(2B)$, $C_2(2B)$ and $C_3(2B)$ be the partial character tables of the inertia factors for the classes which fuse to $2B \in U_4(2)$. Then the portions of the character table of $\bar{G} = 2^6{\cdot}U_4(2)$ corresponding to the coset $2B$ are:

$$C_1(2B)M_1(2B) = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 2 \\ -2 \\ -2 \\ -1 \\ 3 \\ 4 \\ 0 \\ 2 \\ 2 \\ 2 \\ 0 \\ 0 \\ -3 \\ -3 \\ 4 \\ 0 \\ -3 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 1 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 2 & 2 & 2 & 2 & 2 \\ -2 & -2 & -2 & -2 & -2 \\ -2 & -2 & -2 & -2 & -2 \\ -1 & -1 & -1 & -1 & -1 \\ 3 & 3 & 3 & 3 & 3 \\ 4 & 4 & 4 & 4 & 4 \\ 0 & 0 & 0 & 0 & 0 \\ 2 & 2 & 2 & 2 & 2 \\ 2 & 2 & 2 & 2 & 2 \\ 2 & 2 & 2 & 2 & 2 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ -3 & -3 & -3 & -3 & -3 \\ -3 & -3 & -3 & -3 & -3 \\ 4 & 4 & 4 & 4 & 4 \\ 0 & 0 & 0 & 0 & 0 \\ -3 & -3 & -3 & -3 & -3 \end{bmatrix},$$

$$C_2(2B)M_2(2B) = \begin{bmatrix} 1 & 1 \\ 3 & -1 \\ 3 & -1 \\ 4 & 0 \\ 5 & 1 \\ 1 & 1 \\ 1 & 1 \\ 1 & 1 \\ -2 & -2 \\ -2 & 2 \\ 3 & -1 \\ -4 & 0 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 1 & -1 \\ -6 & 6 & 2 & -2 & 0 \end{bmatrix} = \begin{bmatrix} -5 & 7 & 3 & -1 & -1 \\ 9 & -3 & 1 & 5 & -3 \\ 9 & -3 & 1 & 5 & -3 \\ 4 & 4 & 4 & 4 & -4 \\ -1 & 11 & 7 & 3 & -5 \\ -5 & 7 & 3 & -1 & -1 \\ -5 & 7 & 3 & -1 & -1 \\ -5 & 7 & 3 & -1 & -1 \\ 10 & -14 & -6 & 2 & 2 \\ -14 & 10 & 2 & -6 & 2 \\ 9 & -3 & 1 & 5 & -3 \\ -4 & -4 & -4 & -4 & 4 \end{bmatrix},$$

$$C_3(2B)M_3(2B) = \begin{bmatrix} 1 & 1 \\ -1 & 1 \\ 1 & 1 \\ -1 & 1 \\ -3 & 1 \\ 3 & 1 \\ 3 & 1 \\ -3 & 1 \\ 2 & -2 \\ -2 & -2 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} -2 & 2 & -2 & 2 & 0 \\ 6 & 6 & -2 & -2 & 0 \end{bmatrix} = \begin{bmatrix} 4 & 8 & -4 & 0 & 0 \\ 8 & 4 & 0 & -4 & 0 \\ 0 & 12 & -8 & 4 & 0 \\ 12 & 0 & 4 & -8 & 0 \\ 8 & 4 & 0 & -4 & 0 \\ 4 & 8 & -4 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 12 & -8 & 4 & 0 \\ 12 & 0 & 4 & -8 & 0 \\ -16 & -8 & 0 & 8 & 0 \\ -8 & -16 & 8 & 0 & 0 \end{bmatrix}.$$

Chapter 6

An Affine Subgroup of $Sp_8(2)$

The symplectic groups are one of the four large families of groups which make up the classical groups, the other families being the linear groups, the orthogonal groups, and the unitary groups. The symplectic groups are constructed by defining some bilinear form on the underlying vector space and then taking all the form-preserving automorphisms of the space. Two of the groups studied in this dissertation are split extensions of elementary abelian 2-groups by the symplectic group $Sp_6(2)$. The other two groups studied are the non-split extensions of elementary abelian 3-groups by orthogonal groups $O_7(3)$ and $O_7(3){:}2$, which are maximal subgroups of the largest Fischer sporadic simple group Fi_{24}' and its automorphism group Fi_{24} respectively.

The subgroups of symplectic groups which fix a non-zero vector of the underlying symplectic space are called *affine subgroups*. In this chapter we shall construct the character table of the group $A(4) \cong 2^7{:}Sp_6(2)$, an affine subgroup of $Sp_8(2)$ of index 255, using the technique of Fischer-Clifford matrices already described in Chapter 5. Although the character table of group $2^7{:}Sp_6(2)$ is known, however it was constructed using a different method and its Fischer-Clifford matrices were not known. Sections 1 and 2 of this chapter deal with the symplectic groups and their affine subgroups respectively. In Section 3, we construct the affine subgroup $A(4) \cong 2^7{:}Sp_6(2)$ as the stabilizer of e_1 in $Sp_8(2)$, where $e_1 = (1, 0, 0, 0, 0, 0, 0, 0)$. Sections 4, 5 and 6 deal with the conjugacy classes, the inertia groups and the fusion of inertia factor groups into $Sp_6(2)$ respectively. The Fischer-Clifford matrices and the character table of $A(4)$ are given in Section 7. Finally in Section 8 we obtain the fusion map from $A(4)$ into $Sp_8(2)$. For futher readings and information on symplectic groups and their affine subgroups, readers are encouraged to consult [39], [51] and [54].

6.1 Symplectic Groups

Definition 6.1.1 *Let V be a vector space over a field $\mathbb{F}$ and let $f : V \times V \longrightarrow \mathbb{F}$ be a function such that for all $u, v, w \in V$ and all $\alpha, \beta \in \mathbb{F}$ we have*

(i) $f(\alpha u + \beta v, w) = \alpha f(u, w) + \beta f(v, w)$

(ii) $f(w, \alpha u + \beta v) = \alpha f(w, u) + \beta f(w, v)$

Then f is called a bilinear form on V. If f is a bilinear form on V such that for all $u \in V$ we have $f(u, u) = 0$, then f is called an alternating (symplectic) form on V. If f is a symplectic form on V such that for all $u \in V$, $u \neq 0$, there exists $v \in V$ for which $f(u, v) \neq 0$, then f is said to be non-degenerate.

Definition 6.1.2 *Let V be a vector space over a field $\mathbb{F}$. Let $f : V \times V \longrightarrow \mathbb{F}$ be a bilinear form satisfying the relations*

(i) $f(u, u) = 0 \quad \forall\, u \in V$

(ii) $f(u, v) = -f(v, u) \quad \forall\, u, v \in V$

Then the pair (V, f) is called a symplectic space over the field $\mathbb{F}$.

Remark 6.1.3 If $char(F) \neq 2$, then the properties (i) and (ii) in the above definition are equivalent. Moreover the symplectic space (V, f) becomes non-degenerate if f is non-degenerate.

Let (V, f) and (W, g) be symplectic spaces over the same field $\mathbb{F}$, then we say that $V \cong W$ if and only if there exists $T \in L(V, W)$ such that T is an isomorphism and $\forall\, u, v \in V$

$$f(u, v) = g(T(u), T(v)) \ .$$

If $T \in L(V, V)$ is an isomorphism such that $\forall\, u, v \in V$

$$f(u, v) = f(T(u), T(v))$$

then T is called an *isometry* on (V, f).

Definition 6.1.4 *Let (V, f) be a symplectic space and assume that $U \leq V$. Define*

$$U^{\perp} = \{\alpha : \alpha \in V \;\; f(u, \alpha) = 0, \; \forall\, u \in U\} \ .$$

Then $U^{\perp} \leq V$ and we set Radical of $V = R(V) = V^{\perp}$. If $R(V) = \{0_V\}$, then we say that (V, f) is non-degenerate, otherwise we say that it is degenerate.

Remark 6.1.5 *It can be shown that if* (V, f) *is a finite dimensional non-degenerate symplectic space, then* $dim(V) = 2n$, *for some* $n \in \mathbb{N}$.

Definition 6.1.6 *Let* (V, f) *be a non-degenerate symplectic space of dimension* $2n$ *over a field* $\mathbb{F}$. *Then the set of all isometries of* V *forms a group which is called a symplectic group and is denoted by* $Sp_{2n}(\mathbb{F})$.

If $\mathbb{F} = GF(q)$ is a Galois field of q elements, where $q = p^k$ for some k with p a prime, then $Sp_{2n}(\mathbb{F})$ will be denoted by $Sp_{2n}(q)$. We further obtain that $Sp_{2n}(\mathbb{F}) \leq GL_{2n}(\mathbb{F})$. Also within isomorphism, $Sp_{2n}(\mathbb{F})$ is independent of the choice of f.

Remark 6.1.7 *If* $dim(V) = 2$ *then* $Sp_2(\mathbb{F}) = SL_2(\mathbb{F})$.

6.2 The Affine Subgroups of Symplectic Groups

In this section we consider the subgroup of $Sp_{2n}(\mathbb{F})$ which is a stabilizer of a non-zero vector of V and study the structure of this subgroup.

Definition 6.2.1 *Let* (V, f) *be a non-degenerating symplectic space of dimension* $2n$ *over* $\mathbb{F} = GF(q)$, *where* $q = p^k$ *for some prim* p. *Let* $\{e_1, e_2, \ldots, e_{2n}\}$ *be a basis for* V *and* $f : V \times V \longrightarrow \mathbb{F}$ *be defined by* $f(e_i, e_j) = \delta(i, 2n + 1 - j)$, *where* $i \leq j$. *Let* T *be an isometry of* (V, f) *and*

$$G(n) = Sp_{2n}(q) = \{T \mid f(T(x), T(y)) = f(x, y) \ \forall x, y \in V\} \quad .$$

Then $G(n)$ *acts transitively on* $V^* = V - \{0_V\}$. *Let* $\alpha \in V^*$ *and* $A(n)$ *be the stabilizer of* α *in* $G(n)$. *Then we obtain that*

$$A(n) = \{T \in G(n) \mid T(\alpha) = \alpha\} \quad .$$

Thus $A(n) \leq G(n)$ *and* $A(n)$ *is called the affine subgroup of* $G(n)$.

Since $A(n)$ is the subgroup of $G(n)$ that fixes a non-zero vector $\alpha \in V^*$, we have $[G(n) : A(n)] = |V^*| = q^{2n} - 1$.

Let G be a group. The *Frattini subgroup* $\Phi(G)$ of G is defined to be the intersection of all maximal subgroups of G and we write

$$\Phi(G) = \bigcap_{M \overset{\max}{\leq} G} M \quad .$$

If G is finite and $G \neq 1$, then clearly $\Phi(G) < G$ and if G has no maximal subgroup then $\Phi(G) = G$. Also it can be shown that $\Phi(G) \trianglelefteq G$. Now suppose that $G = P$ is a *p-group.* Then $P' \leq \Phi(P)$ and $P/\Phi(P)$ is an elementary abelian p-group. Also $\Phi(G) = 1$ if and only if G is elementary abelian.

Definition 6.2.2 *We define $P(n)$ to be the subgroup of $A(n)$ consisting of elements $T \in G(n)$, such that*

$$T(e_1) = e_1$$

$$T(e_i) = \alpha_i e_1 + e_i, \ \ 2 \le i \le 2n-1$$

and

$$T(e_{2n}) = \sum_{i=1}^{2n} \beta_i e_i$$

with $\beta_{2n} = 1$ and

$$\alpha_j = \begin{cases} -\beta_{2n+1-j} & 2 \le j \le n \\ \beta_{2n+1-j} & n < j \le 2n-1. \end{cases}$$

If $x \in P(n)$, then x is represented by the following matrix, with respect to the basis given in Definition 6.2.1:

$$\begin{pmatrix} 1 & -\beta_{2n-1} & -\beta_{2n-2} & \cdots & \beta_2 & \beta_1 \\ 0 & 1 & 0 & \cdots & 0 & \beta_2 \\ \vdots & \vdots & \vdots & \cdots & \vdots & \vdots \\ 0 & 0 & 0 & \cdots & 1 & \beta_{2n-1} \\ 0 & 0 & 0 & \cdots & 0 & 1 \end{pmatrix}.$$

It is convenient to describe $P(n)$ as an abstract group P in the following manner: Let (W, f) be a non-degenerate symplectic space of dimension $2n-2$ over $GF(q)$ and consider the pairs $[w, a]$, where $w \in W$ and $a \in GF(q)$. Define a multiplication on such pairs by $[w, a][u, b] = [u + w, a + b + f(w, u)]$. Clearly $|P| = q^{2n-2} \times q = q^{2n-1}$.

Lemma 6.2.3 *[39] If char($\mathbb{F}$) $= p$ where p is an odd prime, then the group P is a non-abelian special p-group of order q^{2n-1} isomorphic to $P(n)$.*

Proof. See [39]. □

Remark 6.2.4 *We can easily show that if $p = 2$, then $P(n)$ is an elementary abelian 2-group.*

Lemma 6.2.5 *[78] Let H be the subgroup of $A(n)$ which fixes e_{2n}. Then H fixes both e_1 and e_{2n} and acts on $X =< e_2, e_3, \cdots, e_{2n-1} >$ as $G(n-1)$. Moreover $H \cong G(n-1) \cong Sp_{2n-2}(q)$.*

Proof. See [99]. □

Theorem 6.2.6 *[39] Let q be a power of an odd prime p. Then $A(n)$ is the split extension of a special p-group $P(n)$ of order q^{2n-1} by a subgroup H of $G(n)$ such that $H \cong G(n-1) \cong Sp_{2n-2}(q)$. That is*

$$A(n) = P(n){:}H = P(n){:}Sp_{2n-2}(q).$$

Proof. See [99]. □

Remark 6.2.7 *[78] Let $q = 2^k$ for some $k \in \mathbb{N}$. Then $P(n)$ is an elementary abelian 2-group. The group $A(n)$ has $2q$ orbits on $P(n)$, namely $\Delta_1, \Delta_2, \ldots, \Delta_{2q}$ with*

$$|\Delta_1| = |\Delta_2| = \cdots = |\Delta_q| = 1,$$

$$|\Delta_{q+1}| = |\Delta_{q+2}| = \cdots = |\Delta_{2q}| = q^{2n-2} - 1 \quad .$$

Furthermore the action of $A(n)$ on $Irr(P(n))$ produces $2q$ orbits $\Gamma_1, \Gamma_2, \ldots, \Gamma_{2q}$ with

$$|\Gamma_1| = 1 \quad , \quad |\Gamma_2| = q^{2n-2} - 1$$

$$|\Gamma_3| = |\Gamma_4| = \cdots = |\Gamma_{q+1}| = \frac{1}{2}q^{n-1}(q^{n-1} + 1)$$

$$|\Gamma_{q+2}| = |\Gamma_{q+3}| = \cdots = |\Gamma_{2q}| = \frac{1}{2}q^{n-1}(q^{n-1} - 1).$$

The corresponding inertia factor groups are

$$G(n-1);\ A(n-1);\ O^+(2n-2,q),\ q-1 \text{ copies};\ O^-(2n-2,q),\ q-1 \text{ copies}.$$

6.3 The Group $2^7{:}Sp_6(2)$

In this section we are concerned with the group $A(4)$, the affine subgroup of $Sp_8(2)$. It is the subgroup of $Sp_8(2)$ fixing the non-zero vector e_1 in $V_8(2)$, where $V_8(2)$ is the vector space of dimension 8 over $GF(2)$. From Theorem 6.2.6 we get

$$A(4) = [Sp_8(2)]_{e_1} = P(4){:}H = 2^7{:}Sp_6(2)$$

where $H = [Sp_8(2)]_{[e_1,e_8]} \cong Sp_6(2)$ by Lemma 6.2.5. We constructed $H = Sp_6(2)$ and $P(4)$ inside $Sp_8(2)$. The group $P(4)$ is generated by the following 8×8 matrices

$$T_1 = \begin{pmatrix} 1&1&1&1&1&1&1&1\\ 0&1&0&0&0&0&0&1\\ 0&0&1&0&0&0&0&1\\ 0&0&0&1&0&0&0&1\\ 0&0&0&0&1&0&0&1\\ 0&0&0&0&0&1&0&1\\ 0&0&0&0&0&0&1&1\\ 0&0&0&0&0&0&0&1 \end{pmatrix} \quad T_2 = \begin{pmatrix} 1&1&1&0&0&1&1&1\\ 0&1&0&0&0&0&0&1\\ 0&0&1&0&0&0&0&1\\ 0&0&0&1&0&0&0&0\\ 0&0&0&0&1&0&0&0\\ 0&0&0&0&0&1&0&1\\ 0&0&0&0&0&0&1&1\\ 0&0&0&0&0&0&0&1 \end{pmatrix}$$

$$T_3 = \begin{pmatrix} 1&1&1&1&0&1&1&0\\ 0&1&0&0&0&0&0&1\\ 0&0&1&0&0&0&0&1\\ 0&0&0&1&0&0&0&0\\ 0&0&0&0&1&0&0&1\\ 0&0&0&0&0&1&0&1\\ 0&0&0&0&0&0&1&1\\ 0&0&0&0&0&0&0&1 \end{pmatrix} \quad T_4 = \begin{pmatrix} 1&1&1&1&1&0&0&0\\ 0&1&0&0&0&0&0&0\\ 0&0&1&0&0&0&0&0\\ 0&0&0&1&0&0&0&1\\ 0&0&0&0&1&0&0&1\\ 0&0&0&0&0&1&0&1\\ 0&0&0&0&0&0&1&1\\ 0&0&0&0&0&0&0&1 \end{pmatrix}$$

$$T_5 = \begin{pmatrix} 1 & 1 & 0 & 1 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \quad T_6 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$T_7 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix},$$

and H is generated by the following 8×8 matrices

$$S_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \quad S_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$S_3 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \quad S_4 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$S_5 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \quad S_6 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$S_7 = \begin{pmatrix} 1&0&0&0&0&0&0&0\\ 0&1&0&0&1&0&1&0\\ 0&0&1&0&0&0&0&0\\ 0&0&0&1&1&0&1&0\\ 0&0&0&0&1&0&0&0\\ 0&0&0&0&0&1&0&0\\ 0&1&0&0&1&0&0&0\\ 0&0&0&0&0&0&0&1 \end{pmatrix} \quad S_8 = \begin{pmatrix} 1&0&0&0&0&0&0&0\\ 0&0&1&0&1&0&0&0\\ 0&1&0&0&1&0&0&0\\ 0&0&0&1&1&1&1&0\\ 0&0&0&0&1&0&0&0\\ 0&1&1&0&0&0&1&0\\ 0&1&1&0&0&1&0&0\\ 0&0&0&0&0&0&0&1 \end{pmatrix}$$

$$S_9 = \begin{pmatrix} 1&0&0&0&0&0&0&0\\ 0&0&1&1&0&1&1&0\\ 0&1&1&1&0&0&1&0\\ 0&0&0&1&0&0&0&0\\ 0&1&1&1&1&1&1&0\\ 0&0&0&1&0&0&1&0\\ 0&0&0&0&0&1&1&0\\ 0&0&0&0&0&0&0&1 \end{pmatrix}.$$

We now act H on $P(4) = < T_1, T_2, T_3, T_4, T_5, T_5, T_6, T_7 >$ by conjugation and we are able to represent S_1, S_2, S_3, S_4, S_5, S_6, S_7, S_8 and S_9 in terms of 7×7 matrices:

$$S_1 = \begin{pmatrix} 0&0&1&0&0&1&1\\ 1&1&1&1&0&0&1\\ 1&0&0&0&0&1&1\\ 1&0&1&1&0&1&1\\ 1&0&1&0&1&1&1\\ 1&0&1&0&0&0&1\\ 1&0&1&0&0&1&0 \end{pmatrix} \quad S_2 = \begin{pmatrix} 0&0&0&1&0&1&1\\ 0&1&0&0&0&0&0\\ 1&0&1&1&0&1&1\\ 1&0&0&0&0&1&1\\ 1&0&1&0&1&1&1\\ 1&0&0&1&0&0&1\\ 1&0&0&1&0&1&0 \end{pmatrix}$$

$$S_3 = \begin{pmatrix} 0&0&0&1&0&1&1\\ 1&1&0&1&0&1&1\\ 1&0&1&1&0&1&1\\ 1&0&0&0&0&1&1\\ 1&0&0&0&1&0&1\\ 1&0&0&1&0&0&1\\ 1&0&0&1&0&1&0 \end{pmatrix} \quad S_4 = \begin{pmatrix} 0&0&1&1&0&1&0\\ 0&1&0&1&0&0&1\\ 1&0&0&1&0&1&0\\ 1&0&1&0&0&1&0\\ 1&0&1&1&1&1&0\\ 1&0&1&1&0&0&0\\ 1&0&1&1&0&1&1 \end{pmatrix}$$

$$S_5 = \begin{pmatrix} 1&0&0&1&0&0&1\\ 0&1&0&1&0&0&1\\ 0&0&1&1&0&0&1\\ 0&0&0&0&0&0&1\\ 1&0&0&0&1&0&1\\ 0&0&0&1&0&1&1\\ 0&0&0&1&0&0&0 \end{pmatrix} \quad S_6 = \begin{pmatrix} 1&0&0&1&0&0&1\\ 0&1&0&1&0&0&1\\ 0&0&1&1&0&0&1\\ 0&0&0&0&0&0&1\\ 0&0&0&1&1&0&1\\ 0&0&0&1&0&1&1\\ 0&0&0&1&0&0&0 \end{pmatrix}$$

$$S_7 = \begin{pmatrix} 0 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 0 & 0 & 1 \\ 1 & 1 & 0 & 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 & 0 \end{pmatrix} \quad S_8 = \begin{pmatrix} 1 & 0 & 1 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 & 1 \end{pmatrix}$$

$$S_9 = \begin{pmatrix} 1 & 0 & 1 & 0 & 0 & 1 & 1 \\ 1 & 0 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 0 & 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 & 1 \end{pmatrix}.$$

6.4 The Conjugacy Classes of $2^7{:}Sp_6(2)$

In this section we will determine the conjugacy classes of the group $A(4) = 2^7{:}Sp_6(2)$, described in Section 6.3, using the technique of coset analysis already discussed in Section 2.3. Let $\bar{G} = A(4) = N{:}G$, where $N = 2^7$ and $G = Sp_6(2)$. Using MAGMA we calculate the conjugacy classes of G and we give the conjugacy class representatives of G in terms of 7×7 matrices over $GF(2)$ in the following table, where M is the matrix that represents that particular class.

Table 6.1: The conjugacy classes of elements of $2^7{:}Sp_6(2)$

$[g]_G$	M	$\|[g]_G\|$	$[g]_G$	M	$\|[g]_G\|$
$1A$	$\begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$	1	$2A$	$\begin{pmatrix} 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 0 & 1 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \end{pmatrix}$	63
$2B$	$\begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 & 0 & 1 & 1 \\ 1 & 0 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 0 & 0 \end{pmatrix}$	315	$2C$	$\begin{pmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$	945

Table 6.1: The conjugacy classes of elements of $2^7{:}Sp_6(2)$ (continued)

$[g]_G$	M	$\lvert[g]_G\rvert$	$[g]_G$	M	$\lvert[g]_G\rvert$
$2D$	$\begin{pmatrix} 0&1&1&0&0&1&0 \\ 0&0&1&1&0&0&0 \\ 0&1&0&0&1&1&1 \\ 0&0&0&0&1&1&1 \\ 0&0&0&1&0&1&1 \\ 1&1&1&1&1&1&1 \\ 1&1&1&1&1&0&0 \end{pmatrix}$	3780	$3A$	$\begin{pmatrix} 1&0&1&1&0&0&0 \\ 0&1&0&0&0&0&0 \\ 0&0&0&1&0&0&0 \\ 0&0&1&0&1&0&1 \\ 0&0&0&0&1&0&0 \\ 0&0&1&1&1&1&1 \\ 0&0&1&1&1&0&0 \end{pmatrix}$	672
$3B$	$\begin{pmatrix} 0&0&1&1&1&0&1 \\ 1&0&1&1&0&0&1 \\ 1&0&1&1&0&1&1 \\ 0&0&0&1&1&1&0 \\ 0&1&1&1&0&1&0 \\ 0&1&1&0&0&1&0 \\ 0&1&1&0&0&0&1 \end{pmatrix}$	2240	$3C$	$\begin{pmatrix} 1&0&0&0&0&0&0 \\ 1&1&0&1&1&0&0 \\ 1&1&1&0&1&0&0 \\ 1&0&1&0&0&1&0 \\ 0&1&1&0&0&1&0 \\ 1&1&0&1&1&1&0 \\ 1&1&0&1&1&0&1 \end{pmatrix}$	13440
$4A$	$\begin{pmatrix} 0&1&0&1&0&0&1 \\ 0&1&1&0&1&1&1 \\ 0&0&0&1&0&0&0 \\ 1&1&0&0&1&0&0 \\ 1&1&0&0&0&1&0 \\ 1&1&0&1&1&1&0 \\ 1&1&0&1&1&0&1 \end{pmatrix}$	3780	$4B$	$\begin{pmatrix} 1&1&1&1&1&1&1 \\ 0&0&1&1&1&1&1 \\ 0&1&1&1&0&0&1 \\ 0&1&1&0&1&1&0 \\ 0&0&0&0&1&0&1 \\ 0&0&0&0&0&1&0 \\ 0&0&0&0&0&0&1 \end{pmatrix}$	7560
$4C$	$\begin{pmatrix} 1&1&0&1&0&0&1 \\ 1&0&0&1&0&0&0 \\ 0&1&1&1&0&0&1 \\ 1&1&0&0&0&0&0 \\ 1&0&0&0&1&0&1 \\ 1&1&0&0&1&1&0 \\ 1&1&0&0&1&0&1 \end{pmatrix}$	7560	$4D$	$\begin{pmatrix} 1&0&0&0&0&0&0 \\ 0&1&1&0&1&0&1 \\ 1&1&0&1&0&1&0 \\ 1&0&0&0&1&0&0 \\ 0&0&0&1&0&1&1 \\ 1&1&1&0&1&1&1 \\ 1&1&1&0&1&0&0 \end{pmatrix}$	11340
$4E$	$\begin{pmatrix} 1&0&1&0&1&0&1 \\ 0&1&1&1&0&1&0 \\ 1&1&1&0&0&1&0 \\ 0&0&1&0&1&0&1 \\ 1&1&0&1&0&0&1 \\ 1&1&1&1&1&0&1 \\ 1&1&1&1&1&1&0 \end{pmatrix}$	45360	$5A$	$\begin{pmatrix} 0&1&0&0&1&1&0 \\ 1&1&0&1&1&0&0 \\ 1&0&1&0&0&1&0 \\ 1&0&0&0&1&0&0 \\ 0&1&0&0&0&0&0 \\ 1&0&0&0&1&0&1 \\ 1&0&0&0&1&1&0 \end{pmatrix}$	48384
$6A$	$\begin{pmatrix} 0&1&0&1&0&0&1 \\ 1&1&1&1&1&0&1 \\ 1&0&0&0&0&1&1 \\ 0&0&0&0&1&1&0 \\ 0&1&1&0&0&0&0 \\ 1&1&0&1&0&1&1 \\ 1&1&0&1&0&0&0 \end{pmatrix}$	10080	$6B$	$\begin{pmatrix} 1&0&0&1&0&0&1 \\ 1&1&0&1&1&0&0 \\ 0&0&0&1&0&1&0 \\ 1&0&1&1&0&1&1 \\ 1&0&1&0&1&1&1 \\ 1&0&0&0&0&1&0 \\ 1&0&0&0&0&0&1 \end{pmatrix}$	10080

Table 6.1: The conjugacy classes of elements of $2^7{:}Sp_6(2)$ (continued)

$[g]_G$	M	$\|[g]_G\|$	$[g]_G$	M	$\|[g]_G\|$
$6C$	$\begin{pmatrix} 1&0&0&0&0&1&0\\ 1&1&1&1&0&1&1\\ 0&1&1&0&1&1&0\\ 1&0&1&0&1&0&0\\ 1&0&1&0&0&1&1\\ 0&1&1&1&0&1&1\\ 0&1&1&1&0&0&0 \end{pmatrix}$	20160	$6D$	$\begin{pmatrix} 1&1&0&1&0&0&1\\ 0&1&0&0&1&1&0\\ 1&0&1&1&1&0&1\\ 0&0&0&1&1&1&0\\ 1&0&0&1&0&0&0\\ 0&0&0&0&0&1&0\\ 0&0&0&0&0&0&1 \end{pmatrix}$	30240
$6E$	$\begin{pmatrix} 1&1&1&0&1&1&1\\ 1&1&1&1&1&1&1\\ 0&1&1&0&1&1&0\\ 0&0&1&1&0&0&1\\ 1&1&0&1&1&0&0\\ 1&0&0&1&1&0&1\\ 1&0&0&1&1&1&0 \end{pmatrix}$	40320	$6F$	$\begin{pmatrix} 0&1&0&0&1&0&0\\ 1&0&0&0&1&0&1\\ 1&1&1&1&1&1&0\\ 0&1&1&0&0&1&1\\ 0&1&0&0&0&1&0\\ 0&1&1&0&0&1&0\\ 0&1&1&0&0&0&1 \end{pmatrix}$	40320
$6G$	$\begin{pmatrix} 0&1&0&0&1&1&0\\ 1&1&0&0&0&1&0\\ 1&1&1&0&1&0&0\\ 1&0&1&0&0&0&0\\ 1&0&0&1&1&0&0\\ 1&1&0&0&1&1&0\\ 1&1&0&0&1&0&1 \end{pmatrix}$	120960	$7A$	$\begin{pmatrix} 0&0&0&0&1&0&1\\ 0&0&0&1&1&1&1\\ 1&0&0&0&0&1&1\\ 1&0&1&0&0&0&0\\ 1&0&1&1&0&0&0\\ 0&1&1&0&1&0&1\\ 0&1&1&0&1&1&0 \end{pmatrix}$	207360
$8A$	$\begin{pmatrix} 1&0&0&0&0&0&0\\ 1&1&1&1&0&0&1\\ 1&0&1&1&0&1&1\\ 1&1&1&0&0&1&0\\ 0&1&0&1&0&0&0\\ 0&1&0&0&1&1&0\\ 0&1&0&0&1&0&1 \end{pmatrix}$	90720	$8B$	$\begin{pmatrix} 0&0&0&1&1&0&1\\ 1&1&0&0&0&1&0\\ 0&1&1&0&0&0&1\\ 1&0&1&0&0&1&0\\ 0&1&0&0&0&0&0\\ 1&0&1&1&0&0&0\\ 1&0&1&1&0&1&1 \end{pmatrix}$	90720
$9A$	$\begin{pmatrix} 1&1&0&0&1&1&0\\ 0&0&1&1&0&0&0\\ 0&1&1&1&1&0&0\\ 1&1&0&1&1&1&1\\ 1&1&1&1&1&1&1\\ 1&1&0&0&0&1&1\\ 1&1&0&0&0&0&0 \end{pmatrix}$	161280	$10A$	$\begin{pmatrix} 1&0&1&0&0&1&1\\ 0&0&1&1&0&0&0\\ 1&0&0&1&1&1&1\\ 0&1&0&0&0&1&1\\ 0&1&1&0&1&1&1\\ 1&1&1&0&0&0&1\\ 1&1&1&0&0&1&0 \end{pmatrix}$	145152
$12A$	$\begin{pmatrix} 1&0&1&0&1&1&1\\ 1&1&1&1&0&1&1\\ 1&0&1&1&0&1&1\\ 1&0&1&0&0&1&0\\ 1&1&0&0&1&1&0\\ 0&0&0&0&0&1&0\\ 0&0&0&0&0&0&1 \end{pmatrix}$	60480	$12B$	$\begin{pmatrix} 1&1&1&0&1&1&0\\ 0&0&0&0&1&0&1\\ 0&0&0&1&1&1&0\\ 1&0&1&0&1&1&0\\ 0&0&1&0&1&1&1\\ 0&0&1&1&1&0&1\\ 0&0&1&1&1&1&0 \end{pmatrix}$	60480

Table 6.1: The conjugacy classes of elements of $2^7{:}Sp_6(2)$ (continued)

$[g]_G$	M	$\lvert[g]_G\rvert$	$[g]_G$	M	$\lvert[g]_G\rvert$
$12C$	$\begin{pmatrix} 0&0&1&0&1&1&1\\ 1&0&1&1&0&0&0\\ 0&0&0&0&1&1&0\\ 1&1&0&1&0&1&0\\ 1&0&0&0&1&1&1\\ 1&1&1&0&0&0&1\\ 1&1&1&0&0&1&0 \end{pmatrix}$	120960	$15A$	$\begin{pmatrix} 0&0&1&0&1&1&0\\ 0&1&0&1&1&1&0\\ 0&0&1&0&0&0&1\\ 0&0&1&0&1&0&0\\ 1&1&1&1&0&0&1\\ 1&1&0&0&1&1&1\\ 1&1&0&0&1&0&0 \end{pmatrix}$	96768

We know by Remark 6.2.7 that when $Sp_6(2)$ acts on 2^7 it produces 4 orbits of lengths 1, 1, 63 and 63 with corresponding point stabilizers $Sp_6(2)$, $Sp_6(2)$, $2^5{:}S_6$ and $2^5{:}S_6$ respectively. Let $\chi(Sp_6(2)|2^7)$ be the permutation character of $Sp_6(2)$ acting on 2^7. Then we obtain that

$$\begin{aligned} \chi(Sp_6(2)|2^7) &= 1+1+1_{2^5:S_6}^{Sp_6(2)} + 1_{2^5:S_6}^{Sp_6(2)} \\ &= 1a+1a+1a+27a+35b+1a+27a+35b \\ &= 4\times 1a + 2\times 27a + 2\times 35b \end{aligned}$$

where $I_{2^5:S_6}^{Sp_6(2)}$ is the identity character of $2^5{:}S_6$ induced to $Sp_6(2)$ and written in terms of the irreducibles characters of $Sp_6(2)$. For each class representative $g \in Sp_6(2)$, $\chi(Sp_6(2)|2^7)$ will give us the number k of fixed points of each g in 2^7. We will need the values of k's in order to be able to calculate the conjugacy classes of elements of $2^7{:}Sp_6(2)$. We list these values of k's in the following table.

$[g]_{Sp_6(2)}$	1A	2A	2B	2C	2D	3A	3B	3C	4A	4B	4C	4D	4E	5A	6A
k	128	64	32	32	16	32	2	8	8	16	16	8	8	8	16
$[g]_{Sp_6(2)}$	6B	6C	6D	6E	6F	6G	7A	8A	8B	9A	10A	12A	12B	12C	15A
k	8	2	8	8	4	4	2	4	4	2	4	4	4	2	2

Having obtained the values of the k's for various class representatives of $Sp_6(2)$, we then need to calculate the f's corresponding to these various k's. For this purpose we use Programme A given in Section 2.2. See Appendix, Programme A for $2^7{:}Sp_6(2)$.

From the programme output we calculate the number f_j of orbits Q_i's for $1 \leq i \leq k$, which have come together under the action of $C_{Sp_6(2)}(g)$, $g \in Sp_6(2)$ to form one orbit Δ_j. Having obtained the f_j's, we deduce that the group $2^7{:}Sp_6(2)$ has altogether 114 conjugacy classes of elements. Now for each class representative $g \in G$, we calculate the lengths of the corresponding classes $[x]_{\bar{G}}$ of $\bar{G}$. In Table 6.1 we also list the order of $C_{\bar{G}}(x)$ for each $[x]_{\bar{G}}$ and d_j's where d_jg is a representative of the the Δ_j.

For example if $g = 2A$, then $k = 64$, $f_1 = 1$, $f_2 = 1$, $f_3 = 16$, $f_4 = 16$ and $f_5 = 30$. Hence we produce five corresponding classes $[x_1]_{\bar{G}}$, $[x_2]_{\bar{G}}$, $[x_3]_{\bar{G}}$, $[x_4]_{\bar{G}}$ and $[x_5]_{\bar{G}}$. For $[x_1]_{\bar{G}}$, we have

$$|C_{\bar{G}}(x_1)| = \frac{k|C_{\bar{G}}(g)|}{f_1} = \frac{64 \times 23040}{1} = 1474560$$

and

$$|[x_1]_{\bar{G}}| = \frac{|\bar{G}|}{|C_{\bar{G}}(x_1)|} = 126 \; .$$

Similarly, for $[x_2]_{\bar{G}}$, we obtain $|C_{\bar{G}}(x_2)| = 1474560$ and $|[x_2]_{\bar{G}}| = 126$. For $[x_3]_{\bar{G}}]$, we have

$$|C_{\bar{G}}(x_3)| = \frac{k|C_{\bar{G}}(g)|}{f_3} = \frac{64 \times 23040}{16} = 92160$$

and

$$|[x_3]_{\bar{G}}| = \frac{|\bar{G}|}{|C_{\bar{G}}(x_3)|} = 2016 \; .$$

Similarly for $[x_4]_{\bar{G}}$, we obtain $|C_{\bar{G}}(x_4)| = 92160$ and $|[x_4]_{\bar{G}}| = 2016$. For $[x_5]_{\bar{G}}$, we have

$$|C_{\bar{G}}(x_5)| = \frac{k|C_{\bar{G}}(g)|}{f_5} = \frac{64 \times 23040}{30} = 49152$$

and

$$|[x_5]_{\bar{G}}| = \frac{|\bar{G}|}{|C_{\bar{G}}(x_5)|} = 3780 \; .$$

For a class representative $dg \in \bar{G}$ where $d \in 2^7$, $g \in Sp_6(2)$ and $o(g) = m$, by Theorem 2.2.9 and Remark 2.2.10 we have

$$o(dg) = \begin{cases} m & \text{if } w = 1_N \\ 2m & \text{otherwise} \end{cases} \; .$$

To calculate the orders of the class representatives $dg \in \overline{G}$, we use Programme B given in Chapter 2 to compute w for each $d \in N$ and each class representative $g \in Sp_6(2)$. For example for $g = 2A$ and for $[x_1]_{\bar{G}}$, $[x_2]_{\bar{G}}$ and $[x_5]_{\bar{G}}$, we get $w = (0,0,0,0,0,0,0) = 1_N$ and hence $o(dg) = 2$. Thus we obtain that order of elements in the corresponding classes $[x_1]_{\bar{G}}$, $[x_2]_{\bar{G}}$ and $[x_5]_{\bar{G}}$ is 2 and we represent these classes of $\bar{G}$ by $2D$, $2E$ and $2F$ respectively. Similarly for classes $[x_3]_{\bar{G}}$ and $[x_4]_{\bar{G}}$, we get $w = (1,1,0,1,0,1,1)$ and hence $o(dg) = 2 \times 2 = 4$. Thus, the order of elements in the classes $[x_3]_{\bar{G}}$ and $[x_4]_{\bar{G}}$ is 4 and we obtain the corresponding classes $4A$ and $4B$ of $\bar{G}$. Table 6.1 below gives detailed information about the conjugacy classes of $\bar{G}$.

Table 6.2: The conjugacy classes of elements of $2^7{:}Sp_6(2)$

$[g]_{Sp_6(2)}$	k	f_j	d_j	w	$[x]_{2^7:Sp_6(2)}$	$\lvert[x]_{2^7:Sp_6(2)}\rvert$	$\lvert C_{2^7:Sp_6(2)}(x)\rvert$
$1A$	128	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$1A$	1	185794560
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,1,1)$	$2A$	1	185794560
		$f_3 = 63$	$(1,1,1,1,1,1,1)$	$(1,1,1,1,1,1,1)$	$2B$	63	2949120
		$f_4 = 63$	$(0,0,0,0,0,0,1)$	$(0,0,0,0,0,0,1)$	$2C$	63	2949120
$2A$	64	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$2D$	126	1474560
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$2E$	126	1474560
		$f_3 = 16$	$(0,1,1,1,1,1,0)$	$(1,1,0,1,0,1,1)$	$4A$	2016	92160
		$f_4 = 16$	$(0,0,0,0,0,0,1)$	$(1,1,0,1,0,1,1)$	$4B$	2016	92160
		$f_5 = 30$	$(1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,0)$	$2F$	3780	49152
$2B$	32	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$2G$	1260	147456
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$2H$	1260	147456
		$f_3 = 3$	$(0,1,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$2I$	3780	49152
		$f_4 = 3$	$(1,1,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$2J$	3780	49152
		$f_5 = 24$	$(1,1,1,1,1,1,1)$	$(1,0,1,0,1,1,0)$	$4C$	30240	6144
$2C$	32	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$2K$	3780	49152
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$2L$	3780	49152
		$f_3 = 4$	$(0,1,1,1,1,1,1)$	$(0,0,0,0,0,0,1)$	$4D$	15120	12288
		$f_4 = 4$	$(1,0,1,1,1,0,0)$	$(0,0,0,0,0,0,1)$	$4E$	15120	12288
		$f_5 = 6$	$(1,0,0,1,1,1,1)$	$(0,0,0,0,0,0,0)$	$2M$	22680	8192
		$f_6 = 16$	$(1,1,1,1,1,1,1)$	$(0,1,0,1,0,0,0)$	$4F$	60480	3072
$2D$	16	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$2N$	30240	6144
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$2O$	30240	6144
		$f_3 = 1$	$(1,1,1,1,1,1,1)$	$(1,1,1,1,1,0,1)$	$4G$	30240	6144
		$f_4 = 1$	$(1,1,1,1,1,0,0)$	$(1,1,1,1,1,0,1)$	$4H$	30240	6144
		$f_5 = 6$	$(1,0,1,1,0,1,1)$	$(1,0,0,1,0,1,0)$	$4I$	181440	1024
		$f_6 = 6$	$(0,0,1,1,0,1,0)$	$(1,0,0,0,1,0,1)$	$4J$	181440	1024
$3A$	32	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$3A$	2688	69120
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,1,1)$	$6A$	2688	69120
		$f_3 = 15$	$(1,1,1,1,1,1,1)$	$(1,1,1,1,0,1,0)$	$6B$	40320	4608
		$f_4 = 15$	$(1,0,0,0,1,0,0)$	$(1,0,1,1,0,0,1)$	$6C$	40320	4608
$3B$	2	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$3B$	143360	1296
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,1,1)$	$6D$	143360	1296
$3C$	8	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$3C$	215040	864
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,1,1)$	$6E$	215040	864
		$f_3 = 3$	$(1,1,1,1,1,1,1)$	$(0,0,0,1,1,0,1)$	$6F$	645120	288
		$f_4 = 3$	$(1,1,0,0,0,1,0)$	$(0,0,0,1,1,1,0)$	$6G$	645120	288
$4A$	8	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$4K$	60480	3072
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$4L$	60480	3072
		$f_3 = 6$	$(1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,0)$	$4M$	362880	512

Table 6.2: The conjugacy classes of elements of $2^7{:}Sp_6(2)$ (continued)

$[g]_{Sp_6(2)}$	k	f_j	d_j	w	$[x]_{2^7:Sp_6(2)}$	$\|[x]_{2^7:Sp_6(2)}\|$	$\|C_{2^7:Sp_6(2)}(x)\|$
$4B$	16	$f_1=1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$4N$	60480	3072
		$f_2=1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$4O$	60480	3072
		$f_3=3$	$(1,1,1,0,0,0,1)$	$(0,0,0,0,0,0,0)$	$4P$	181440	1024
		$f_4=3$	$(0,1,1,1,0,0,1)$	$(0,0,0,0,0,0,0)$	$4Q$	181440	1024
		$f_5=8$	$(1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,1)$	$8A$	483840	384
$4C$	16	$f_1=1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$4R$	60480	3072
		$f_2=1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$4S$	60480	3072
		$f_3=3$	$(0,1,1,0,1,1,1)$	$(0,0,0,0,0,0,0)$	$4T$	181440	1024
		$f_4=3$	$(0,1,1,1,0,0,0)$	$(0,0,0,0,0,0,0)$	$4U$	181440	1024
		$f_5=8$	$(1,1,1,1,1,1,1)$	$(1,1,0,0,1,0,0)$	$8B$	483840	384
$4D$	8	$f_1=1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$4V$	181440	1024
		$f_2=1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$4W$	181440	1024
		$f_3=2$	$(1,0,0,1,0,1,1)$	$(0,0,0,0,0,0,0)$	$4X$	362880	512
		$f_4=4$	$(1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,0)$	$4Y$	725760	256
$4E$	8	$f_1=1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$4Z$	725760	256
		$f_2=1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$4AA$	725760	256
		$f_3=1$	$(0,1,1,1,1,1,0)$	$(0,0,0,0,0,0,0)$	$4AB$	725760	256
		$f_4=1$	$(0,1,1,0,0,1,0)$	$(0,0,0,0,0,0,0)$	$4AC$	725760	256
		$f_5=2$	$(0,1,1,1,0,1,1)$	$(1,1,0,1,1,0,1)$	$8C$	1451520	128
		$f_6=2$	$(1,1,1,1,0,1,0)$	$(1,1,0,1,1,0,1)$	$8D$	1451520	128
$5A$	8	$f_1=1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$5A$	774144	240
		$f_2=1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,1,1)$	$10A$	774144	240
		$f_3=3$	$(1,1,1,1,1,1,1)$	$(1,1,1,1,1,1,1)$	$10B$	2322432	80
		$f_4=3$	$(1,1,0,0,1,1,1)$	$(0,1,0,1,0,1,1)$	$10C$	2322432	80
$6A$	16	$f_1=1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$6H$	80640	2304
		$f_2=1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$6I$	80640	2304
		$f_3=4$	$(0,1,0,0,0,1,0)$	$(1,1,0,0,1,1,1)$	$12A$	322560	576
		$f_4=4$	$(1,1,1,0,0,1,0)$	$(1,1,0,0,1,1,1)$	$12B$	322560	576
		$f_5=6$	$(1,1,1,1,0,1,1)$	$(0,0,0,0,0,0,0)$	$6J$	483840	384
$6B$	8	$f_1=1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$6K$	161280	1152
		$f_2=1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$6L$	161280	1152
		$f_3=6$	$(1,1,1,1,1,1,1)$	$(1,0,1,0,1,1,0)$	$12C$	967680	192
$6C$	2	$f_1=1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$6M$	1290240	144
		$f_2=1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$6N$	1290240	144
$6D$	8	$f_1=1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$6O$	483840	384
		$f_2=1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$6P$	483840	384
		$f_3=1$	$(0,0,1,0,1,1,0)$	$(0,0,0,0,0,0,1)$	$12D$	483840	384
		$f_4=1$	$(1,0,1,1,1,1,0)$	$(0,0,0,0,0,0,1)$	$12E$	483840	384
		$f_5=4$	$(1,1,1,1,1,1,1)$	$(0,1,0,1,0,0,0)$	$12F$	1935360	96

Table 6.2: The conjugacy classes of elements of $2^7{:}Sp_6(2)$ (continued)

$[g]_{Sp_6(2)}$	k	f_j	d_j	w	$[x]_{2^7:Sp_6(2)}$	$\lvert[x]_{2^7:Sp_6(2)}\rvert$	$\lvert C_{2^7:Sp_6(2)}(x)\rvert$
$6E$	8	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$6Q$	645120	288
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$6R$	645120	288
		$f_3 = 3$	$(1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,0)$	$6S$	1935360	96
		$f_4 = 3$	$(1,0,1,0,1,0,1)$	$(0,0,0,0,0,0,0)$	$6T$	1935360	96
$6F$	4	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$6U$	1290240	144
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$6V$	1290240	144
		$f_3 = 1$	$(1,1,1,1,1,1,1)$	$(0,1,1,1,0,1,0)$	$12G$	1290240	144
		$f_4 = 1$	$(1,0,0,1,1,0,0)$	$(0,1,1,1,0,1,0)$	$12H$	1290240	144
$6G$	4	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$6W$	3870720	48
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$6X$	3870720	48
		$f_3 = 1$	$(0,0,1,0,1,1,1)$	$(0,0,1,0,0,1,0)$	$12I$	3870720	48
		$f_4 = 1$	$(0,0,0,1,1,1,0)$	$(0,0,1,0,0,1,0)$	$12J$	3870720	48
$7A$	2	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$7A$	13271040	14
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,1,1)$	$14A$	13271040	14
$8A$	4	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$8E$	2903040	64
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$8F$	2903040	64
		$f_3 = 2$	$(1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,0)$	$8G$	5806080	32
$8B$	4	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$8H$	2903040	64
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$8I$	2903040	64
		$f_3 = 2$	$(1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,0)$	$8J$	2903040	64
$9A$	2	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$9A$	10321920	18
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,1,1)$	$18A$	10321920	18
$10A$	4	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$10D$	4644864	40
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$10E$	4644864	40
		$f_3 = 1$	$(1,0,0,1,0,1,0)$	$(1,1,0,1,0,1,1)$	$20A$	4644864	40
		$f_4 = 1$	$(0,0,1,1,0,1,0)$	$(1,1,0,1,0,1,1)$	$20B$	4644864	40
$12A$	4	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$12K$	1935360	96
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$12L$	1935360	96
		$f_3 = 2$	$(1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,1)$	$24A$	3870720	48
$12B$	4	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$12M$	1935360	96
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$12N$	1935360	96
		$f_3 = 2$	$(0,1,1,1,1,1,1)$	$(1,1,0,0,1,0,0)$	$24B$	3870720	48
$12C$	2	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$12O$	7741440	24
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,0,0)$	$12P$	7741440	24
$15A$	2	$f_1 = 1$	$(0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0)$	$15A$	6193152	30
		$f_2 = 1$	$(0,0,0,0,0,1,1)$	$(0,0,0,0,0,1,1)$	$30A$	6193152	30

6.5 The Inertia Groups of $2^7{:}Sp_6(2)$

From the Remark 6.2.7 we have that $Sp_6(2)$ acting on $Irr(2^7)$ produces 4 inertia factor groups $Sp_6(2)$, $2^5{:}S_6$, S_8 and $O_6^-(2)$ of indices 1, 63, 36 and 28 in $Sp_6(2)$ respectively. Using the conjugacy classes of $Sp_6(2)$ we generated these inertia factor groups in terms of 7×7 matrices over $GF(2)$. We were able to produce α_1, α_2, β_1, β_2, β_3, γ_1 and γ_2 such that

- $<\alpha_1, \alpha_2> = 2^5{:}S_6$, $\alpha_1 \in 4B$, $\alpha_2 \in 6E$ where

$$\alpha_1 = \begin{pmatrix} 1&0&0&0&0&0&0\\ 1&0&0&0&1&1&1\\ 0&0&1&0&1&0&0\\ 1&1&0&1&1&1&1\\ 1&0&0&1&0&0&0\\ 0&0&0&0&0&1&0\\ 0&0&0&0&0&0&1 \end{pmatrix} \quad \alpha_2 = \begin{pmatrix} 1&0&1&1&0&0&0\\ 0&1&1&0&1&1&1\\ 1&0&1&0&1&0&0\\ 0&0&0&0&1&1&1\\ 1&0&0&1&0&0&0\\ 1&0&1&0&0&0&1\\ 1&0&1&0&0&1&0 \end{pmatrix}.$$

- $<\beta_1, \beta_2, \beta_3> = S_8$, $\beta_1 \in 2A$, $\beta_2 \in 2D$, $\beta_3 \in 4B$ where

$$\beta_1 = \begin{pmatrix} 1&0&0&0&0&0&0\\ 0&1&0&0&0&0&0\\ 0&0&1&0&0&0&0\\ 0&0&0&1&0&0&0\\ 0&0&0&0&1&0&0\\ 1&1&0&1&0&0&1\\ 1&1&0&1&0&1&0 \end{pmatrix} \quad \beta_2 = \begin{pmatrix} 0&1&1&0&0&1&0\\ 0&0&1&1&0&0&0\\ 0&1&0&0&1&1&1\\ 0&0&0&0&1&1&1\\ 0&0&0&1&0&1&1\\ 1&1&1&1&1&1&1\\ 1&1&1&1&1&0&0 \end{pmatrix}$$

$$\beta_3 = \begin{pmatrix} 1&1&1&1&1&1&1\\ 0&0&1&1&1&1&1\\ 0&1&1&1&0&0&1\\ 0&1&1&0&1&1&0\\ 0&0&0&0&1&0&1\\ 0&0&0&0&0&1&0\\ 0&0&0&0&0&0&1 \end{pmatrix}.$$

- $<\gamma_1, \gamma_2> = O_6^-(2)$, $\gamma_1 \in 4B$, $\gamma_2 \in 6A$ where

$$\gamma_1 = \begin{pmatrix} 1&1&1&1&1&1&1\\ 0&0&1&1&1&1&1\\ 0&1&1&1&0&0&1\\ 0&1&1&0&1&1&0\\ 0&0&0&0&1&0&1\\ 0&0&0&0&0&1&0\\ 0&0&0&0&0&0&1 \end{pmatrix} \quad \gamma_2 = \begin{pmatrix} 0&1&0&1&0&0&1\\ 1&1&1&1&1&0&1\\ 1&0&0&0&0&1&1\\ 0&0&0&0&1&1&0\\ 0&1&1&0&0&0&0\\ 1&1&0&1&0&1&1\\ 1&1&0&1&0&0&0 \end{pmatrix}.$$

Notice that $2A$, $2D$, $4B$, $6A$ and $6E$ are conjugacy classes of elements of $Sp_6(2)$ (See Table 6.1).

6.6 The Fusion of Inertia Factor Groups into $Sp_6(2)$

As we mentioned in the previous section, there are four inertia factor groups $Sp_6(2)$, $2^5{:}S_6$, S_8 and $O_6^-(2)$ of $2^7{:}Sp_6(2)$. Using the character tables of these inertia factor together with power maps of their elements, the permutation characters of $Sp_6(2)$ of degrees 63, 36 and

28 respectively, and Corollary 2.5.5 we are able to obtain the partial fusions of $2^5{:}S_6$, S_8 and $O_6^-(2)$ into $Sp_6(2)$. We completed the fusion maps by using matrix conjugation in $Sp_6(2)$. These fusion maps are listed in Tables 6.3, 6.4 and 6.5 below.

Table 6.3: The fusion of $2^5{:}S_6$ into $Sp_6(2)$

$[h]_{2^5:S_6}$	$\longrightarrow$	$[g]_{Sp_6(2)}$	$[h]_{2^5:S_6}$	$\longrightarrow$	$[g]_{Sp_6(2)}$	$[h]_{2^5:S_6}$	$\longrightarrow$	$[g]_{Sp_6(2)}$
$1A$		$1A$	$2A$		$2A$	$2B$		$2B$
$2C$		$2C$	$2D$		$2C$	$2E$		$2A$
$2F$		$2D$	$2G$		$2B$	$2H$		$2C$
$2I$		$2D$	$2J$		$2D$	$3A$		$3A$
$3B$		$3C$	$4A$		$4B$	$4B$		$4C$
$4C$		$4A$	$4D$		$4D$	$4E$		$4D$
$4F$		$4C$	$4G$		$4E$	$4H$		$4E$
$4I$		$4E$	$4J$		$4B$	$5A$		$5A$
$6A$		$6A$	$6B$		$6D$	$6C$		$6B$
$6D$		$6F$	$6G$		$6G$	$6H$		$6E$
$8A$		$8B$	$8B$		$8A$	$10A$		$10A$
$12A$		$12A$	$12B$		$12B$			

Table 6.4: The fusion of S_8 into $Sp_6(2)$

$[h]_{S_8}$	$\longrightarrow$	$[g]_{Sp_6(2)}$	$[h]_{S_8}$	$\longrightarrow$	$[g]_{Sp_6(2)}$	$[h]_{S_8}$	$\longrightarrow$	$[g]_{Sp_6(2)}$
$1A$		$1A$	$2A$		$2A$	$2B$		$2B$
$2C$		$2C$	$2D$		$2D$	$3A$		$3A$
$3B$		$3C$	$4A$		$4B$	$4B$		$4D$
$4C$		$4C$	$4D$		$4E$	$5A$		$5A$
$6A$		$6F$	$6B$		$6A$	$6C$		$6D$
$6D$		$6G$	$6E$		$6E$	$7A$		$7A$
$8A$		$8A$	$10A$		$10A$	$12A$		$12A$
$15A$		$15A$						

Table 6.5: The fusion of $O_6^-(2)$ into $Sp_6(2)$

$[h]_{O_6^-(2)}$	$\longrightarrow$	$[g]_{Sp_6(2)}$	$[h]_{O_6^-(2)}$	$\longrightarrow$	$[g]_{Sp_6(2)}$	$[h]_{O_6^-(2)}$	$\longrightarrow$	$[g]_{Sp_6(2)}$
$1A$		$1A$	$2A$		$2A$	$2B$		$2B$
$2C$		$2C$	$2D$		$2D$	$3A$		$3B$
$3B$		$3A$	$3C$		$3C$	$4A$		$4A$
$4B$		$4C$	$4C$		$4B$	$4D$		$4E$
$5A$		$5A$	$6A$		$6C$	$6B$		$6A$
$6C$		$6F$	$6D$		$6E$	$6E$		$6B$
$6F$		$6D$	$6G$		$6G$	$8A$		$8B$
$9A$		$9A$	$10A$		$10A$	$12A$		$12C$
$12B$		$12B$						

6.7 The Fischer-Clifford Matrices of $2^7{:}Sp_6(2)$

Having obtained the fusions of inertia factor groups $2^5{:}S_6$, S_8 and $O_6^-(2)$ into $Sp_6(2)$, we are now able to compute the Fischer-Clifford matrices of the group $2^7{:}Sp_6(2)$. We will use the properties of Fischer-Clifford matrices which are given in Subsection 5.1.1 and Section

5.2. Note that all the relations of Section 5.2 holds since the extension is a split extension and hence by Lemma 5.2.6 every coset is a split coset.

For example consider the conjugacy class $2A$ of $Sp_6(2)$. Then we obtain that $M(2A)$ has the following form with corresponding weights attached to the rows and columns

$$M(2A) = \begin{array}{c} \\ 23040 \\ 23040 \\ 768 \\ 1440 \\ 1440 \\ \\ \end{array} \begin{array}{c} \begin{array}{ccccc} 1474560 & 1474560 & 92160 & 92160 & 49152 \end{array} \\ \left(\begin{array}{ccccc} a & f & k & p & u \\ b & g & l & q & v \\ c & h & m & r & w \\ d & i & n & s & x \\ e & j & o & t & y \end{array} \right) \\ \begin{array}{ccccc} 2 & 2 & 32 & 32 & 60 \end{array} \end{array}.$$

By Theorems 5.1.4 and 5.2.8 we have $a = f = k = p = u = 1$, $b = 1$, $c = 30$, $d = 16$ and $e = 16$. Thus we get the following form

$$M(2A) = \begin{array}{c} \\ 23040 \\ 23040 \\ 768 \\ 1440 \\ 1440 \\ \\ \end{array} \begin{array}{c} \begin{array}{ccccc} 1474560 & 1474560 & 92160 & 92160 & 49152 \end{array} \\ \left(\begin{array}{ccccc} 1 & 1 & 1 & 1 & 1 \\ 1 & a & f & m & w \\ 30 & b & g & n & x \\ 16 & c & h & p & y \\ 16 & d & k & q & z \end{array} \right) \\ \begin{array}{ccccc} 2 & 2 & 32 & 32 & 60 \end{array} \end{array}.$$

We find the remaining entries of $M(2A)$ by using the properties of Fischer-Clifford matrices which are given in Subsection 5.1 and Section 5.2. Hence we have

$$M(2A) = \begin{array}{c} \\ 23040 \\ 23040 \\ 768 \\ 1440 \\ 1440 \\ \\ \end{array} \begin{array}{c} \begin{array}{ccccc} 1474560 & 1474560 & 92160 & 92160 & 49152 \end{array} \\ \left(\begin{array}{ccccc} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & -1 & -1 & 1 \\ 30 & 30 & 0 & 0 & -2 \\ 16 & -16 & -4 & 4 & 0 \\ 16 & -16 & 4 & -4 & 0 \end{array} \right) \\ \begin{array}{ccccc} 2 & 2 & 32 & 32 & 60 \end{array} \end{array}.$$

For each class representative $g \in Sp_6(2)$, we construct a Fischer-Clifford matrix $M(g)$ which are given in the following table.

Table 6.6: The Fischer-Clifford matrices of $2^7{:}Sp_6(2)$

$M(g)$	$M(g)$
$M(1A) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 63 & 63 & -1 & -1 \\ 36 & -36 & 4 & -4 \\ 28 & -28 & -4 & 4 \end{pmatrix}$	$M(2A) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & -1 & -1 & 1 \\ 30 & 30 & 0 & 0 & -2 \\ 16 & -16 & -4 & 4 & 0 \\ 16 & -16 & 4 & -4 & 0 \end{pmatrix}$
$M(2B) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 3 & 3 & 3 & 3 & -1 \\ 12 & 12 & -4 & -4 & 0 \\ 12 & -12 & -4 & 4 & 0 \\ 4 & -4 & 4 & -4 & 0 \end{pmatrix}$	$M(2C) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & -1 \\ 2 & 2 & -2 & -2 & 2 & 0 \\ 12 & 12 & 0 & 0 & -4 & 0 \\ 8 & -8 & -4 & 4 & 0 & 0 \\ 8 & -8 & 4 & -4 & 0 & 0 \end{pmatrix}$
$M(2D) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & -1 & -1 & 1 & -1 \\ 3 & 3 & -3 & -3 & -1 & 1 \\ 3 & 3 & 3 & 3 & -1 & -1 \\ 4 & -4 & 4 & -4 & 0 & 0 \\ 4 & -4 & -4 & 4 & 0 & 0 \end{pmatrix}$	$M(3A) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 15 & 15 & -1 & -1 \\ 6 & -6 & -2 & 2 \\ 10 & -10 & 2 & -2 \end{pmatrix}$
$M(3B) = \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$	$M(3C) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 3 & 3 & -1 & -1 \\ 3 & -3 & 1 & -1 \\ 1 & -1 & -1 & 1 \end{pmatrix}$
$M(4A) = \begin{pmatrix} 1 & 1 & 1 \\ 3 & 3 & -1 \\ 4 & -4 & 0 \end{pmatrix}$	$M(4B) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & -1 \\ 6 & 6 & -2 & -2 & 0 \\ 2 & -2 & 2 & -2 & 0 \\ 6 & -6 & -2 & 2 & 0 \end{pmatrix}$
$M(4C) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & -1 \\ 6 & 6 & -2 & -2 & 0 \\ 6 & -6 & 2 & -2 & 0 \\ 2 & -2 & -2 & 2 & 0 \end{pmatrix}$	$M(4D) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & -1 \\ 2 & 2 & -2 & 0 \\ 4 & -4 & 0 & 0 \end{pmatrix}$
$M(4E) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & -1 & -1 & 1 & -1 \\ 1 & 1 & -1 & -1 & -1 & 1 \\ 1 & 1 & 1 & 1 & -1 & -1 \\ 2 & -2 & -2 & 2 & 0 & 0 \\ 2 & -2 & 2 & -2 & 0 & 0 \end{pmatrix}$	$M(5A) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 3 & 3 & -1 & -1 \\ 1 & -1 & 1 & -1 \\ 3 & -3 & -1 & 1 \end{pmatrix}$

Table 6.6: The Fischer-Clifford matrices of $2^7{:}Sp_6(2)$ (continued)

$M(g)$	$M(g)$
$M(6A)=\begin{pmatrix}1&1&1&1&1\\1&1&-1&-1&1\\6&6&0&0&-2\\4&-4&2&-2&0\\4&-4&-2&2&0\end{pmatrix}$	$M(6B)=\begin{pmatrix}1&1&1\\3&3&-1\\4&-4&0\end{pmatrix}$
$M(6C)=\begin{pmatrix}1&1\\1&-1\end{pmatrix}$	$M(6D)=\begin{pmatrix}1&1&1&1&1\\1&1&1&1&-1\\2&2&-2&-2&0\\2&-2&2&-2&0\\2&-2&-2&2&0\end{pmatrix}$
$M(6E)=\begin{pmatrix}1&1&1&1\\3&3&-1&-1\\3&-3&1&-1\\1&-1&-1&1\end{pmatrix}$	$M(6F)=\begin{pmatrix}1&1&1&1\\1&1&-1&-1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}$
$M(6G)=\begin{pmatrix}1&1&1&1\\1&1&-1&-1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}$	$M(7A)=\begin{pmatrix}1&1\\1&-1\end{pmatrix}$
$M(8A)=\begin{pmatrix}1&1&1\\1&1&-1\\2&-2&0\end{pmatrix}$	$M(8B)=\begin{pmatrix}1&1&1\\1&1&-1\\2&-2&0\end{pmatrix}$
$M(9A)=\begin{pmatrix}1&1\\1&-1\end{pmatrix}$	$M(10A)=\begin{pmatrix}1&1&1&1\\1&1&-1&-1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}$
$M(12A)=\begin{pmatrix}1&1&1\\1&1&-1\\2&-2&0\end{pmatrix}$	$M(12B)=\begin{pmatrix}1&1&1\\1&1&-1\\2&-2&0\end{pmatrix}$
$M(12C)=\begin{pmatrix}1&1\\1&-1\end{pmatrix}$	$M(15A)=\begin{pmatrix}1&1\\1&-1\end{pmatrix}$

We use the above Fischer-Clifford matrices and the character tables of the inertia factors groups $Sp_6(2)$, $2^5{:}S_6$, S_8 and $O_6^-(2)$ together with the fusions of these inertia factors into $Sp_6(2)$ which are given in Tables 6.2, 6.3 and 6.4 to obtain the full character table of $\bar{G} = 2^7{:}Sp_6(2)$. The set of irreducibles characters of $\bar{G}$ will be partitioned into four blocks B_1, B_2, B_3 and B_4 corresponding to the inertia factors $Sp_6(2)$, $2^5{:}S_6$, S_8 and $O_6^-(2)$ respectively. In fact $B_1 = \{\chi_i|\ 1 \le i \le 30\}$, $B_2 = \{\chi_i|\ 31 \le i \le 67\}$, $B_3 = \{\chi_i|\ 68 \le i \le 89\}$, and $B_4 = \{\chi_i|\ 90 \le i \le 114\}$, where $Irr(2^7{:}Sp_6(2)) = \bigcup_{i=1}^4 B_i$. The complete character table of $\bar{G}$ is given in Table 7.5. Please note that the centralizers of elements of $\bar{G}$ were listed in the last column of Table 6.1.

Table 6.7: The character table of $2^7{:}Sp_6(2)$

	$1A$				$2A$					$2B$					$2C$		
	$1A$	$2A$	$2B$	$2C$	$2D$	$2E$	$4A$	$4B$	$2F$	$2G$	$2H$	$2I$	$2J$	$4C$	$2K$	$2L$	$4D$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	7	7	7	7	-5	-5	-5	-5	-5	-1	-1	-1	-1	-1	3	3	3
χ_3	15	15	15	15	-5	-5	-5	-5	-5	7	7	7	7	7	3	3	3
χ_4	21	21	21	21	-11	-11	-11	-11	-11	5	5	5	5	5	5	5	5
χ_5	21	21	21	21	9	9	9	9	9	-3	-3	-3	-3	-3	1	1	1
χ_6	27	27	27	27	15	15	15	15	15	3	3	3	3	3	7	7	7
χ_7	35	35	35	35	-5	-5	-5	-5	-5	3	3	3	3	3	-5	-5	-5
χ_8	35	35	35	35	15	15	15	15	15	11	11	11	11	11	7	7	7
χ_9	56	56	56	56	-24	-24	-24	-24	-24	-8	-8	-8	-8	-8	8	8	8
χ_{10}	70	70	70	70	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	6	6	6
χ_{11}	84	84	84	84	4	4	4	4	4	20	20	20	20	20	4	4	4
χ_{12}	105	105	105	105	-35	-35	-35	-35	-35	1	1	1	1	1	5	5	5
χ_{13}	105	105	105	105	5	5	5	5	5	17	17	17	17	17	-3	-3	-3
χ_{14}	105	105	105	105	25	25	25	25	25	-7	-7	-7	-7	-7	9	9	9
χ_{15}	120	120	120	120	40	40	40	40	40	-8	-8	-8	-8	-8	8	8	8
χ_{16}	168	168	168	168	40	40	40	40	40	8	8	8	8	8	8	8	8
χ_{17}	189	189	189	189	-51	-51	-51	-51	-51	-3	-3	-3	-3	-3	13	13	13
χ_{18}	189	189	189	189	21	21	21	21	21	-3	-3	-3	-3	-3	-11	-11	-11
χ_{19}	189	189	189	189	-39	-39	-39	-39	-39	21	21	21	21	21	1	1	1
χ_{20}	210	210	210	210	10	10	10	10	10	-14	-14	-14	-14	-14	10	10	10
χ_{21}	210	210	210	210	50	50	50	50	50	2	2	2	2	2	2	2	2
χ_{22}	216	216	216	216	-24	-24	-24	-24	-24	24	24	24	24	24	8	8	8
χ_{23}	280	280	280	280	40	40	40	40	40	24	24	24	24	24	8	8	8
χ_{24}	280	280	280	280	-40	-40	-40	-40	-40	-8	-8	-8	-8	-8	-8	-8	-8
χ_{25}	315	315	315	315	-45	-45	-45	-45	-45	-21	-21	-21	-21	-21	3	3	3
χ_{26}	336	336	336	336	-16	-16	-16	-16	-16	16	16	16	16	16	-16	-16	-16
χ_{27}	378	378	378	378	-30	-30	-30	-30	-30	-6	-6	-6	-6	-6	2	2	2
χ_{28}	405	405	405	405	45	45	45	45	45	-27	-27	-27	-27	-27	-3	-3	-3
χ_{29}	420	420	420	420	20	20	20	20	20	4	4	4	4	4	-12	-12	-12
χ_{30}	512	512	512	512	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$2C$			$2D$						$3A$				$3B$	
	$4E$	$2M$	$4F$	$2N$	$2O$	$4G$	$4H$	$4I$	$4J$	$3A$	$6A$	$6B$	$6C$	$3B$	$6D$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	3	3	3	-1	-1	-1	-1	-1	-1	4	4	4	4	-2	-2
χ_3	3	3	3	-1	-1	-1	-1	-1	-1	0	0	0	0	-3	-3
χ_4	5	5	5	-3	-3	-3	-3	-3	-3	6	6	6	6	3	3
χ_5	1	1	1	-3	-3	-3	-3	-3	-3	6	6	6	6	3	3
χ_6	7	7	7	3	3	3	3	3	3	9	9	9	9	0	0
χ_7	-5	-5	-5	3	3	3	3	3	3	5	5	5	5	-1	-1
χ_8	7	7	7	3	3	3	3	3	3	5	5	5	5	-1	-1
χ_9	8	8	8	0	0	0	0	0	0	11	11	11	11	2	2
χ_{10}	6	6	6	-2	-2	-2	-2	-2	-2	-5	-5	-5	-5	7	7
χ_{11}	4	4	4	4	4	4	4	4	4	-6	-6	-6	-6	3	3
χ_{12}	5	5	5	1	1	1	1	1	1	15	15	15	15	-3	-3
χ_{13}	-3	-3	-3	-7	-7	-7	-7	-7	-7	0	0	0	0	6	6
χ_{14}	9	9	9	1	1	1	1	1	1	0	0	0	0	6	6
χ_{15}	8	8	8	0	0	0	0	0	0	15	15	15	15	-6	-6
χ_{16}	8	8	8	8	8	8	8	8	8	6	6	6	6	6	6
χ_{17}	13	13	13	-3	-3	-3	-3	-3	-3	9	9	9	9	0	0
χ_{18}	-11	-11	-11	-3	-3	-3	-3	-3	-3	9	9	9	9	0	0
χ_{19}	1	1	1	-3	-3	-3	-3	-3	-3	9	9	9	9	0	0
χ_{20}	10	10	10	2	2	2	2	2	2	-15	-15	-15	-15	-6	-6
χ_{21}	2	2	2	-6	-6	-6	-6	-6	-6	15	15	15	15	3	3
χ_{22}	8	8	8	0	0	0	0	0	0	-9	-9	-9	-9	0	0
χ_{23}	8	8	8	0	0	0	0	0	0	-5	-5	-5	-5	-8	-8
χ_{24}	-8	-8	-8	8	8	8	8	8	8	10	10	10	10	10	10
χ_{25}	3	3	3	3	3	3	3	3	3	0	0	0	0	-9	-9
χ_{26}	-16	-16	-16	0	0	0	0	0	0	6	6	6	6	-6	-6
χ_{27}	2	2	2	-6	-6	-6	-6	-6	-6	-9	-9	-9	-9	0	0
χ_{28}	-3	-3	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	0	0
χ_{29}	-12	-12	-12	4	4	4	4	4	4	0	0	0	0	-3	-3
χ_{30}	0	0	0	0	0	0	0	0	0	-16	-16	-16	-16	8	8

Table 6.7: The character table of $2^7{:}SP(6,2)$ (continued)

	$3C$				$4A$			$4B$					$4C$				
	$3C$	$6E$	$6F$	$6G$	$4K$	$4L$	$4M$	$4N$	$4O$	$4P$	$4Q$	$8A$	$4R$	$4S$	$4T$	$4U$	$8B$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	1	1	3	3	3	-3	-3	-3	-3	-3	1	1	1	1	1
χ_3	3	3	3	3	-1	-1	-1	1	1	1	1	1	-3	-3	-3	-3	-3
χ_4	0	0	0	0	1	1	1	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
χ_5	0	0	0	0	5	5	5	3	3	3	3	3	-1	-1	-1	-1	-1
χ_6	0	0	0	0	3	3	3	5	5	5	5	5	1	1	1	1	1
χ_7	2	2	2	2	7	7	7	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_8	2	2	2	2	-1	-1	-1	1	1	1	1	1	5	5	5	5	5
χ_9	2	2	2	2	0	0	0	-4	-4	-4	-4	-4	4	4	4	4	4
χ_{10}	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
χ_{11}	3	3	3	3	4	4	4	0	0	0	0	0	0	0	0	0	0
χ_{12}	-3	-3	-3	-3	5	5	5	-5	-5	-5	-5	-5	-1	-1	-1	-1	-1
χ_{13}	3	3	3	3	-3	-3	-3	-1	-1	-1	-1	-1	3	3	3	3	3
χ_{14}	3	3	3	3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
χ_{15}	0	0	0	0	0	0	0	4	4	4	4	4	-4	-4	-4	-4	-4
χ_{16}	-3	-3	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{17}	0	0	0	0	-3	-3	-3	1	1	1	1	1	1	1	1	1	1
χ_{18}	0	0	0	0	9	9	9	1	1	1	1	1	1	1	1	1	1
χ_{19}	0	0	0	0	-3	-3	-3	-1	-1	-1	-1	-1	-5	-5	-5	-5	-5
χ_{20}	3	3	3	3	6	6	6	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
χ_{21}	0	0	0	0	-2	-2	-2	2	2	2	2	2	2	2	2	2	2
χ_{22}	0	0	0	0	0	0	0	4	4	4	4	4	-4	-4	-4	-4	-4
χ_{23}	-2	-2	-2	-2	0	0	0	-4	-4	-4	-4	-4	4	4	4	4	4
χ_{24}	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{25}	0	0	0	0	-5	-5	-5	3	3	3	3	3	3	3	3	3	3
χ_{26}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{27}	0	0	0	0	6	6	6	2	2	2	2	2	6	6	2	2	2
χ_{28}	0	0	0	0	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
χ_{29}	3	3	3	3	-4	-4	-4	0	0	0	0	0	0	0	0	0	0
χ_{30}	-4	-4	-4	-4	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$4D$				$4E$						$5A$				$6A$	
	$4V$	$4W$	$4X$	$4Y$	$4Z$	$4AA$	$4AB$	$4AC$	$8C$	$8D$	$5A$	$10A$	$10B$	$10C$	$6H$	$6I$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	-1	-1	-1	-1	1	1	1	1	1	1	2	2	2	2	-2	-2
χ_3	3	3	3	3	1	1	1	1	1	1	0	0	0	0	-2	-2
χ_4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-2	-2
χ_5	1	1	1	1	-1	-1	-1	-1	-1	-1	1	1	1	1	0	0
χ_6	-1	-1	-1	-1	1	1	1	1	1	1	2	2	2	2	3	3
χ_7	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	1	1
χ_8	3	3	3	3	1	1	1	1	1	1	0	0	0	0	1	1
χ_9	0	0	0	0	0	0	0	0	0	0	1	1	1	1	-3	-3
χ_{10}	2	2	2	2	-2	-2	-2	-2	-2	-2	0	0	0	0	-1	-1
χ_{11}	4	4	4	4	0	0	0	0	0	0	-1	-1	-1	-1	-2	-2
χ_{12}	1	1	1	1	-1	-1	-1	-1	-1	-1	0	0	0	0	1	1
χ_{13}	1	1	1	1	-1	-1	-1	-1	-1	-1	0	0	0	0	2	2
χ_{14}	-3	-3	-3	-3	1	1	1	1	1	1	0	0	0	0	4	4
χ_{15}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{16}	0	0	0	0	0	0	0	0	0	0	-2	-2	-2	-2	-2	-2
χ_{17}	-3	-3	-3	-3	1	1	1	1	1	1	-1	-1	-1	-1	-3	-3
χ_{18}	1	1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	3	3
χ_{19}	1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	3	3
χ_{20}	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	0	0	0	0	1	1
χ_{21}	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	0	0	0	0	-1	-1
χ_{22}	0	0	0	0	0	0	0	0	0	0	1	1	1	1	-3	-3
χ_{23}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{24}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
χ_{25}	3	3	3	3	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0
χ_{26}	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2
χ_{27}	-2	-2	-2	-2	2	2	2	2	2	2	-2	-2	-2	-2	3	3
χ_{28}	5	5	5	5	1	1	1	1	1	1	0	0	0	0	0	0
χ_{29}	-4	-4	-4	-4	0	0	0	0	0	0	0	0	0	0	-4	-4
χ_{30}	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$6A$			$6B$			$6C$		$6D$					$6E$			
	$12A$	$12B$	$6J$	$6K$	$6L$	$12C$	$6M$	$6N$	$6O$	$6P$	$12D$	$12E$	$12F$	$6Q$	$6R$	$6S$	$6T$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	-2	-2	-2	2	2	2	2	2	0	0	0	0	0	-1	-1	-1	-1
χ_3	-2	-2	-2	-2	-2	-2	1	1	0	0	0	0	0	1	1	1	1
χ_4	-2	-2	-2	2	2	2	-1	-1	2	2	2	2	2	2	2	2	2
χ_5	0	0	0	0	0	0	3	3	-2	-2	-2	-2	-2	0	0	0	0
χ_6	3	3	3	3	3	3	0	0	1	1	1	1	1	0	0	0	0
χ_7	1	1	1	-3	-3	-3	3	3	1	1	1	1	1	0	0	0	0
χ_8	3	3	3	-1	-1	-1	-1	-1	1	1	1	1	1	2	2	2	2
χ_9	-3	-3	-3	1	1	1	-2	-2	-1	-1	-1	-1	-1	-2	-2	-2	-2
χ_{10}	-1	-1	-1	-1	-1	-1	-1	-1	3	3	3	3	3	-1	-1	-1	-1
χ_{11}	-2	-2	-2	2	2	2	-1	-1	-2	-2	-2	-2	-2	-1	-1	-1	-1
χ_{12}	1	1	1	1	1	1	1	1	-1	-1	-1	-1	-1	1	1	1	1
χ_{13}	2	2	2	2	2	2	2	2	0	0	0	0	0	-1	-1	-1	-1
χ_{14}	4	4	4	-4	-4	-4	2	2	0	0	0	0	0	-1	-1	-1	-1
χ_{15}	1	1	1	1	1	1	-2	-2	-1	-1	-1	-1	-1	-2	-2	-2	-2
χ_{16}	-2	-2	-2	2	2	2	2	2	2	2	2	2	2	-1	-1	-1	-1
χ_{17}	-3	-3	-3	-3	-3	-3	0	0	1	1	1	1	1	0	0	0	0
χ_{18}	-3	-3	-3	-3	-3	-3	0	0	1	1	1	1	1	0	0	0	0
χ_{19}	3	3	3	3	3	3	0	0	1	1	1	1	1	0	0	0	0
χ_{20}	1	1	1	1	1	1	-2	-2	1	1	1	1	1	1	1	1	1
χ_{21}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	2	2	2	2
χ_{22}	-3	-3	-3	-3	-3	-3	0	0	-1	-1	-1	-1	-1	0	0	0	0
χ_{23}	1	1	1	-3	-3	-3	0	0	-1	-1	-1	-1	-1	0	0	0	0
χ_{24}	2	2	2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	1	1	1	1
χ_{25}	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0
χ_{26}	2	2	2	-2	-2	-2	-2	-2	2	2	2	2	2	-2	-2	-2	-2
χ_{27}	3	3	3	3	3	3	0	0	-1	-1	-1	-1	-1	0	0	0	0
χ_{28}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{29}	-4	-4	-4	4	4	4	1	1	0	0	0	0	0	1	1	1	1
χ_{30}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$6F$				$6G$				$7A$		$8A$			$8B$		
	$6U$	$6V$	$12G$	$12H$	$6W$	$6X$	$12I$	$12J$	$7A$	$14A$	$8E$	$8F$	$8G$	$8H$	$8I$	$8J$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	1	1	-1	-1	-1	-1	0	0	1	1	1	-1	-1	-1
χ_3	1	1	1	1	-1	-1	-1	-1	1	1	-1	-1	-1	1	1	1
χ_4	-2	-2	-2	-2	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1
χ_5	0	0	0	0	0	0	0	0	0	0	1	1	1	-1	-1	-1
χ_6	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	1	1	1
χ_7	-2	-2	-2	-2	0	0	0	0	0	0	1	1	1	1	1	1
χ_8	0	0	0	0	0	0	0	0	0	0	1	1	1	-1	-1	-1
χ_9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{10}	-1	-1	-1	-1	1	1	1	1	0	0	0	0	0	0	0	0
χ_{11}	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
χ_{12}	1	1	1	1	1	1	1	1	0	0	-1	-1	-1	1	1	1
χ_{13}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	-1	-1	-1	1	1	1
χ_{14}	1	1	1	1	1	1	1	1	0	0	-1	-1	-1	-1	-1	-1
χ_{15}	-2	-2	-2	-2	0	0	0	0	1	1	0	0	0	0	0	0
χ_{16}	1	1	1	1	-1	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{17}	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
χ_{18}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1
χ_{19}	0	0	0	0	0	0	0	0	0	0	1	1	1	-1	-1	-1
χ_{20}	1	1	1	1	-1	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{21}	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{22}	0	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0
χ_{23}	-2	-2	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{24}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{25}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1
χ_{26}	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{27}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{28}	0	0	0	0	0	0	0	0	-1	-1	1	1	1	1	1	1
χ_{29}	-1	-1	-1	-1	1	1	1	1	0	0	0	0	0	0	0	0
χ_{30}	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$9A$			$10A$				$12A$			$12B$		$12C$		$15A$	
	$9A$	$18A$	$10D$	$10E$	$20A$	$20B$	$12K$	$12L$	$24A$	$12M$	$12N$	$24B$	$12O$	$12P$	$15A$	$30A$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	0	0	0	0	0	0	0	-2	-2	-2	0	0	-1	-1
χ_3	0	0	0	0	0	0	-2	-2	-2	0	0	0	-1	-1	0	0
χ_4	0	0	-1	-1	-1	-1	0	0	0	0	0	0	1	1	1	1
χ_5	0	0	-1	-1	-1	-1	0	0	0	2	2	2	-1	-1	1	1
χ_6	0	0	0	0	0	0	-1	-1	-1	1	1	1	0	0	-1	-1
χ_7	-1	-1	0	0	0	0	-1	-1	-1	-1	-1	-1	1	1	0	0
χ_8	-1	-1	0	0	0	0	1	1	1	-1	-1	-1	-1	-1	0	0
χ_9	-1	-1	1	1	1	1	-1	-1	-1	1	1	1	0	0	1	1
χ_{10}	1	1	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0
χ_{11}	0	0	-1	-1	-1	-1	0	0	0	0	0	0	1	1	-1	-1
χ_{12}	0	0	0	0	0	0	1	1	1	-1	-1	-1	-1	-1	0	0
χ_{13}	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0
χ_{14}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{15}	0	0	0	0	0	0	1	1	1	-1	-1	-1	0	0	0	0
χ_{16}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{17}	0	0	-1	-1	-1	-1	1	1	1	1	1	1	0	0	-1	-1
χ_{18}	0	0	1	1	1	1	1	1	1	1	1	1	0	0	-1	-1
χ_{19}	0	0	1	1	1	1	-1	-1	-1	1	1	1	0	0	-1	-1
χ_{20}	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0
χ_{21}	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	1	1	0	0
χ_{22}	0	0	1	1	1	1	1	1	1	-1	-1	-1	0	0	1	1
χ_{23}	1	1	0	0	0	0	-1	-1	-1	1	1	1	0	0	0	0
χ_{24}	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{25}	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
χ_{26}	0	0	-1	-1	-1	-1	0	0	0	0	0	0	0	0	1	1
χ_{27}	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	0	0	1	1
χ_{28}	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	0	0
χ_{30}	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$1A$				$2A$					$2B$					$2C$		
	$1A$	$2A$	$2B$	$2C$	$2D$	$2E$	$4A$	$4B$	$2F$	$2G$	$2H$	$2I$	$2J$	$4C$	$2K$	$2L$	$4D$
χ_{31}	63	63	-1	-1	31	31	-1	-1	-1	15	15	-1	-1	-1	15	15	-1
χ_{32}	63	63	-1	-1	-29	-29	-1	-1	3	-9	-9	7	7	-1	11	11	3
χ_{33}	315	315	-5	-5	35	35	-5	-5	3	-21	-21	27	27	-5	19	19	3
χ_{34}	315	315	-5	-5	-25	-25	-5	-5	7	51	51	3	3	-5	15	15	7
χ_{35}	315	315	-5	-5	95	95	-5	-5	-1	3	3	19	19	-5	23	23	-1
χ_{36}	315	315	-5	-5	-85	-85	-5	-5	11	27	27	11	11	-5	11	11	11
χ_{37}	378	378	-6	-6	-126	-126	6	6	2	-6	-6	-6	-6	2	34	34	-6
χ_{38}	378	378	-6	-6	114	114	6	6	-14	-6	-6	-6	-6	2	18	18	10
χ_{39}	567	567	-9	-9	-81	-81	-9	-9	15	-9	-9	39	39	-9	15	15	15
χ_{40}	567	567	-9	-9	99	99	-9	-9	3	63	63	15	15	-9	27	27	3
χ_{41}	630	630	-10	-10	70	70	-10	-10	6	6	6	38	38	-10	-10	-10	6
χ_{42}	630	630	-10	-10	110	110	10	10	-18	54	54	-10	-10	-2	14	14	6
χ_{43}	630	630	-10	-10	-130	-130	10	10	-2	54	54	-10	-10	-2	30	30	-10
χ_{44}	630	630	-10	-10	-130	-130	10	10	-2	-42	-42	22	22	-2	30	30	-10
χ_{45}	630	630	-10	-10	-50	-50	-10	-10	14	54	54	22	22	-10	-18	-18	14
χ_{46}	630	630	-10	-10	110	110	10	10	-18	-42	-42	22	22	-2	14	14	6
χ_{47}	945	945	-15	-15	225	225	-15	-15	1	33	33	-15	-15	1	49	49	-15
χ_{48}	945	945	-15	-15	-135	-135	-15	-15	25	33	33	-15	-15	1	-23	-23	9
χ_{49}	945	945	-15	-15	165	165	-15	-15	5	-39	-39	9	9	1	-3	-3	-11
χ_{50}	945	945	-15	-15	-195	-195	-15	-15	29	-39	-39	9	9	1	21	21	13
χ_{51}	1008	1008	-16	-16	16	16	-16	-16	16	48	48	48	48	-16	16	16	16
χ_{52}	1260	1260	-20	-20	-20	-20	20	20	-20	12	12	12	12	-4	-52	-52	-4
χ_{53}	1512	1512	-24	-24	-264	-264	24	24	-8	-24	-24	-24	-24	8	24	24	-8
χ_{54}	1512	1512	-24	-24	216	216	24	24	-40	-24	-24	-24	-24	8	-8	-8	24
χ_{55}	1890	1890	-30	-30	90	90	-30	-30	26	66	66	-30	-30	2	26	26	-6
χ_{56}	1890	1890	-30	-30	-30	-30	-30	-30	34	-78	-78	18	18	2	18	18	2
χ_{57}	1890	1890	-30	-30	90	90	30	30	-38	-30	-30	-30	-30	10	26	26	18
χ_{58}	1890	1890	-30	-30	-150	-150	30	30	-22	-30	-30	-30	-30	10	42	42	2
χ_{59}	2268	2268	-36	-36	-36	-36	36	36	-36	-36	-36	-36	-36	12	-36	-36	12
χ_{60}	2520	2520	-40	-40	-280	-280	40	40	-24	24	24	24	24	-8	8	8	-24
χ_{61}	2520	2520	-40	-40	-40	-40	40	40	-40	120	120	-8	-8	-8	-8	-8	-8
χ_{62}	2520	2520	-40	-40	200	200	40	40	-56	24	24	24	24	-8	-24	-24	8
χ_{63}	2520	2520	-40	-40	-40	-40	40	40	-40	-72	-72	56	56	-8	-8	-8	-8
χ_{64}	2835	2835	-45	-45	-45	-45	-45	-45	51	-45	-45	3	3	3	-45	-45	3
χ_{65}	2835	2835	-45	-45	315	315	-45	-45	27	-45	-45	3	3	3	27	27	-21
χ_{66}	2835	2835	-45	-45	-225	-225	-45	-45	63	27	27	-21	-21	3	-9	-9	15
χ_{67}	2835	2835	-45	-45	135	135	-45	-45	39	27	27	-21	-21	3	-33	-33	-9
χ_{68}	36	-36	4	-4	16	-16	-4	4	0	12	-12	-4	4	0	8	-8	-4
χ_{69}	36	-36	4	-4	-16	16	4	-4	0	12	-12	-4	4	0	8	-8	-4
χ_{70}	252	-252	28	-28	80	-80	-20	20	0	-12	12	4	-4	0	24	-24	-12
χ_{71}	252	-252	28	-28	-80	80	20	-20	0	-12	12	4	-4	0	24	-24	-12
χ_{72}	504	-504	56	-56	64	-64	-16	16	0	72	-72	-24	24	0	16	-16	-8
χ_{73}	504	-504	56	-56	-64	64	16	-16	0	72	-72	-24	24	0	16	-16	-8
χ_{74}	720	-720	80	-80	-160	160	40	-40	0	48	-48	-16	16	0	32	-32	-16

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$2C$			$2D$						$3A$				$3B$	
	$4E$	$2M$	$4F$	$2N$	$2O$	$4G$	$4H$	$4I$	$4J$	$3A$	$6A$	$6B$	$6C$	$3B$	$6D$
χ_{31}	-1	-1	-1	7	7	-1	-1	-1	-1	15	15	-1	-1	0	0
χ_{32}	3	-5	-1	-1	-1	-5	-5	-1	3	15	15	-1	-1	0	0
χ_{33}	3	3	-5	3	3	3	3	-5	3	-15	-15	1	1	0	0
χ_{34}	7	-1	-5	3	3	-9	-9	3	-1	-15	-15	1	1	0	0
χ_{35}	-1	7	-5	11	11	7	7	-5	-1	30	30	-2	-2	0	0
χ_{36}	11	-5	-5	-5	-5	-13	-13	3	3	30	30	-2	-2	0	0
χ_{37}	-6	2	-2	-6	-6	6	6	2	-2	45	45	-3	-3	0	0
χ_{38}	10	-14	-2	-6	-6	6	6	2	-2	45	45	-3	-3	0	0
χ_{39}	15	-1	-9	-9	-9	-9	-9	-1	7	0	0	0	0	0	0
χ_{40}	3	3	11	-9	15	15	3	3	-1	-5	0	0	0	0	0
χ_{41}	6	22	-10	-2	-2	14	14	-2	-2	15	15	-1	-1	0	0
χ_{42}	6	-18	2	-10	-10	10	10	-2	2	15	15	-1	-1	0	0
χ_{43}	-10	-2	2	-10	-10	10	10	-2	2	15	15	-1	-1	0	0
χ_{44}	-10	-2	2	-2	-2	2	2	6	-6	15	15	-1	-1	0	0
χ_{45}	14	14	-10	-10	-10	-2	-2	6	-2	15	15	-1	-1	0	0
χ_{46}	6	-18	2	-2	-2	2	2	6	-6	15	15	-1	-1	0	0
χ_{47}	-15	1	1	9	9	-15	-15	1	1	45	45	-3	-3	0	0
χ_{48}	9	-7	1	9	9	9	9	1	-7	45	45	-3	-3	0	0
χ_{49}	-11	13	1	-15	-15	-3	-3	1	5	45	45	-3	-3	0	0
χ_{50}	13	-27	1	9	9	-3	-3	-7	5	45	45	-3	-3	0	0
χ_{51}	16	16	-16	0	0	0	0	0	0	-30	-30	2	2	0	0
χ_{52}	-4	12	4	12	12	-12	-12	-4	4	30	30	-2	-2	0	0
χ_{53}	-8	24	-8	0	0	0	0	0	0	45	45	-3	-3	0	0
χ_{54}	24	-8	-8	0	0	0	0	0	0	45	45	-3	-3	0	0
χ_{55}	-6	-6	2	18	18	-6	-6	2	-6	-45	-45	3	3	0	0
χ_{56}	2	-14	2	-6	-6	-6	-6	-6	10	-45	-45	3	3	0	0
χ_{57}	18	-6	-10	-6	-6	6	6	2	-2	-45	-45	3	3	0	0
χ_{58}	2	10	-10	-6	-6	6	6	2	-2	-45	-45	3	3	0	0
χ_{59}	12	28	-12	12	12	-12	-12	-4	4	0	0	0	0	0	0
χ_{60}	-24	8	8	0	0	0	0	0	0	15	15	-1	-1	0	0
χ_{61}	-8	-8	8	-8	-8	8	8	-8	8	-30	-30	2	2	0	0
χ_{62}	8	-24	8	0	0	0	0	0	0	15	15	-1	-1	0	0
χ_{63}	-8	-8	8	8	8	-8	-8	8	-8	-30	-30	2	2	0	0
χ_{64}	3	3	3	3	3	27	27	-5	-5	0	0	0	0	0	0
χ_{65}	-21	11	3	3	3	3	3	-5	3	0	0	0	0	0	0
χ_{66}	15	-25	3	3	3	-9	-9	3	-1	0	0	0	0	0	0
χ_{67}	-9	15	3	-21	-21	-9	-9	11	-1	0	0	0	0	0	0
χ_{68}	4	0	0	4	-4	4	-4	0	0	6	-6	-2	2	0	0
χ_{69}	4	0	0	-4	4	-4	4	0	0	6	-6	-2	2	0	0
χ_{70}	12	0	0	4	-4	4	-4	0	0	24	-24	-8	8	0	0
χ_{71}	12	0	0	-4	4	-4	4	0	0	24	-24	-8	8	0	0
χ_{72}	8	0	0	0	0	0	0	0	0	-6	6	2	-2	0	0
χ_{73}	8	0	0	0	0	0	0	0	0	-6	6	2	-2	0	0
χ_{74}	16	0	0	-8	8	-8	8	0	0	30	-30	-10	10	0	0

Table 6.7: The character table of $2^7{:}SP(6,2)$ (continued)

	$3C$				$4A$			$4B$					$4C$				
	$3C$	$6E$	$6F$	$6G$	$4K$	$4L$	$4M$	$4N$	$4O$	$4P$	$4Q$	$8A$	$4R$	$4S$	$4T$	$4U$	$8B$
χ_{31}	3	3	-1	-1	3	3	-1	7	7	-1	-1	-1	7	7	-1	-1	-1
χ_{32}	3	3	-1	-1	3	3	-1	-7	-7	1	1	1	5	5	-3	-3	1
χ_{33}	6	6	-2	-2	3	3	-1	-5	-5	3	3	-1	-5	-5	3	3	-1
χ_{34}	6	6	-2	-2	3	3	-1	5	5	-3	-3	1	-7	-7	1	1	1
χ_{35}	-3	-3	1	1	3	3	-1	9	9	1	1	-3	-3	-3	5	5	-3
χ_{36}	-3	-3	1	1	3	3	-1	-9	-9	-1	-1	3	-9	-9	-1	-1	3
χ_{37}	0	0	0	0	6	6	-2	-14	-14	2	2	2	2	2	2	2	-2
χ_{38}	0	0	0	0	6	6	-2	14	14	-2	-2	-2	-2	-2	-2	-2	2
χ_{39}	0	0	0	0	3	3	-1	3	3	-5	-5	3	3	3	-5	-5	3
χ_{40}	0	0	0	0	0	3	3	-1	-3	-3	5	5	-3	9	9	1	1
χ_{41}	3	3	-1	-1	-6	-6	2	2	2	2	2	-2	2	2	2	2	-2
χ_{42}	3	3	-1	-1	-6	-6	2	-2	-2	-2	-2	2	14	14	-2	-2	-2
χ_{43}	3	3	-1	-1	-6	-6	2	2	2	2	2	-2	-14	-14	2	2	2
χ_{44}	3	3	-1	-1	-6	-6	2	2	2	2	2	-2	10	10	-6	-6	2
χ_{45}	3	3	-1	-1	-6	-6	2	-2	-2	-2	-2	2	-2	-2	-2	-2	2
χ_{46}	3	3	-1	-1	-6	-6	2	-2	-2	-2	-2	2	-10	-10	6	6	-2
χ_{47}	0	0	0	0	-3	-3	1	5	5	-3	-3	1	5	5	-3	-3	1
χ_{48}	0	0	0	0	9	9	-3	-7	-7	1	1	1	-7	-7	1	1	1
χ_{49}	0	0	0	0	9	9	-3	7	7	-1	-1	-1	-5	-5	3	3	-1
χ_{50}	0	0	0	0	-3	-3	1	-5	-5	3	3	-1	7	7	-1	-1	-1
χ_{51}	-6	-6	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{52}	6	6	-2	-2	12	12	-4	0	0	0	0	0	0	0	0	0	0
χ_{53}	0	0	0	0	0	0	0	-4	-4	-4	-4	4	4	4	4	4	-4
χ_{54}	0	0	0	0	0	0	0	4	4	4	4	-4	-4	-4	-4	-4	4
χ_{55}	0	0	0	0	6	6	-2	-2	-2	-2	-2	2	-2	-2	-2	-2	2
χ_{56}	0	0	0	0	6	6	-2	2	2	2	2	-2	2	2	2	2	-2
χ_{57}	0	0	0	0	6	6	-2	-10	-10	6	6	-2	-2	-2	-2	-2	2
χ_{58}	0	0	0	0	6	6	-2	10	10	-6	-6	2	2	2	2	2	-2
χ_{59}	0	0	0	0	-12	-12	4	0	0	0	0	0	0	0	0	0	0
χ_{60}	-6	-6	2	2	0	0	0	4	4	4	4	-4	-4	-4	-4	-4	4
χ_{61}	3	3	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{62}	-6	-6	2	2	0	0	0	-4	-4	-4	-4	4	4	4	4	4	-4
χ_{63}	3	3	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{64}	0	0	0	0	3	3	-1	3	3	-5	-5	3	3	3	-5	-5	3
χ_{65}	0	0	0	0	-9	-9	3	-9	-9	-1	-1	3	-9	-9	-1	-1	3
χ_{66}	0	0	0	0	-9	-9	3	9	9	1	1	-3	-3	-3	5	5	-3
χ_{67}	0	0	0	0	3	3	-1	-3	-3	5	5	-3	9	9	1	1	-3
χ_{68}	3	-3	1	-1	0	0	0	2	-2	2	-2	0	6	-6	2	-2	0
χ_{69}	3	-3	1	-1	0	0	0	-2	2	-2	2	0	-6	6	-2	2	0
χ_{70}	3	-3	1	-1	0	0	0	6	-6	6	-6	0	-6	6	-2	2	0
χ_{71}	3	-3	1	-1	0	0	0	-6	6	-6	6	0	6	-6	2	-2	0
χ_{72}	6	-6	2	-2	0	0	0	-4	4	-4	4	0	12	-12	4	-4	0
χ_{73}	6	-6	2	-2	0	0	0	4	-4	4	-4	0	-12	12	-4	4	0
χ_{74}	-3	3	-1	1	0	0	0	-4	4	-4	4	0	-12	12	-4	4	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$4D$				$4E$						$5A$				$6A$	
	$4V$	$4W$	$4X$	$4Y$	$4Z$	$4AA$	$4AB$	$4AC$	$8C$	$8D$	$5A$	$10A$	$10B$	$10C$	$6H$	$6I$
χ_{31}	3	3	-1	-1	3	3	-1	-1	-1	-1	3	3	-1	-1	7	7
χ_{32}	-1	-1	3	-1	1	1	1	1	-3	1	3	3	-1	-1	-5	-5
χ_{33}	-5	-5	7	-1	-1	-1	3	3	-1	-1	0	0	0	0	5	5
χ_{34}	7	7	-5	-1	1	1	1	1	1	-3	0	0	0	0	-7	-7
χ_{35}	-1	-1	3	-1	1	1	1	1	1	-3	0	0	0	0	2	2
χ_{36}	3	3	-1	-1	-1	-1	3	3	-1	-1	0	0	0	0	2	2
χ_{37}	-2	-2	-2	2	2	2	-2	-2	2	-2	3	3	-1	-1	-9	-9
χ_{38}	-2	-2	-2	2	-2	-2	2	2	-2	2	3	3	-1	-1	3	3
χ_{39}	-5	-5	7	-1	3	3	-1	-1	-1	-1	-3	-3	1	1	0	0
χ_{40}	-3	7	7	-5	-1	1	1	1	1	-3	1	-3	-3	1	1	0
χ_{41}	-6	-6	2	2	-2	-2	-2	-2	2	2	0	0	0	0	-5	-5
χ_{42}	2	2	2	-2	-2	-2	2	2	2	-2	0	0	0	0	5	5
χ_{43}	2	2	2	-2	2	2	-2	-2	-2	2	0	0	0	0	-7	-7
χ_{44}	2	2	2	-2	-2	-2	2	2	2	-2	0	0	0	0	-7	-7
χ_{45}	2	2	-6	2	-2	-2	-2	-2	2	2	0	0	0	0	7	7
χ_{46}	2	2	2	-2	2	2	-2	-2	-2	2	0	0	0	0	5	5
χ_{47}	-3	-3	1	1	1	1	-3	-3	1	1	0	0	0	0	9	9
χ_{48}	1	1	5	-3	-3	-3	1	1	1	1	0	0	0	0	9	9
χ_{49}	5	5	1	-3	-1	-1	-1	-1	3	-1	0	0	0	0	-3	-3
χ_{50}	1	1	-3	1	-1	-1	-1	-1	-1	3	0	0	0	0	-3	-3
χ_{51}	0	0	0	0	0	0	0	0	0	0	3	3	-1	-1	-2	-2
χ_{52}	-4	-4	-4	4	0	0	0	0	0	0	0	0	0	0	-2	-2
χ_{53}	0	0	0	0	0	0	0	0	0	0	-3	-3	1	1	3	3
χ_{54}	0	0	0	0	0	0	0	0	0	0	-3	-3	1	1	-9	-9
χ_{55}	-2	-2	6	-2	-2	-2	-2	-2	2	2	0	0	0	0	-9	-9
χ_{56}	6	6	-2	-2	-2	-2	-2	-2	2	2	0	0	0	0	3	3
χ_{57}	-2	-2	-2	2	2	2	-2	-2	2	-2	0	0	0	0	9	9
χ_{58}	-2	-2	-2	2	-2	-2	2	2	-2	2	0	0	0	0	-3	-3
χ_{59}	4	4	4	-4	0	0	0	0	0	0	3	3	-1	-1	0	0
χ_{60}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
χ_{61}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
χ_{62}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-7	-7
χ_{63}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
χ_{64}	3	3	-1	-1	3	3	-1	-1	-1	-1	0	0	0	0	0	0
χ_{65}	-1	-1	-5	3	-1	-1	3	3	-1	-1	0	0	0	0	0	0
χ_{66}	-5	-5	-1	3	1	1	1	1	1	-3	0	0	0	0	0	0
χ_{67}	-1	-1	3	-1	1	1	1	1	-3	1	0	0	0	0	0	0
χ_{68}	4	-4	0	0	2	-2	-2	2	0	0	1	-1	1	-1	4	-4
χ_{69}	4	-4	0	0	2	-2	-2	2	0	0	1	-1	1	-1	-4	4
χ_{70}	-4	4	0	0	2	-2	-2	2	0	0	2	-2	2	-2	8	-8
χ_{71}	-4	4	0	0	2	-2	-2	2	0	0	2	-2	2	-2	-8	8
χ_{72}	8	-8	0	0	0	0	0	0	0	0	-1	1	-1	1	4	-4
χ_{73}	8	-8	0	0	0	0	0	0	0	0	-1	1	-1	1	-4	4
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	4

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$6A$			$6B$			$6C$		$6D$					$6E$			
	$12A$	$12B$	$6J$	$6K$	$6L$	$12C$	$6M$	$6N$	$6O$	$6P$	$12D$	$12E$	$12F$	$6Q$	$6R$	$6S$	$6T$
χ_{31}	-1	-1	-1	3	3	-1	0	0	3	3	-1	-1	-1	3	3	-1	-1
χ_{32}	-1	-1	3	3	3	-1	0	0	-1	-1	3	3	-1	-3	-3	1	1
χ_{33}	1	1	-3	-3	-3	1	0	0	1	1	-3	-3	1	0	0	0	0
χ_{34}	1	1	1	-3	-3	1	0	0	-3	-3	1	1	1	0	0	0	0
χ_{35}	-2	-2	2	6	6	-2	0	0	2	2	2	2	-2	-3	-3	1	1
χ_{36}	-2	-2	2	6	6	-2	0	0	2	2	2	2	-2	3	3	-1	-1
χ_{37}	3	3	-1	3	3	-1	0	0	1	1	-3	-3	1	0	0	0	0
χ_{38}	3	3	-5	3	3	-1	0	0	-3	-3	1	1	1	0	0	0	0
χ_{39}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{40}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{41}	-1	-1	3	3	3	-1	0	0	-1	-1	3	3	-1	3	3	-1	-1
χ_{42}	1	1	-3	-3	-3	1	0	0	-1	-1	3	3	-1	3	3	-1	-1
χ_{43}	1	1	1	-3	-3	1	0	0	3	3	-1	-1	-1	3	3	-1	-1
χ_{44}	1	1	1	-3	-3	1	0	0	3	3	-1	-1	-1	-3	-3	1	1
χ_{45}	-1	-1	-1	3	3	-1	0	0	3	3	-1	-1	-1	-3	-3	1	1
χ_{46}	1	1	-3	-3	-3	1	0	0	-1	-1	3	3	-1	-3	-3	1	1
χ_{47}	-3	-3	1	-3	-3	1	0	0	1	1	-3	-3	1	0	0	0	0
χ_{48}	-3	-3	1	-3	-3	1	0	0	1	1	-3	-3	1	0	0	0	0
χ_{49}	-3	-3	5	-3	-3	1	0	0	-3	-3	1	1	1	0	0	0	0
χ_{50}	-3	-3	5	-3	-3	1	0	0	-3	-3	1	1	1	0	0	0	0
χ_{51}	2	2	-2	-6	-6	2	0	0	-2	-2	-2	-2	2	0	0	0	0
χ_{52}	2	2	-2	-6	-6	2	0	0	2	2	2	2	-2	0	0	0	0
χ_{53}	3	3	-5	3	3	-1	0	0	-3	-3	1	1	1	0	0	0	0
χ_{54}	3	3	-1	3	3	-1	0	0	1	1	-3	-3	1	0	0	0	0
χ_{55}	3	3	-1	3	3	-1	0	0	-1	-1	3	3	-1	0	0	0	0
χ_{56}	3	3	-5	3	3	-1	0	0	3	3	-1	-1	-1	0	0	0	0
χ_{57}	-3	-3	1	-3	-3	1	0	0	-1	-1	3	3	-1	0	0	0	0
χ_{58}	-3	-3	5	-3	-3	1	0	0	3	3	-1	-1	-1	0	0	0	0
χ_{59}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{60}	1	1	-3	-3	-3	1	0	0	-1	-1	3	3	-1	0	0	0	0
χ_{61}	-2	-2	2	6	6	-2	0	0	-2	-2	-2	-2	2	-3	-3	1	1
χ_{62}	1	1	1	-3	-3	1	0	0	3	3	-1	-1	-1	0	0	0	0
χ_{63}	-2	-2	2	6	6	-2	0	0	-2	-2	-2	-2	2	3	3	-1	-1
χ_{64}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{65}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{66}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{67}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{68}	2	-2	0	0	0	0	0	0	2	-2	2	-2	0	3	-3	1	-1
χ_{69}	-2	2	0	0	0	0	0	0	2	-2	2	-2	0	3	-3	1	-1
χ_{70}	4	-4	0	0	0	0	0	0	0	0	0	0	0	-3	3	-1	1
χ_{71}	-4	4	0	0	0	0	0	0	0	0	0	0	0	-3	3	-1	1
χ_{72}	2	-2	0	0	0	0	0	0	-2	2	-2	2	0	0	0	0	0
χ_{73}	-2	2	0	0	0	0	0	0	-2	2	-2	2	0	0	0	0	0
χ_{74}	-2	2	0	0	0	0	0	0	2	-2	2	-2	0	3	-3	1	-1

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	6F				6G				7A		8A			8B		
	6U	6V	12G	12H	6W	6X	12I	12J	7A	14A	8E	8F	8G	8H	8I	8J
χ_{31}	1	1	-1	-1	1	1	-1	-1	0	0	1	1	-1	1	1	-1
χ_{32}	1	1	-1	-1	-1	-1	1	1	0	0	1	1	-1	-1	-1	1
χ_{33}	2	2	-2	-2	0	0	0	0	0	0	-1	-1	1	-1	-1	1
χ_{34}	2	2	-2	-2	0	0	0	0	0	0	-1	-1	1	1	1	-1
χ_{35}	-1	-1	1	1	-1	-1	1	1	0	0	-1	-1	1	1	1	-1
χ_{36}	-1	-1	1	1	1	1	-1	-1	0	0	-1	-1	1	-1	-1	1
χ_{37}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{38}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{39}	0	0	0	0	0	0	0	0	0	0	1	1	-1	1	1	-1
χ_{40}	0	0	0	0	0	0	0	0	0	0	0	1	1	-1	-1	-1
χ_{41}	1	1	-1	-1	1	1	-1	-1	0	0	0	0	0	0	0	0
χ_{42}	-1	-1	1	1	-1	-1	1	1	0	0	0	0	0	0	0	0
χ_{43}	-1	-1	1	1	-1	-1	1	1	0	0	0	0	0	0	0	0
χ_{44}	-1	-1	1	1	1	1	-1	-1	0	0	0	0	0	0	0	0
χ_{45}	1	1	-1	-1	-1	-1	1	1	0	0	0	0	0	0	0	0
χ_{46}	-1	-1	1	1	1	1	-1	-1	0	0	0	0	0	0	0	0
χ_{47}	0	0	0	0	0	0	0	0	0	0	-1	-1	1	-1	-1	1
χ_{48}	0	0	0	0	0	0	0	0	0	0	1	1	-1	1	1	-1
χ_{49}	0	0	0	0	0	0	0	0	0	0	1	1	-1	-1	-1	1
χ_{50}	0	0	0	0	0	0	0	0	0	0	-1	-1	1	1	1	-1
χ_{51}	-2	-2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{52}	-2	-2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{53}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{54}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{55}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{56}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{57}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{58}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{59}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{60}	2	2	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{61}	-1	-1	1	1	1	1	-1	-1	0	0	0	0	0	0	0	0
χ_{62}	2	2	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{63}	-1	-1	1	1	-1	-1	1	1	0	0	0	0	0	0	0	0
χ_{64}	0	0	0	0	0	0	0	0	0	0	-1	-1	1	-1	-1	1
χ_{65}	0	0	0	0	0	0	0	0	0	0	1	1	-1	1	1	-1
χ_{66}	0	0	0	0	0	0	0	0	0	0	1	1	-1	-1	-1	1
χ_{67}	0	0	0	0	0	0	0	0	0	0	-1	-1	1	1	1	-1
χ_{68}	1	-1	1	-1	1	-1	1	-1	1	-1	2	-2	0	0	0	0
χ_{69}	-1	1	-1	1	-1	1	-1	1	1	-1	-2	2	0	0	0	0
χ_{70}	-1	1	-1	1	1	-1	1	-1	0	0	-2	2	0	0	0	0
χ_{71}	1	-1	1	-1	-1	1	-1	1	0	0	2	-2	0	0	0	0
χ_{72}	-2	2	-2	2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{73}	2	-2	2	-2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{74}	-1	1	-1	1	1	-1	1	-1	-1	1	0	0	0	0	0	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$9A$		$10A$				$12A$			$12B$			$12C$		$15A$	
	$9A$	$18A$	$10D$	$10E$	$20A$	$20B$	$12K$	$12L$	$24A$	$12M$	$12N$	$24B$	$12O$	$12P$	$15A$	$30A$
χ_{31}	0	0	1	1	-1	-1	1	1	-1	1	1	-1	0	0	0	0
χ_{32}	0	0	1	1	-1	-1	-1	-1	1	-1	-1	1	0	0	0	0
χ_{33}	0	0	0	0	0	0	1	1	-1	1	1	-1	0	0	0	0
χ_{34}	0	0	0	0	0	0	-1	-1	1	-1	-1	1	0	0	0	0
χ_{35}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{36}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{37}	0	0	-1	-1	1	1	1	1	-1	-1	-1	1	0	0	0	0
χ_{38}	0	0	-1	-1	1	1	-1	-1	1	1	1	-1	0	0	0	0
χ_{39}	0	0	-1	-1	1	1	0	0	0	0	0	0	0	0	0	0
χ_{40}	0	0	-1	-1	1	1	0	0	0	0	0	0	0	0	0	0
χ_{41}	0	0	0	0	0	0	-1	-1	1	-1	-1	1	0	0	0	0
χ_{42}	0	0	0	0	0	0	1	1	-1	-1	-1	1	0	0	0	0
χ_{43}	0	0	0	0	0	0	-1	-1	1	1	1	-1	0	0	0	0
χ_{44}	0	0	0	0	0	0	-1	-1	1	1	1	-1	0	0	0	0
χ_{45}	0	0	0	0	0	0	1	1	-1	1	1	-1	0	0	0	0
χ_{46}	0	0	0	0	0	0	1	1	-1	-1	-1	1	0	0	0	0
χ_{47}	0	0	0	0	0	0	-1	-1	1	-1	-1	1	0	0	0	0
χ_{48}	0	0	0	0	0	0	-1	-1	1	-1	-1	1	0	0	0	0
χ_{49}	0	0	0	0	0	0	1	1	-1	1	1	-1	0	0	0	0
χ_{50}	0	0	0	0	0	0	1	1	-1	1	1	-1	0	0	0	0
χ_{51}	0	0	1	1	-1	-1	0	0	0	0	0	0	0	0	0	0
χ_{52}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{53}	0	0	1	1	-1	-1	-1	-1	1	1	1	-1	0	0	0	0
χ_{54}	0	0	1	1	-1	-1	1	1	-1	-1	-1	1	0	0	0	0
χ_{55}	0	0	0	0	0	0	1	1	-1	1	1	-1	0	0	0	0
χ_{56}	0	0	0	0	0	0	-1	-1	1	-1	-1	1	0	0	0	0
χ_{57}	0	0	0	0	0	0	-1	-1	1	1	1	-1	0	0	0	0
χ_{58}	0	0	0	0	0	0	1	1	-1	-1	-1	1	0	0	0	0
χ_{59}	0	0	-1	-1	1	1	0	0	0	0	0	0	0	0	0	0
χ_{60}	0	0	0	0	0	0	1	1	-1	-1	-1	1	0	0	0	0
χ_{61}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{62}	0	0	0	0	0	0	-1	-1	1	1	1	-1	0	0	0	0
χ_{63}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{64}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{65}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{66}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{67}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{68}	0	0	1	-1	1	-1	2	-2	0	0	0	0	0	0	1	-1
χ_{69}	0	0	-1	1	-1	1	-2	2	0	0	0	0	0	0	1	-1
χ_{70}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
χ_{72}	0	0	-1	1	-1	1	2	-2	0	0	0	0	0	0	-1	1
χ_{73}	0	0	1	-1	1	-1	-2	2	0	0	0	0	0	0	-1	1
χ_{74}	0	0	0	0	0	0	2	-2	0	0	0	0	0	0	0	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$1A$				$2A$					$2B$					$2C$		
	$1A$	$2A$	$2B$	$2C$	$2D$	$2E$	$4A$	$4B$	$2F$	$2G$	$2H$	$2I$	$2J$	$4C$	$2K$	$2L$	$4D$
χ_{75}	720	-720	80	-80	160	-160	-40	40	0	48	-48	-16	16	0	32	-32	-16
χ_{76}	756	-756	84	-84	-144	144	36	-36	0	-36	36	12	-12	0	8	-8	-4
χ_{77}	756	-756	84	-84	144	-144	-36	36	0	-36	36	12	-12	0	8	-8	-4
χ_{78}	1008	-1008	112	-112	160	-160	-40	40	0	-48	48	16	-16	0	32	-32	-16
χ_{79}	1008	-1008	112	-112	-160	160	40	-40	0	-48	48	16	-16	0	32	-32	-16
χ_{80}	1260	-1260	140	-140	-80	80	20	-20	0	36	-36	-12	12	0	-40	40	20
χ_{81}	1260	-1260	140	-140	80	-80	-20	20	0	36	-36	-12	12	0	-40	40	20
χ_{82}	1512	-1512	168	-168	0	0	0	0	0	-72	72	24	-24	0	16	-16	-8
χ_{83}	2016	-2016	224	-224	64	-64	-16	16	0	96	-96	-32	32	0	0	0	0
χ_{84}	2016	-2016	224	-224	-64	64	16	-16	0	96	-96	-32	32	0	0	0	0
χ_{85}	2304	-2304	256	-256	256	-256	-64	64	0	0	0	0	0	0	0	0	0
χ_{86}	2304	-2304	256	-256	-256	256	64	-64	0	0	0	0	0	0	0	0	0
χ_{87}	2520	-2520	280	-280	-160	160	40	-40	0	-24	24	8	-8	0	16	-16	-8
χ_{88}	2520	-2520	280	-280	160	-160	-40	40	0	-24	24	8	-8	0	16	-16	-8
χ_{89}	3240	-3240	360	-360	0	0	0	0	0	-72	72	24	-24	0	-48	48	24
χ_{90}	28	-28	-4	4	16	-16	4	-4	0	4	-4	4	-4	0	8	-8	4
χ_{91}	28	-28	-4	4	-16	16	-4	4	0	4	-4	4	-4	0	8	-8	4
χ_{92}	168	-168	-24	24	64	-64	16	-16	0	-8	8	-8	8	0	16	-16	8
χ_{93}	168	-168	-24	24	-64	64	-16	16	0	-8	8	-8	8	0	16	-16	8
χ_{94}	280	-280	-40	40	0	0	0	0	0	-24	24	-24	24	0	16	-16	8
χ_{95}	420	-420	-60	60	-80	80	-20	20	0	28	-28	28	-28	0	24	-24	12
χ_{96}	420	-420	-60	60	80	-80	20	-20	0	-4	4	-4	4	0	-8	8	-4
χ_{97}	420	-420	-60	60	-80	80	-20	20	0	-4	4	-4	4	0	-8	8	-4
χ_{98}	420	-420	-60	60	80	-80	20	-20	0	28	-28	28	-28	0	24	-24	12
χ_{99}	560	-560	-80	80	-160	160	-40	40	0	16	-16	16	-16	0	32	-32	16
χ_{100}	560	-560	-80	80	160	-160	40	-40	0	16	-16	16	-16	0	32	-32	16
χ_{101}	560	-560	-80	80	0	0	0	0	0	16	-16	16	-16	0	-32	32	-16
χ_{102}	672	-672	-96	96	-64	64	-16	16	0	32	-32	32	-32	0	0	0	0
χ_{103}	672	-672	-96	96	64	-64	16	-16	0	32	-32	32	-32	0	0	0	0
χ_{104}	840	-840	-120	120	-160	160	-40	40	0	-40	40	-40	40	0	16	-16	8
χ_{105}	840	-840	-120	120	160	-160	40	-40	0	-40	40	-40	40	0	16	-16	8
χ_{106}	1680	-1680	-240	240	0	0	0	0	0	48	-48	48	-48	0	32	-32	16
χ_{107}	1680	-1680	-240	240	-160	160	-40	40	0	-16	16	-16	16	0	32	-32	16
χ_{108}	1680	-1680	-240	240	160	-160	40	-40	0	-16	16	-16	16	0	32	-32	16
χ_{109}	1792	-1792	-256	256	-256	256	-64	64	0	0	0	0	0	0	0	0	0
χ_{110}	1792	-1792	-256	256	256	-256	64	-64	0	0	0	0	0	0	0	0	0
χ_{111}	2240	-2240	-320	320	0	0	0	0	0	-64	64	-64	64	0	0	0	0
χ_{112}	2268	-2268	-324	324	-144	144	-36	36	0	36	-36	36	-36	0	-24	24	-12
χ_{113}	2268	-2268	-324	324	144	-144	36	-36	0	36	-36	36	-36	0	-24	24	-12
χ_{114}	2520	-2520	-360	360	0	0	0	0	0	-24	24	-24	24	0	-48	48	-24

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$2C$			$2D$						$3A$				$3B$	
	$4E$	$2M$	$4F$	$2N$	$2O$	$4G$	$4H$	$4I$	$4J$	$3A$	$6A$	$6B$	$6C$	$3B$	$6D$
χ_{75}	16	0	0	8	-8	8	-8	0	0	30	-30	-10	10	0	0
χ_{76}	4	0	0	12	-12	12	-12	0	0	36	-36	-12	12	0	0
χ_{77}	4	0	0	-12	12	-12	12	0	0	36	-36	-12	12	0	0
χ_{78}	16	0	0	8	-8	8	-8	0	0	6	-6	-2	2	0	0
χ_{79}	16	0	0	-8	8	-8	8	0	0	6	-6	-2	2	0	0
χ_{80}	-20	0	0	12	-12	12	-12	0	0	30	-30	-10	10	0	0
χ_{81}	-20	0	0	-12	12	-12	12	0	0	30	-30	-10	10	0	0
χ_{82}	8	0	0	0	0	0	0	0	0	-36	36	12	-12	0	0
χ_{83}	0	0	0	16	-16	16	-16	0	0	-24	24	8	-8	0	0
χ_{84}	0	0	0	-16	16	-16	16	0	0	-24	24	8	-8	0	0
χ_{85}	0	0	0	0	0	0	0	0	0	24	-24	-8	8	0	0
χ_{86}	0	0	0	0	0	0	0	0	0	24	-24	-8	8	0	0
χ_{87}	8	0	0	8	-8	8	-8	0	0	-30	30	10	-10	0	0
χ_{88}	8	0	0	-8	8	-8	8	0	0	-30	30	10	-10	0	0
χ_{89}	-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	-4	0	0	4	-4	-4	4	0	0	10	-10	2	-2	1	-1
χ_{91}	-4	0	0	-4	4	4	-4	0	0	10	-10	2	-2	1	-1
χ_{92}	-8	0	0	0	0	0	0	0	0	30	-30	6	-6	-3	3
χ_{93}	-8	0	0	0	0	0	0	0	0	30	-30	6	-6	-3	3
χ_{94}	-8	0	0	0	0	0	0	0	0	-20	20	-4	4	1	-1
χ_{95}	-12	0	0	-4	4	4	-4	0	0	0	0	0	0	-3	3
χ_{96}	4	0	0	-12	12	12	-12	0	0	30	-30	6	-6	6	-6
χ_{97}	4	0	0	12	-12	-12	12	0	0	30	-30	6	-6	6	-6
χ_{98}	-12	0	0	4	-4	-4	4	0	0	0	0	0	0	-3	3
χ_{99}	-16	0	0	-8	8	8	-8	0	0	50	-50	10	-10	2	-2
χ_{100}	-16	0	0	8	-8	-8	8	0	0	50	-50	10	-10	2	-2
χ_{101}	16	0	0	0	0	0	0	0	0	20	-20	4	-4	-7	7
χ_{102}	0	0	0	-16	16	16	-16	0	0	0	0	0	0	6	-6
χ_{103}	0	0	0	16	-16	-16	16	0	0	0	0	0	0	6	-6
χ_{104}	-8	0	0	8	-8	-8	8	0	0	30	-30	6	-6	3	-3
χ_{105}	-8	0	0	-8	8	8	-8	0	0	30	-30	6	-6	3	-3
χ_{106}	-16	0	0	0	0	0	0	0	0	-60	60	-12	12	-3	3
χ_{107}	-16	0	0	-8	8	8	-8	0	0	-30	30	-6	6	6	-6
χ_{108}	-16	0	0	8	-8	-8	8	0	0	-30	30	-6	6	6	-6
χ_{109}	0	0	0	0	0	0	0	0	0	40	-40	8	-8	-8	8
χ_{110}	0	0	0	0	0	0	0	0	0	40	-40	8	-8	-8	8
χ_{111}	0	0	0	0	0	0	0	0	0	-40	40	-8	8	-10	10
χ_{112}	12	0	0	12	-12	-12	12	0	0	0	0	0	0	0	0
χ_{113}	12	0	0	-12	12	12	-12	0	0	0	0	0	0	0	0
χ_{114}	24	0	0	0	0	0	0	0	0	0	0	0	0	9	-9

Table 6.7: The character table of $2^7{:}SP(6,2)$ (continued)

	$3C$				$4A$			$4B$					$4C$				
	$3C$	$6E$	$6F$	$6G$	$4K$	$4L$	$4M$	$4N$	$4O$	$4P$	$4Q$	$8A$	$4R$	$4S$	$4T$	$4U$	$8B$
χ_{75}	-3	3	-1	1	0	0	0	4	-4	4	-4	0	12	-12	4	-4	0
χ_{76}	0	0	0	0	0	0	0	-6	6	-6	6	0	6	-6	2	-2	0
χ_{77}	0	0	0	0	0	0	0	6	-6	6	-6	0	-6	6	-2	2	0
χ_{78}	3	-3	1	-1	0	0	0	-4	4	-4	4	0	-12	12	-4	4	0
χ_{79}	3	-3	1	-1	0	0	0	4	-4	4	-4	0	12	-12	4	-4	0
χ_{80}	6	-6	2	-2	0	0	0	-2	2	-2	2	0	-6	6	-2	2	0
χ_{81}	6	-6	2	-2	0	0	0	2	-2	2	-2	0	6	-6	2	-2	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	-3	3	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	-3	3	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	-6	6	-2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{86}	-6	6	-2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{87}	3	-3	1	-1	0	0	0	8	-8	8	-8	0	0	0	0	0	0
χ_{88}	3	-3	1	-1	0	0	0	-8	8	-8	8	0	0	0	0	0	0
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	1	-1	-1	1	4	-4	0	6	-6	-2	2	0	2	-2	-2	2	0
χ_{91}	1	-1	-1	1	4	-4	0	-6	6	2	-2	0	-2	2	2	-2	0
χ_{92}	0	0	0	0	8	-8	0	12	-12	-4	4	0	-4	4	4	-4	0
χ_{93}	0	0	0	0	8	-8	0	-12	12	4	-4	0	4	-4	-4	4	0
χ_{94}	4	-4	-4	4	8	-8	0	0	0	0	0	0	0	0	0	0	0
χ_{95}	3	-3	-3	3	-4	4	0	6	-6	-2	2	0	-6	6	6	-6	0
χ_{96}	0	0	0	0	12	-12	0	6	-6	-2	2	0	2	-2	-2	2	0
χ_{97}	0	0	0	0	12	-12	0	-6	6	2	-2	0	-2	2	2	-2	0
χ_{98}	3	-3	-3	3	-4	4	0	-6	6	2	-2	0	6	-6	-6	6	0
χ_{99}	-1	1	1	-1	0	0	0	-12	12	4	-4	0	-4	4	4	-4	0
χ_{100}	-1	1	1	-1	0	0	0	12	-12	-4	4	0	4	-4	-4	4	0
χ_{101}	2	-2	-2	2	16	-16	0	0	0	0	0	0	0	0	0	0	0
χ_{102}	3	-3	-3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{103}	3	-3	-3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{104}	3	-3	-3	3	-8	8	0	0	0	0	0	0	8	-8	-8	8	0
χ_{105}	3	-3	-3	3	-8	8	0	0	0	0	0	0	-8	8	8	-8	0
χ_{106}	0	0	0	0	16	-16	0	0	0	0	0	0	0	0	0	0	0
χ_{107}	-3	3	3	-3	0	0	0	12	-12	-4	4	0	4	-4	-4	4	0
χ_{108}	-3	3	3	-3	0	0	0	-12	12	4	-4	0	-4	4	4	-4	0
χ_{109}	-2	2	2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{110}	-2	2	2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{111}	2	-2	-2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{112}	0	0	0	0	-12	12	0	6	-6	-2	2	0	-6	6	6	-6	0
χ_{113}	0	0	0	0	-12	12	0	-6	6	2	-2	0	6	-6	-6	6	0
χ_{114}	0	0	0	0	8	-8	0	0	0	0	0	0	0	0	0	0	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$4D$				$4E$						$5A$				$6A$	
	$4V$	$4W$	$4X$	$4Y$	$4Z$	$4AA$	$4AB$	$4AC$	$8C$	$8D$	$5A$	$10A$	$10B$	$10C$	$6H$	$6I$
χ_{75}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-4
χ_{76}	4	-4	0	0	-2	2	2	-2	0	0	1	-1	1	-1	0	0
χ_{77}	4	-4	0	0	-2	2	2	-2	0	0	1	-1	1	-1	0	0
χ_{78}	0	0	0	0	0	0	0	0	0	0	-2	2	-2	2	4	-4
χ_{79}	0	0	0	0	0	0	0	0	0	0	-2	2	-2	2	-4	4
χ_{80}	-4	4	0	0	-2	2	2	-2	0	0	0	0	0	0	4	-4
χ_{81}	-4	4	0	0	-2	2	2	-2	0	0	0	0	0	0	-4	4
χ_{82}	8	-8	0	0	-4	4	4	-4	0	0	2	-2	2	-2	0	0
χ_{83}	0	0	0	0	0	0	0	0	0	0	1	-1	1	-1	-8	8
χ_{84}	0	0	0	0	0	0	0	0	0	0	1	-1	1	-1	8	-8
χ_{85}	0	0	0	0	0	0	0	0	0	0	-1	1	-1	1	-8	8
χ_{86}	0	0	0	0	0	0	0	0	0	0	-1	1	-1	1	8	-8
χ_{87}	-8	8	0	0	0	0	0	0	0	0	0	0	0	0	-4	4
χ_{88}	-8	8	0	0	0	0	0	0	0	0	0	0	0	0	4	-4
χ_{89}	8	-8	0	0	4	-4	-4	4	0	0	0	0	0	0	0	0
χ_{90}	0	0	0	0	2	-2	2	-2	0	0	3	-3	-1	1	4	-4
χ_{91}	0	0	0	0	2	-2	2	-2	0	0	3	-3	-1	1	-4	4
χ_{92}	0	0	0	0	0	0	0	0	0	0	3	-3	-1	1	4	-4
χ_{93}	0	0	0	0	0	0	0	0	0	0	3	-3	-1	1	-4	4
χ_{94}	0	0	0	0	-4	4	-4	4	0	0	0	0	0	0	0	0
χ_{95}	0	0	0	0	2	-2	2	-2	0	0	0	0	0	0	-8	8
χ_{96}	0	0	0	0	-2	2	-2	2	0	0	0	0	0	0	-4	4
χ_{97}	0	0	0	0	-2	2	-2	2	0	0	0	0	0	0	4	-4
χ_{98}	0	0	0	0	2	-2	2	-2	0	0	0	0	0	0	8	-8
χ_{99}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	4
χ_{100}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-4
χ_{101}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{102}	0	0	0	0	0	0	0	0	0	0	-3	3	1	-1	8	-8
χ_{103}	0	0	0	0	0	0	0	0	0	0	-3	3	1	-1	-8	8
χ_{104}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	4
χ_{105}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-4
χ_{106}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{107}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	4
χ_{108}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-4
χ_{109}	0	0	0	0	0	0	0	0	0	0	-3	3	1	-1	8	-8
χ_{110}	0	0	0	0	0	0	0	0	0	0	-3	3	1	-1	-8	8
χ_{111}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{112}	0	0	0	0	-2	2	-2	2	0	0	3	-3	-1	1	0	0
χ_{113}	0	0	0	0	0	-2	2	-2	2	0	0	3	-3	-1	1	0
χ_{114}	0	0	0	0	4	-4	4	-4	0	0	0	0	0	0	0	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$6A$			$6B$			$6C$		$6D$					$6E$			
	$12A$	$12B$	$6J$	$6K$	$6L$	$12C$	$6M$	$6N$	$6O$	$6P$	$12D$	$12E$	$12F$	$6Q$	$6R$	$6S$	$6T$
χ_{75}	2	-2	0	0	0	0	0	0	2	-2	2	-2	0	3	-3	1	-1
χ_{76}	0	0	0	0	0	0	0	0	-4	4	-4	4	0	0	0	0	0
χ_{77}	0	0	0	0	0	0	0	0	-4	4	-4	4	0	0	0	0	0
χ_{78}	2	-2	0	0	0	0	0	0	2	-2	2	-2	0	-3	3	-1	1
χ_{79}	-2	2	0	0	0	0	0	0	2	-2	2	-2	0	-3	3	-1	1
χ_{80}	2	-2	0	0	0	0	0	0	2	-2	2	-2	0	0	0	0	0
χ_{81}	-2	2	0	0	0	0	0	0	2	-2	2	-2	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	4	-4	4	-4	0	0	0	0	0
χ_{83}	-4	4	0	0	0	0	0	0	0	0	0	0	0	-3	3	-1	1
χ_{84}	4	-4	0	0	0	0	0	0	0	0	0	0	0	-3	3	-1	1
χ_{85}	-4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{86}	4	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{87}	-2	2	0	0	0	0	0	0	-2	2	-2	2	0	3	-3	1	-1
χ_{88}	2	-2	0	0	0	0	0	0	-2	2	-2	2	0	3	-3	1	-1
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	-2	2	0	4	-4	0	1	-1	2	-2	-2	2	0	1	-1	-1	1
χ_{91}	2	-2	0	4	-4	0	1	-1	2	-2	-2	2	0	1	-1	-1	1
χ_{92}	-2	2	0	4	-4	0	1	-1	-2	2	2	-2	0	-2	2	2	-2
χ_{93}	2	-2	0	4	-4	0	1	-1	-2	2	2	-2	0	-2	2	2	-2
χ_{94}	0	0	0	0	0	0	-3	3	4	-4	-4	4	0	0	0	0	0
χ_{95}	4	-4	0	-8	8	0	1	-1	0	0	0	0	0	1	-1	-1	1
χ_{96}	2	-2	0	-4	4	0	2	-2	-2	2	2	-2	0	2	-2	-2	2
χ_{97}	-2	2	0	-4	4	0	2	-2	-2	2	2	-2	0	2	-2	-2	2
χ_{98}	-4	4	0	-8	8	0	1	-1	0	0	0	0	0	1	-1	-1	1
χ_{99}	2	-2	0	4	-4	0	-2	2	2	-2	-2	2	0	1	-1	-1	1
χ_{100}	-2	2	0	4	-4	0	-2	2	2	-2	-2	2	0	1	-1	-1	1
χ_{101}	0	0	0	-8	8	0	1	-1	4	-4	-4	4	0	-2	2	2	-2
χ_{102}	-4	4	0	8	-8	0	2	-2	0	0	0	0	0	-1	1	1	-1
χ_{103}	4	-4	0	8	-8	0	2	-2	0	0	0	0	0	-1	1	1	-1
χ_{104}	2	-2	0	-4	4	0	-1	1	-2	2	2	-2	0	-1	1	1	-1
χ_{105}	-2	2	0	-4	4	0	-1	1	-2	2	2	-2	0	-1	1	1	-1
χ_{106}	0	0	0	0	0	0	-3	3	-4	4	4	-4	0	0	0	0	0
χ_{107}	2	-2	0	-4	4	0	2	-2	2	-2	-2	2	0	-1	1	1	-1
χ_{108}	-2	2	0	-4	4	0	2	-2	2	-2	-2	2	0	-1	1	1	-1
χ_{109}	-4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{110}	4	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{111}	0	0	0	8	-8	0	2	-2	0	0	0	0	0	2	-2	-2	2
χ_{112}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{113}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{114}	0	0	0	0	0	0	-3	3	0	0	0	0	0	0	0	0	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	6F				6G				7A		8A			8B		
	$6U$	$6V$	$12G$	$12H$	$6W$	$6X$	$12I$	$12J$	$7A$	$14A$	$8E$	$8F$	$8G$	$8H$	$8I$	$8J$
χ_{75}	1	-1	1	-1	-1	1	-1	1	-1	1	0	0	0	0	0	0
χ_{76}	0	0	0	0	0	0	0	0	0	0	-2	2	0	0	0	0
χ_{77}	0	0	0	0	0	0	0	0	0	0	2	-2	0	0	0	0
χ_{78}	1	-1	1	-1	-1	1	-1	1	0	0	0	0	0	0	0	0
χ_{79}	-1	1	-1	1	1	-1	1	-1	0	0	0	0	0	0	0	0
χ_{80}	-2	2	-2	2	0	0	0	0	0	0	2	-2	0	0	0	0
χ_{81}	2	-2	2	-2	0	0	0	0	0	0	-2	2	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	1	-1	1	-1	1	-1	1	-1	0	0	0	0	0	0	0	0
χ_{84}	-1	1	-1	1	-1	1	-1	1	0	0	0	0	0	0	0	0
χ_{85}	-2	2	-2	2	0	0	0	0	1	-1	0	0	0	0	0	0
χ_{86}	2	-2	2	-2	0	0	0	0	1	-1	0	0	0	0	0	0
χ_{87}	-1	1	-1	1	-1	1	-1	1	0	0	0	0	0	0	0	0
χ_{88}	1	-1	1	-1	1	-1	1	-1	0	0	0	0	0	0	0	0
χ_{89}	0	0	0	0	0	0	0	0	-1	1	0	0	0	0	0	0
χ_{90}	1	-1	-1	1	1	-1	-1	1	0	0	0	0	0	2	-2	0
χ_{91}	-1	1	1	-1	-1	1	1	-1	0	0	0	0	0	-2	2	0
χ_{92}	-2	2	2	-2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{93}	2	-2	-2	2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{94}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{95}	1	-1	-1	1	-1	1	1	-1	0	0	0	0	0	2	-2	0
χ_{96}	2	-2	-2	2	0	0	0	0	0	0	0	0	0	-2	2	0
χ_{97}	-2	2	2	-2	0	0	0	0	0	0	0	0	0	2	-2	0
χ_{98}	-1	1	1	-1	1	-1	-1	1	0	0	0	0	0	-2	2	0
χ_{99}	-1	1	1	-1	1	-1	-1	1	0	0	0	0	0	0	0	0
χ_{100}	1	-1	-1	1	-1	1	1	-1	0	0	0	0	0	0	0	0
χ_{101}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{102}	-1	1	1	-1	-1	1	1	-1	0	0	0	0	0	0	0	0
χ_{103}	1	-1	-1	1	1	-1	-1	1	0	0	0	0	0	0	0	0
χ_{104}	-1	1	1	-1	-1	1	1	-1	0	0	0	0	0	0	0	0
χ_{105}	1	-1	-1	1	1	-1	-1	1	0	0	0	0	0	0	0	0
χ_{106}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{107}	-1	1	1	-1	1	-1	-1	1	0	0	0	0	0	0	0	0
χ_{108}	1	-1	-1	1	-1	1	1	-1	0	0	0	0	0	0	0	0
χ_{109}	2	-2	-2	2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{110}	-2	2	2	-2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{111}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{112}	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	2	0
χ_{113}	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-2	0
χ_{114}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6.7: The character table of $2^7{:}Sp_6(2)$ (continued)

	$9A$		$10A$				$12A$			$12B$			$12C$		$15A$	
	$9A$	$18A$	$10D$	$10E$	$20A$	$20B$	$12K$	$12L$	$24A$	$12M$	$12N$	$24B$	$12O$	$12P$	$15A$	$30A$
χ_{75}	0	0	0	0	0	0	-2	2	0	0	0	0	0	0	0	0
χ_{76}	0	0	1	-1	1	-1	0	0	0	0	0	0	0	0	1	-1
χ_{77}	0	0	-1	1	-1	1	0	0	0	0	0	0	0	0	1	-1
χ_{78}	0	0	0	0	0	0	2	-2	0	0	0	0	0	0	1	-1
χ_{79}	0	0	0	0	0	0	-2	2	0	0	0	0	0	0	1	-1
χ_{80}	0	0	0	0	0	0	-2	2	0	0	0	0	0	0	0	0
χ_{81}	0	0	0	0	0	0	2	-2	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
χ_{83}	0	0	-1	1	-1	1	0	0	0	0	0	0	0	0	1	-1
χ_{84}	0	0	1	-1	1	-1	0	0	0	0	0	0	0	0	1	-1
χ_{85}	0	0	1	-1	1	-1	0	0	0	0	0	0	0	0	-1	1
χ_{86}	0	0	-1	1	-1	1	0	0	0	0	0	0	0	0	-1	1
χ_{87}	0	0	0	0	0	0	2	-2	0	0	0	0	0	0	0	0
χ_{88}	0	0	0	0	0	0	-2	2	0	0	0	0	0	0	0	0
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	1	-1	1	-1	-1	1	0	0	0	2	-2	0	1	-1	0	0
χ_{91}	1	-1	-1	1	1	-1	0	0	0	-2	2	0	1	-1	0	0
χ_{92}	0	0	-1	1	1	-1	0	0	0	2	-2	0	-1	1	0	0
χ_{93}	0	0	1	-1	-1	1	0	0	0	-2	2	0	-1	1	0	0
χ_{94}	1	-1	0	0	0	0	0	0	0	0	0	0	-1	1	0	0
χ_{95}	0	0	0	0	0	0	0	0	0	0	0	0	-1	1	0	0
χ_{96}	0	0	0	0	0	0	0	0	0	2	-2	0	0	0	0	0
χ_{97}	0	0	0	0	0	0	0	0	0	-2	2	0	0	0	0	0
χ_{98}	0	0	0	0	0	0	0	0	0	0	0	0	-1	1	0	0
χ_{99}	-1	1	0	0	0	0	0	0	0	2	-2	0	0	0	0	0
χ_{100}	-1	1	0	0	0	0	0	0	0	-2	2	0	0	0	0	0
χ_{101}	-1	1	0	0	0	0	0	0	0	0	0	0	1	-1	0	0
χ_{102}	0	0	1	-1	-1	1	0	0	0	0	0	0	0	0	0	0
χ_{103}	0	0	-1	1	1	-1	0	0	0	0	0	0	0	0	0	0
χ_{104}	0	0	0	0	0	0	0	0	0	2	-2	0	1	-1	0	0
χ_{105}	0	0	0	0	0	0	0	0	0	-2	2	0	1	-1	0	0
χ_{106}	0	0	0	0	0	0	0	0	0	0	0	0	1	-1	0	0
χ_{107}	0	0	0	0	0	0	0	0	0	-2	2	0	0	0	0	0
χ_{108}	0	0	0	0	0	0	0	0	0	2	-2	0	0	0	0	0
χ_{109}	1	-1	-1	1	1	-1	0	0	0	0	0	0	0	0	0	0
χ_{110}	1	-1	1	-1	-1	1	0	0	0	0	0	0	0	0	0	0
χ_{111}	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{112}	0	0	1	-1	-1	1	0	0	0	0	0	0	0	0	0	0
χ_{113}	0	0	-1	1	1	-1	0	0	0	0	0	0	0	0	0	0
χ_{114}	0	0	0	0	0	0	0	0	0	0	0	0	-1	1	0	0

6.8 The Fusion of $2^7{:}Sp_6(2)$ into $Sp_8(2)$

We use the conjugacy classes of $2^7{:}Sp_6(2)$ and other results which were given in Table 6.2 to compute the power maps of the elements of $2^7{:}Sp_6(2)$. We list these power maps in the following Table.

Table 6.8: The power maps of the elements of $2^7{:}Sp_6(2)$

$[g]_{Sp_6(2)}$	$[x]_{2^7:Sp_6(2)}$	2	3	5	7	$[g]_{Sp_6(2)}$	$[x]_{2^7:Sp_6(2)}$	2	3	5	7
$1A$	$1A$					$2A$	$2D$	$1A$			
	$2A$	$1A$					$2E$	$1A$			
	$2B$	$1A$					$4A$	$2C$			
	$2C$	$1A$					$4B$	$2C$			
							$2F$	$1A$			
$2B$	$2G$	$1A$				$2C$	$2K$	$1A$			
	$2H$	$1A$					$2L$	$1A$			
	$2I$	$1A$					$4D$	$2B$			
	$2J$	$1A$					$4E$	$2B$			
	$4C$	$2B$					$2M$	$1A$			
							$4F$	$2C$			
$2D$	$2N$	$1A$				$3A$	$3A$		$1A$		
	$2O$	$1A$					$6A$	$3A$	$2A$		
	$4G$	$2C$					$6B$	$3A$	$2B$		
	$4H$	$2C$					$6C$	$3A$	$2C$		
	$4I$	$2B$									
	$4J$	$2C$									
$3B$	$3B$		$1A$			$3C$	$3C$		$1A$		
	$6D$	$3B$	$2A$				$6E$	$3C$	$2A$		
							$6F$	$3C$	$2B$		
							$6G$	$3C$	$2C$		
$4A$	$4K$	$2G$				$4B$	$4N$	$2K$			
	$4L$	$2G$					$4O$	$2K$			
	$4M$	$2I$					$4P$	$2K$			
							$4Q$	$2K$			
							$8A$	$4D$			
$4C$	$4R$	$2K$				$4D$	$4V$	$2G$			
	$4S$	$2K$					$4W$	$2G$			
	$4T$	$2K$					$4X$	$2I$			
	$4U$	$2K$					$4Y$	$2J$			
	$8B$	$4E$									
$4E$	$4Z$	$2K$				$5A$	$5A$			$1A$	
	$4AA$	$2K$					$10A$	$5A$		$2A$	
	$4AB$	$2M$					$10B$	$5A$		$2C$	
	$4AC$	$2M$					$10C$	$5A$		$2B$	
	$8C$	$4D$									
	$8D$	$4E$									

Table 6.8: The power maps of the elements of $2^7{:}Sp_6(2)$ (continued)

$[g]_{Sp_6(2)}$	$[x]_{2^7:Sp_6(2)}$	2	3	5	7	$[g]_{Sp_6(2)}$	$[x]_{2^7:Sp_6(2)}$	2	3	5	7
6A	6H	3A	2D			6B	6K	3A	2G		
	6I	3A	2E				6L	3A	2H		
	12A	6C	4A				12C	6B	4C		
	12B	6C	4B								
	6J	3A	2F								
6C	6M	3B	2G			6D	6O	3A	2K		
	6N	3B	2H				6P	3A	2L		
							12D	6B	4D		
							12E	6B	4E		
							12F	6C	4F		
6E	6Q	3C	2G			6F	6U	3C	2D		
	6R	3C	2H				6V	3C	2E		
	6S	3C	2J				12G	6G	4B		
	6T	3C	2I				12H	6G	4A		
6G	6W	3C	2N			7A	7A				1A
	6X	3C	2O				14A	7A			2A
	12I	6G	4G								
	12J	6G	4H								
8A	8E	4U				8B	8H	4K			
	8F	4V					8I	4K			
	8G	4X					8J	4M			
9A	9A		3B			10A	10D	5A		2D	
	18A	9A	6D				10E	5A		2E	
							20A	10B		4A	
							20B	10B		4B	
12A	12K	6O	4N			12B	12M	6O	4R		
	12L	6O	4O				12N	6O	4S		
	24A	12D	8A				24B	12E	8B		
12C	12O	6M	4K			15A	15A		5A	3A	
	12P	6M	4L				30A	15A	10A	6A	

The power maps of $Sp_8(2)$ and its permutation character of degree 255 are given in the ATLAS. By using the information provided by the conjugacy classes of the elements of $2^7{:}Sp_6(2)$ and $Sp_8(2)$, the power maps and permutation character of $Sp_8(2)$ of degree 255, we are able to obtain the partial fusion of $2^7{:}Sp_6(2)$ into $Sp_8(2)$. We complete the remaining fusion map by restricting few irreducible characters of $Sp_8(2)$ to $2^7{:}Sp_6(2)$. For restriction of characters we used the technique of *set intersections for characters.* We restrict the irreducible characters of $Sp_8(2)$ of degrees 35, 51 and 85 respectively to $2^7{:}Sp_6(2)$. For detailed information regarding set intersection technique we refer the readers to Moori [72], Mpono [88], Moori and Mpono ([81], [82] and [83]).

Let ρ be the character of $Sp_6(2)$ afforded by the regular representation of $Sp_6(2)$. We obtain that $\rho = \sum_{i=1}^{30} e_i\phi_i$, where $\phi_i \in Irr(Sp_6(2))$ and $e_i = deg(\phi_i)$. Then ρ can be regarded as a character of $2^7{:}Sp_6(2)$ which contains 2^7 in its kernel such that

$$\rho(g) = \begin{cases} |Sp_6(2)| & \text{if } g \in 2^7 \\ 0 & \text{otherwise.} \end{cases}$$

If ψ is a character of $Sp_8(2)$, then we obtain that

$$\begin{aligned}\langle \rho, \psi\rangle_{2^7:Sp_6(2)} &= \frac{1}{|2^7{:}Sp_6(2)|}\{\rho(1A)\psi(1A)+\rho(2A)\psi(2A)+63\rho(2B)\psi(2B)+63\rho(2C)\psi(2C)\}\\ &= \frac{1}{|2^7{:}Sp_6(2)|}\{|Sp_6(2)|\psi(1A)+|Sp_6(2)|\psi(2A)+63|Sp_6(2)|\psi(2B)+63|Sp_6(2)|\psi(2C)\}\\ &= \frac{1}{128}\{\psi(1A)+\psi(2A)+63\psi(2B)+63\psi(2C)\}\\ &= \langle \psi_{2^7}, \tau_1\rangle\end{aligned}$$

where τ_1 is the identity character of 2^7 and ψ_{2^7} is the restriction of ψ to 2^7. Also for ψ we obtain that

$$\psi_{2^7} = a_1\theta_1 + a_2\theta_2 + a_3\theta_3 + a_4\theta_4\ ,$$

where $a_1, a_2, a_3, a_4 \in \mathbb{N}\cup\{0\}$ and $\theta_i, i \in \{1,2,3,4\}$ are the sums of the irreducible characters of 2^7 which are in one orbit under the action of $Sp_6(2)$ on $Irr(2^7)$. Let $\tau_j \in Irr(2^7)$, where $j \in \{1, 2, \ldots, 128\}$. Then we obtain that

$$\theta_1 = \tau_1\ ,\quad deg(\theta_1) = 1$$

$$\theta_2 = \sum_{j=2}^{29}\tau_j\ ,\quad deg(\theta_2) = 28$$

$$\theta_3 = \sum_{j=30}^{65}\tau_j \quad deg(\theta_3) = 36$$

$$\theta_4 = \sum_{j=66}^{128}\tau_j \quad deg(\theta_4) = 63.$$

Hence

$$\psi_{2^7} = a_1\tau_1 + a_2\sum_{j=2}^{29}\tau_j + a_3\sum_{j=30}^{65} + a_4\sum_{j=66} 128$$

and hence

$$\langle\psi_{2^7}, \psi_{2^7}\rangle = a_1^2 + 28a_2^2 + 36a_3^2 + 63a_4^2\ ,$$

where $a_1 = \langle\psi_{2^7}, \tau_1\rangle = \langle\rho, \psi\rangle_{2^7:Sp_6(2)}$. We also have that

$$\langle\psi_{2^7}, \psi_{2^7}\rangle = \frac{1}{128}\{\psi(1A)\psi(1A) + \psi(2A)\psi(2A) + 63\psi(2B)\psi(2B) + \psi(2C)\psi(2C)\}\ .$$

Now we apply the above results to the irreducible characters of $Sp_8(2)$. Let $\psi_1 = 35a$, $\psi_2 = 51a$ and $\psi_3 = 85a$ be the irreducible characters of $Sp_8(2)$ of degrees 35, 51 and 85 respectively. For ψ_1 we obtain that

$$\langle\rho, \psi_1\rangle_{2^7:Sp_6(2)} = \frac{1}{128}[35 + (-21) + 63(3) + 63(11)] = 7\ .$$

Since $deg(\psi_1) = 35$, we must have that $a_1 + 28a_2 + 36a_3 + 63a_4 = 35$ and since $a_1 = 7$, we must have that $a_2 = 1$, $a_3 = a_4 = 0$. Hence based on the partial fusion of $2^7{:}Sp_6(2)$ into $Sp_8(2)$ which has already been determined, we obtain that $(\psi_1)_{2^7:Sp_6(2)} = \chi_2 + \chi_{90}$.

Similarly for ψ_2 and ψ_3 we obtain that

$$(\psi_2)_{2^7:Sp_6(2)} = \chi_3 + \chi_{68}$$

and

$$(\psi_3)_{2^7:Sp_6(2)} = \chi_4 + \chi_{68} + \chi_{90}\ .$$

Using the partial fusion already determined and the values of ψ_1, ψ_2 and ψ_3 on the classes of $Sp_8(2)$ and the values of $(\psi_1)_{2^7:Sp_6(2)}$, $(\psi_2)_{2^7:Sp_6(2)}$ and $(\psi_3)_{2^7:Sp_6(2)}$ on the classes of $2^7{:}Sp_6(2)$, we are able to complete the fusion map of $2^7{:}Sp_6(2)$ into $Sp_8(2)$ and this is given in following Table 6.9.

Table 6.9: The fusion of $2^7{:}Sp_6(2)$ into $Sp_8(2)$

$[g]_{Sp_6(2)}$	$[x]_{2^7:Sp_6(2)}$	$\longrightarrow$	$[y]_{Sp_8(2)}$	$[g]_{Sp_6(2)}$	$[x]_{2^7:Sp_6(2)}$	$\longrightarrow$	$[y]_{Sp_8(2)}$
1A	1A		1A	2A	2D		2C
	2A		2A		2E		2A
	2B		2B		4A		4B
	2C		2C		4B		4A
					2F		2E
2B	2G		2B	2C	2K		2C
	2H		2E		2L		2E
	2I		2F		4D		4C
	2J		2D		4E		4D
	4C		4D		2M		2F
					4F		4H
2D	2N		2F	3A	3A		3A
	2O		2E		6A		6A
	4G		4E		6B		6B
	4H		2F		6C		6C
	4I		4G				
	4J		4I				
3B	3B		3D	3C	3C		3C
	6D		6F		6E		6H
					6F		6I
					6G		6L
4A	4K		4C	4B	4N		4H
	4L		4G		4O		4B
	4M		4K		4P		4E
					4Q		4I
					8A		8A
4C	4R		4H	4D	4V		4D
	4S		4A		4W		4G
	4T		4I		4X		4L
	4U		4F		4Y		4J
	8B		8B				

Table 6.9: The fusion of $2^7{:}Sp_6(2)$ into $Sp_8(2)$ (continued)

$[g]_{Sp_6(2)}$	$[x]_{2^7:Sp_6(2)}$	$\longrightarrow$ $[y]_{Sp_8(2)}$	$[g]_{Sp_6(2)}$	$[x]_{2^7:Sp_6(2)}$	$\longrightarrow$ $[y]_{Sp_8(2)}$
$4E$	$4Z$	$4H$	$5A$	$5A$	$5A$
	$4AA$	$4I$		$10A$	$10A$
	$4AB$	$4K$		$10B$	$10C$
	$4AC$	$4L$		$10C$	$10B$
	$8C$	$8C$			
	$8D$	$8D$			
$6A$	$6H$	$6C$	$6B$	$6K$	$6B$
	$6I$	$6A$		$6L$	$6G$
	$12A$	$12B$		$12C$	$12D$
	$12B$	$12C$			
	$6J$	$6G$			
$6C$	$6M$	$6J$	$6D$	$6O$	$6C$
	$6N$	$6O$		$6P$	$6G$
				$12D$	$12A$
				$12E$	$12D$
				$12F$	$12H$
$6E$	$6Q$	$6D$	$6F$	$6U$	$6L$
	$6R$	$6N$		$6V$	$6H$
	$6S$	$6M$		$12G$	$12G$
	$6T$	$6P$		$12H$	$12F$
$6G$	$6W$	$6P$	$7A$	$7A$	$7A$
	$6X$	$6N$		$14A$	$14A$
	$12I$	$12J$			
	$12J$	$12K$			
$8A$	$8E$	$8D$	$8B$	$8H$	$8C$
	$8F$	$8B$		$8I$	$8A$
	$8G$	$8F$		$8J$	$8E$
$9A$	$9A$	$9C$	$10A$	$10D$	$10C$
	$18A$	$18A$		$10E$	$10A$
				$20A$	$20A$
				$10B$	$20B$
$12A$	$12K$	$12H$	$12B$	$12M$	$12H$
	$12L$	$12C$		$12N$	$12B$
	$24A$	$24A$		$24B$	$24B$
$12C$	$12O$	$12I$	$15A$	$15A$	$15A$
	$12P$	$12L$		$30A$	$30A$

Remark 6.8.1 *There is another group of the form $E = 2^7{:}Sp_6(2)$, which is a maximal subgroup of $\bar{Fi}_{22} = Aut(Fi_{22})$. For this group we have four inertia factor groups $Sp_6(2)$, $Sp_6(2)$, $2^5{:}S_6$ and $2^5{:}S_6$ in $Sp_6(2)$ respectively. Mpono [88] has constructed the character table of E, which is now available in* GAP. *As the group E has* 134 *conjugacy classes, therefore the group of the form $2^7{:}Sp_6(2)$ that has been studied in this chapter is not isomorphic to E.*

Chapter 7

A Maximal Subgroup of $2^8{:}O_8^+(2)$

The orthogonal simple group $O_{10}^+(2)$ has 9 conjugacy classes of maximal subgroups. It has exactly four conjugacy classes of involutions represented in the ATLAS [19] by $2A$, $2B$, $2C$ and $2D$ respectively. In $O_{10}^+(2)$, we have $N_{O_{10}^+(2)}(2^8) = 2^8{:}O_8^+(2)$ and using the list of maximal subgroups of $O_{10}^+(2)$ given in the ATLAS, we can see that $2^8{:}O_8^+(2)$ is a maximal subgroup of $O_{10}^+(2)$. We should add here that there are three groups of the form $V_i{:}O_8^+(2)$ where $V_i \cong 2^8$ $(1 \le i \le 3)$ are irreducible modules for $O_8^+(2)$ [58].

In this chapter we study the group $\bar{G} = 2^8{:}Sp_8(2)$ that sits maximally inside group $2^8{:}O_8^+(2)$. Let $\bar{G} = N{:}G$ where $N = 2^8$ is the vector space of dimension 8 over $GF(2)$ and $G = Sp_6(2)$ which acts irreducibly on N (see [58]). The character table of $\bar{G}$ is not yet known. We use the technique of coset analysis to determine the conjugacy classes of $\bar{G}$ and then we construct the complete character table using the Fischer-Clifford matrices. The complete fusion of $2^8{:}Sp_6(2)$ into $2^8{:}O_8^+(2)$ will also be fully determined.

7.1 The action of $Sp_6(2)$ on 2^8

In $O_8^+(2)$ there are three non-conjugate classes of $Sp_6(2)$. We choose an $Sp_6(2)$ from the first class and we observe that for this $Sp_6(2)$ we have $Sp_6(2) = C_{O_8^+(2)}(\theta_1)$ where θ_1 is an involutory outer automorphism of $O_8^+(2)$ represented by $2F$ in the ATLAS. The permutation character of $O_8^+(2)$ on $C_{O_8^+(2)}(\theta_1)$ is given by $1a + 35a + 84a$. Now by using the conjugacy classes of elements of $O_8^+(2)$, obtained using MAGMA [10], we generated the group $C_{O_8^+(2)}(\theta_1) = Sp_6(2)$ by two elements α and β of $O_8^+(2)$ which are given by:

$$\alpha = \begin{pmatrix} 0&1&0&0&0&0&0&0\\ 1&0&0&0&0&0&0&0\\ 0&0&0&0&1&0&0&0\\ 1&0&0&1&1&1&0&0\\ 0&0&1&0&0&0&0&0\\ 1&1&1&0&1&1&0&0\\ 0&0&0&0&0&0&0&1\\ 0&0&0&0&0&0&1&0 \end{pmatrix} \quad \text{and} \quad \beta = \begin{pmatrix} 0&0&1&0&0&0&0&0\\ 0&0&0&1&0&0&0&0\\ 0&0&0&0&0&1&0&0\\ 0&0&0&0&0&0&1&0\\ 0&0&0&1&1&0&1&0\\ 1&0&1&0&0&0&0&0\\ 0&1&1&1&1&1&1&0\\ 1&0&0&1&1&1&1&1 \end{pmatrix}$$

where $O(\alpha) = 2$ and $O(\beta) = 6$.

We give the class representatives for each $g \in Sp_6(2)$ in terms of 8×8 matrices over $GF(2)$ in the following table, where $[g]_G$ is the class containing g and M is the matrix that represents that particular class.

$[g]_G$	M	$\lvert[g]_G\rvert$	$[g]_G$	M	$\lvert[g]_G\rvert$
$1A$	$\begin{pmatrix} 1&0&0&0&0&0&0&0\\ 0&1&0&0&0&0&0&0\\ 0&0&1&0&0&0&0&0\\ 0&0&0&1&0&0&0&0\\ 0&0&0&0&1&0&0&0\\ 0&0&0&0&0&1&0&0\\ 0&0&0&0&0&0&1&0\\ 0&0&0&0&0&0&0&1 \end{pmatrix}$	1	$2A$	$\begin{pmatrix} 1&1&0&0&0&0&0&0\\ 0&1&0&0&0&0&0&0\\ 0&0&1&0&1&0&0&0\\ 1&0&1&0&1&1&0&0\\ 0&0&0&0&1&0&0&0\\ 1&1&1&1&0&0&0&0\\ 1&0&0&1&1&0&1&1\\ 1&1&1&1&1&1&0&1 \end{pmatrix}$	63
$2B$	$\begin{pmatrix} 1&0&0&1&0&0&0&1\\ 0&1&0&0&0&0&0&0\\ 0&0&1&1&0&0&0&1\\ 0&0&0&1&0&0&0&0\\ 1&0&0&0&0&1&1&0\\ 1&0&0&1&1&0&1&1\\ 0&0&0&0&0&0&1&0\\ 0&0&0&0&0&0&0&1 \end{pmatrix}$	315	$2C$	$\begin{pmatrix} 0&1&1&0&0&1&1&0\\ 1&0&1&0&0&0&1&1\\ 1&0&1&1&1&0&0&0\\ 0&0&0&1&0&0&1&0\\ 1&1&1&0&1&1&0&0\\ 1&0&0&1&1&0&0&1\\ 0&0&0&0&0&0&1&0\\ 1&0&0&1&1&1&0&0 \end{pmatrix}$	945
$2D$	$\begin{pmatrix} 0&1&1&0&1&0&0&1\\ 1&1&0&0&0&1&0&1\\ 0&1&0&0&1&1&0&0\\ 0&0&1&0&1&0&1&1\\ 1&1&1&0&1&0&0&0\\ 0&0&0&0&1&1&0&1\\ 0&1&0&1&0&1&0&1\\ 1&1&1&0&0&0&0&1 \end{pmatrix}$	3780	$3A$	$\begin{pmatrix} 0&0&0&0&0&1&0&0\\ 1&1&1&0&1&1&0&0\\ 0&1&1&0&1&0&1&1\\ 1&0&1&0&1&1&0&1\\ 1&0&1&0&1&0&1&1\\ 1&0&0&0&0&1&0&0\\ 1&0&0&1&1&0&1&0\\ 1&1&1&1&1&1&0&1 \end{pmatrix}$	672
$3B$	$\begin{pmatrix} 0&1&0&1&0&1&0&0\\ 0&0&0&1&1&1&0&0\\ 1&1&0&1&1&0&0&0\\ 0&0&1&0&0&1&0&0\\ 1&0&0&0&0&0&0&0\\ 0&0&1&1&0&0&0&0\\ 1&1&0&0&1&1&1&1\\ 1&1&1&0&1&1&1&0 \end{pmatrix}$	2240	$3C$	$\begin{pmatrix} 1&0&0&1&1&1&0&0\\ 1&0&0&0&1&1&1&0\\ 1&0&1&0&1&1&0&0\\ 0&1&0&0&0&0&0&1\\ 1&1&0&1&0&1&0&1\\ 1&0&0&1&1&0&1&1\\ 0&0&0&0&1&1&0&1\\ 0&1&0&1&0&0&0&0 \end{pmatrix}$	13440

$[g]_G$	M	$\lvert [g]_G \rvert$	$[g]_G$	M	$\lvert [g]_G \rvert$
$4A$	$\begin{pmatrix} 0&0&1&0&0&1&0&1 \\ 0&0&0&1&0&0&1&0 \\ 0&1&1&0&0&1&0&0 \\ 0&0&1&1&1&1&0&0 \\ 1&1&1&1&1&1&1&1 \\ 0&0&1&0&1&0&0&0 \\ 1&1&1&0&0&0&1&1 \\ 1&0&1&1&0&0&1&0 \end{pmatrix}$	3780	$4B$	$\begin{pmatrix} 0&0&1&0&0&0&0&0 \\ 0&0&1&0&1&0&0&0 \\ 0&1&1&0&0&1&1&0 \\ 0&0&0&0&0&0&1&1 \\ 1&1&0&0&0&1&0&1 \\ 0&1&1&0&1&0&1&1 \\ 1&0&0&1&1&1&0&1 \\ 1&0&0&0&1&1&1&1 \end{pmatrix}$	7560
$4C$	$\begin{pmatrix} 0&1&0&1&1&0&1&1 \\ 0&0&1&1&0&0&0&0 \\ 1&1&1&0&1&1&0&0 \\ 1&0&1&1&1&1&0&0 \\ 0&0&0&0&0&0&0&1 \\ 0&0&0&1&1&0&1&0 \\ 1&0&0&1&1&0&0&0 \\ 0&0&0&1&1&0&0&0 \end{pmatrix}$	7560	$4D$	$\begin{pmatrix} 1&1&1&1&1&1&0&0 \\ 0&1&0&0&0&0&0&0 \\ 1&1&0&0&0&0&1&1 \\ 1&0&0&0&1&1&1&1 \\ 1&0&1&0&1&0&1&0 \\ 1&1&0&0&1&0&1&1 \\ 0&0&0&1&0&0&1&1 \\ 1&0&0&1&1&1&1&0 \end{pmatrix}$	11340
$4E$	$\begin{pmatrix} 1&0&1&0&0&1&0&0 \\ 0&1&0&1&0&1&0&0 \\ 1&1&1&0&1&0&1&1 \\ 0&0&0&0&0&1&0&1 \\ 1&1&0&0&0&1&0&1 \\ 1&0&0&0&0&0&0&0 \\ 0&1&0&1&1&0&0&0 \\ 1&1&1&0&1&0&0&1 \end{pmatrix}$	45360	$5A$	$\begin{pmatrix} 1&0&0&0&1&1&1&0 \\ 0&0&1&0&1&1&0&1 \\ 0&1&1&0&0&1&0&0 \\ 1&1&1&1&1&1&1&1 \\ 1&1&1&1&1&1&0&0 \\ 1&0&0&0&1&1&0&0 \\ 0&0&0&1&0&0&0&0 \\ 0&0&1&1&0&0&0&1 \end{pmatrix}$	48384
$6A$	$\begin{pmatrix} 1&0&1&0&1&1&0&1 \\ 1&0&0&0&0&1&1&0 \\ 0&1&0&1&0&0&0&1 \\ 1&1&1&0&0&0&1&1 \\ 0&0&0&1&1&1&1&0 \\ 1&0&0&1&1&0&1&1 \\ 1&1&1&1&0&0&0&0 \\ 0&1&0&1&0&1&0&0 \end{pmatrix}$	10080	$6B$	$\begin{pmatrix} 1&0&1&1&1&1&0&1 \\ 0&1&0&1&0&0&0&1 \\ 0&0&1&0&0&1&0&0 \\ 1&1&0&0&0&0&0&0 \\ 0&0&1&1&0&1&1&0 \\ 0&0&1&0&0&0&0&0 \\ 1&1&0&0&0&1&1&0 \\ 1&0&0&0&0&0&0&0 \end{pmatrix}$	10080
$6C$	$\begin{pmatrix} 1&1&1&0&1&0&0&1 \\ 1&1&1&0&1&0&1&0 \\ 0&0&0&0&1&1&0&1 \\ 1&0&0&1&0&1&1&0 \\ 1&1&0&0&1&0&1&1 \\ 1&0&0&0&0&0&1&0 \\ 1&1&0&1&1&0&0&1 \\ 1&0&0&1&0&0&0&1 \end{pmatrix}$	20160	$6D$	$\begin{pmatrix} 1&1&1&1&1&1&1&1 \\ 1&0&1&0&1&0&1&1 \\ 1&1&0&1&0&0&0&1 \\ 0&0&1&0&0&1&0&1 \\ 0&1&0&0&0&0&0&0 \\ 0&1&1&0&0&1&1&0 \\ 1&0&0&1&1&0&0&0 \\ 0&0&0&1&1&0&1&0 \end{pmatrix}$	30240
$6E$	$\begin{pmatrix} 1&0&1&1&0&1&1&1 \\ 0&1&0&1&0&1&0&0 \\ 1&1&0&1&0&0&0&1 \\ 1&1&0&0&1&1&1&1 \\ 1&1&1&1&0&1&0&0 \\ 1&0&1&0&1&1&0&1 \\ 0&0&1&0&1&0&1&1 \\ 1&1&0&0&0&0&0&0 \end{pmatrix}$	40320	$6F$	$\begin{pmatrix} 1&1&0&1&0&1&1&0 \\ 0&0&0&1&1&1&0&0 \\ 1&0&1&0&1&0&1&0 \\ 1&1&1&1&1&1&1&1 \\ 1&1&0&0&0&0&1&1 \\ 1&0&0&0&1&1&1&0 \\ 0&0&1&1&1&1&1&1 \\ 1&0&1&0&1&0&1&1 \end{pmatrix}$	40320

$[g]_G$	M	$\|[g]_G\|$	$[g]_G$	M	$\|[g]_G\|$
$6G$	$\begin{pmatrix} 1&1&1&1&0&1&1&0\\ 1&1&0&1&0&1&1&0\\ 0&0&0&1&0&0&1&0\\ 0&0&1&1&0&1&1&1\\ 1&0&1&0&1&0&1&0\\ 0&0&0&0&0&0&1&0\\ 1&0&0&1&1&0&1&1\\ 1&1&1&1&1&1&0&1 \end{pmatrix}$	120960	$7A$	$\begin{pmatrix} 0&1&1&0&0&1&1&1\\ 0&1&1&0&0&1&0&0\\ 1&0&1&0&1&1&0&1\\ 0&1&0&0&0&0&0&0\\ 1&0&0&1&0&1&1&0\\ 0&0&1&0&0&0&0&0\\ 1&1&0&1&1&1&1&0\\ 1&0&0&0&0&0&0&0 \end{pmatrix}$	207360
$8A$	$\begin{pmatrix} 1&0&1&0&1&0&1&0\\ 0&0&1&0&1&1&1&0\\ 0&1&1&0&0&1&0&0\\ 1&1&1&1&1&1&0&0\\ 0&0&1&1&1&1&1&1\\ 0&1&0&0&1&1&0&0\\ 0&0&1&1&0&1&1&1\\ 1&1&0&1&1&0&0&0 \end{pmatrix}$	90720	$8B$	$\begin{pmatrix} 1&1&0&1&1&1&1&0\\ 0&0&0&1&0&0&0&1\\ 1&1&0&1&1&0&0&0\\ 0&0&0&1&0&0&1&1\\ 1&1&1&1&1&1&0&0\\ 1&1&1&0&1&0&0&0\\ 0&1&0&0&1&0&0&0\\ 1&0&0&0&1&1&0&1 \end{pmatrix}$	90720
$9A$	$\begin{pmatrix} 1&0&0&1&0&0&0&1\\ 1&0&0&1&1&1&1&0\\ 1&0&1&1&1&0&0&1\\ 0&0&0&1&1&0&1&0\\ 0&1&0&1&1&1&0&1\\ 1&1&1&0&1&1&0&1\\ 1&0&1&0&1&1&0&1\\ 1&0&0&0&0&1&1&0 \end{pmatrix}$	161280	$10A$	$\begin{pmatrix} 0&1&1&1&1&1&1&0\\ 1&1&0&1&1&0&0&1\\ 1&1&0&0&1&1&1&1\\ 0&0&1&1&0&0&0&0\\ 1&1&0&1&0&0&0&1\\ 1&1&1&0&0&1&0&0\\ 1&0&0&1&1&1&0&1\\ 0&1&1&0&1&0&1&1 \end{pmatrix}$	145152
$12A$	$\begin{pmatrix} 0&1&1&0&1&0&0&1\\ 1&1&0&0&0&1&0&1\\ 0&0&0&0&0&1&0&0\\ 0&0&0&1&1&1&0&0\\ 1&1&1&0&1&0&0&0\\ 1&1&0&1&0&0&0&1\\ 0&1&1&1&1&0&1&1\\ 1&1&0&1&0&1&1&0 \end{pmatrix}$	60480	$12B$	$\begin{pmatrix} 1&0&1&0&0&1&0&0\\ 1&1&1&0&1&0&0&0\\ 1&0&1&1&0&1&1&1\\ 0&0&1&1&0&0&0&1\\ 0&1&1&0&0&1&0&1\\ 0&0&0&0&1&1&1&1\\ 1&1&0&0&1&1&1&1\\ 1&1&0&1&1&1&1&0 \end{pmatrix}$	60480
$12C$	$\begin{pmatrix} 1&0&0&1&1&0&0&1\\ 0&0&0&0&1&0&1&0\\ 0&1&1&0&1&0&1&1\\ 1&0&1&0&1&1&0&1\\ 0&1&0&1&1&0&1&1\\ 1&0&1&1&1&0&0&1\\ 1&0&1&1&0&0&0&1\\ 1&0&0&0&0&1&1&0 \end{pmatrix}$	120960	$15A$	$\begin{pmatrix} 1&0&0&0&1&1&1&0\\ 0&0&1&0&1&1&1&0\\ 0&1&0&1&0&0&0&1\\ 1&0&1&0&1&1&0&0\\ 0&0&0&1&1&1&1&0\\ 1&1&1&0&1&0&0&1\\ 0&1&0&1&1&0&0&0\\ 0&1&1&0&1&0&0&1 \end{pmatrix}$	96768

We obtain that $Sp_6(2)$ has 30 conjugacy classes and its action on 2^8 gives rise to three orbits of lengths 1, 120 and 135 with corresponding point stabilizers $Sp_6(2)$, $U_3(3){:}2$ and $2^6{:}L_3(2)$ respectively. Let ρ_1 and ρ_2 be the permutation characters of $Sp_6(2)$ of degrees 120 and 135. Then from ATLAS, we deduce that $\chi_{\rho_1} = 1a + 35a + 84a$ and $\chi_{\rho_2} = 1a + 15a + 35b + 84a$.

Suppose $\chi = \chi(Sp_6(2)|2^8)$ is the permutation character of $Sp_6(2)$ on 2^8. Then we obtain that

$$\chi = 1a + 1_{U_3(3):2}^{Sp_6(2)} + 1_{2^6:L_3(2)}^{Sp_6(2)} = 3 \times 1a + 15a + 35a + 35b + 2 \times 84a,$$

where $1_{U_3(3):2}^{Sp_6(2)}$ and $1_{2^6:L_3(2)}^{Sp_6(2)}$ are the characters of $Sp_6(2)$ induced from identity characters of $U_3(3){:}2$ and $2^6{:}L_3(2)$ respectively.

For each class representative $g \in Sp_6(2)$, $\chi(Sp_6(2)|2^8)(g)$ is equal to the number of fixed points of g in 2^8.

$[g]_{Sp_6(2)}$	$1A$	$2A$	$2B$	$2C$	$2D$	$3A$	$3B$	$3C$	$4A$	$4B$	$4C$	$4D$
$\chi(SP(6,2)\|U_3(3){:}2)$	120	0	24	0	8	0	3	6	12	0	0	4
$\chi(Sp_6(2)\|2^6{:}L_3(2))$	135	15	39	15	7	0	0	9	3	3	3	11
k	256	16	64	16	16	1	4	16	16	4	4	16
$[g]_{Sp_6(2)}$	$4E$	$5A$	$6A$	$6B$	$6C$	$6D$	$6E$	$6F$	$6G$	$7A$	$8A$	$8B$
$\chi(SP(6,2)\|U_3(3){:}2)$	0	0	0	0	3	0	0	0	2	1	2	2
$\chi(Sp_6(2)\|2^6{:}L_3(2))$	3	0	0	0	0	0	3	3	1	2	1	1
k	4	1	1	1	4	1	4	4	4	4	4	4
$[g]_{SP(6,2)}$	$9A$	$10A$	$12A$	$12B$	$12C$	$15A$						
$\chi(Sp_6(2)\|U_3(3){:}2)$	0	0	0	0	3	0						
$\chi(Sp_6(2)\|2^6{:}L_3(2))$	0	0	0	0	0	0						
k	1	1	1	1	4	1						

Now having obtained the values of the k's for each class representative $g \in Sp_6(2)$, we use Programme A.2 (See Appendix A) written in *MAGMA* [10] to find the values of f_j's corresponding to these k's. From the programme output, we calculate the number f_j of orbits Q_i's ($1 \leq i \leq k$) which have come together under the action of $C_{Sp_6(2)}(g)$ for each class representative $g \in Sp_6(2)$. We deduce that altogether we have 70 conjugacy classes of elements in $2^8{:}Sp_6(2)$, which we list in Table 7.1. In Table 7.1 we also list the d_j's where d_jg is a representative of the Δ_j, and for each $[x]_{\bar{G}}$ the order of $C_{\bar{G}}(x)$ is given in the last column of Table 7.1.

Table 7.1: The conjugacy classes of $2^8{:}Sp_6(2)$

$[g]_{Sp_6(2)}$	k	f_j	d_j	w	$[x]_{2^8:Sp_6(2)}$	$\|[x]_{2^8:Sp_6(2)}\|$	$\|C_{2^8:Sp_6(2)}(x)\|$
$1A$	256	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$1A$	1	371589120
		$f_2 = 120$	$(1,1,1,1,1,0,0,0)$	$(1,1,1,1,1,0,0,0)$	$2A$	120	3096576
		$f_3 = 135$	$(1,1,1,1,1,1,1,1)$	$(1,1,1,1,1,1,1,1)$	$2B$	135	2752512
$2A$	16	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$2C$	1008	368640
		$f_2 = 15$	$(1,1,1,1,1,1,1,1)$	$(0,1,1,0,0,1,0,1)$	$4A$	15120	24576
$2B$	64	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$2D$	1260	294912
		$f_2 = 6$	$(1,1,0,0,1,1,0,0)$	$(0,0,0,0,0,0,0,0)$	$2E$	7560	49152
		$f_3 = 9$	$(0,1,1,1,1,1,0,0)$	$(0,0,0,0,0,0,0,0)$	$2F$	11340	32768
		$f_4 = 48$	$(1,1,1,1,1,1,1,1)$	$(0,0,0,1,0,0,0,1)$	$4B$	60480	6144
$2C$	16	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$2G$	15120	24576
		$f_2 = 3$	$(1,1,1,1,0,0,0)$	$(1,0,0,1,1,1,1,1)$	$4C$	45360	8192
		$f_3 = 12$	$(1,1,1,1,1,1,1,1)$	$(0,1,1,1,1,0,1,1)$	$4D$	181440	2048

Table 7.1: The conjugacy classes of $2^8{:}Sp_6(2)$ (continued)

$[g]_{Sp_6(2)}$	k	f_j	d_j	w	$[x]_{2^8:Sp_6(2)}$	$\|[x]_{2^8:Sp_6(2)}\|$	$\|C_{2^8:Sp_6(2)}(x)\|$
$2D$	16	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$2H$	60480	6144
		$f_2 = 1$	$(1,0,0,0,1,1,1,1)$	$(1,0,1,1,0,1,1,1)$	$4E$	60480	6144
		$f_3 = 6$	$(1,1,1,1,1,1,1,1)$	$(0,1,1,0,0,1,0,1)$	$4F$	362880	1024
		$f_4 = 8$	$(1,1,1,1,1,1,1,0)$	$(1,0,0,0,0,1,0,1)$	$4G$	483840	768
$3A$	1	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$3A$	172032	2160
$3B$	4	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$3B$	143360	2592
		$f_2 = 3$	$(1,1,1,1,1,1,1,1)$	$(1,1,0,1,1,1,0,0)$	$6A$	430080	864
$3C$	16	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$3C$	215040	1728
		$f_2 = 6$	$(1,1,1,1,1,1,1,0)$	$(0,1,1,1,1,1,0,1)$	$6B$	1290240	288
		$f_3 = 9$	$(1,1,1,1,1,1,1,1)$	$(1,1,1,0,0,0,1,1)$	$6C$	1935360	192
$4A$	16	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$4H$	60480	6144
		$f_2 = 1$	$(0,0,0,0,0,1,1,1)$	$(0,0,0,0,0,0,0,0)$	$4I$	60480	6144
		$f_3 = 2$	$(0,0,1,1,1,1,1,1)$	$(0,0,0,0,0,0,0,0)$	$4J$	120960	3072
		$f_4 = 12$	$(1,1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,0,0)$	$4K$	725760	512
$4B$	4	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$4L$	483840	768
		$f_2 = 3$	$(1,1,1,1,1,1,1,1)$	$(1,1,1,0,0,0,0,1)$	$8A$	1451520	256
$4C$	4	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$4M$	483840	768
		$f_2 = 3$	$(1,1,1,1,1,1,1,1)$	$(0,1,1,1,1,0,0,1)$	$8B$	1451520	256
$4D$	16	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$4N$	181440	2048
		$f_2 = 1$	$(0,1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,0,0)$	$4O$	181440	2048
		$f_3 = 2$	$(1,0,0,1,1,1,0,1)$	$(0,0,0,0,0,0,0,0)$	$4P$	362880	1024
		$f_4 = 4$	$(1,0,0,0,0,1,0,0)$	$(0,0,0,0,0,0,0,0)$	$4Q$	725760	512
		$f_5 = 8$	$(1,1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,0,0)$	$4R$	1451520	256
$4E$	4	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$4S$	2903040	128
		$f_2 = 1$	$(0,1,0,1,0,0,1,1)$	$(1,1,0,1,1,0,0,1)$	$8C$	2903040	128
		$f_3 = 2$	$(1,1,1,1,1,1,1,1)$	$(1,1,1,0,1,1,1,1)$	$8D$	5806080	64
$5A$	1	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$5A$	12386304	30
$6A$	1	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$6D$	2580480	144
$6B$	1	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$6E$	2580480	144
$6C$	4	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$6F$	1290240	288
		$f_2 = 3$	$(1,1,1,1,1,1,1,1)$	$(0,0,0,0,0,0,0,0)$	$6G$	3870720	96
$6D$	1	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$6H$	7741440	48
$6E$	4	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$6I$	2580480	144
		$f_2 = 3$	$(1,1,1,1,1,1,1,1)$	$(0,1,0,0,1,0,1,1)$	$12A$	7741440	48
$6F$	4	$f_1 = 1$	$(0,0,0,0,0,0,0,0)$	$(0,0,0,0,0,0,0,0)$	$6J$	2580480	144
		$f_2 = 3$	$(1,1,1,1,1,1,1,1)$	$(0,1,0,0,1,0,1,1)$	$12B$	7741440	48

Table 7.1: The conjugacy classes of $2^8{:}Sp_6(2)$ (continued)

$[g]_{Sp_6(2)}$	k	f_j	d_j	w	$[x]_{2^8:Sp_6(2)}$	$\|[x]_{2^8:Sp_6(2)}\|$	$\|C_{2^8:Sp_6(2)}(x)\|$
$6G$	4	$f_1=1$	(0,0,0,0,0,0,0,0)	(0,0,0,0,0,0,0,0)	$6K$	7741440	48
		$f_2=1$	(1,1,1,1,1,1,1,1)	(1,0,1,1,0,1,1,1)	$12C$	7741440	48
		$f_3=2$	(0,0,0,0,0,0,0,1)	(0,1,1,0,1,1,0,0)	$12D$	15482880	24
$7A$	4	$f_1=1$	(0,0,0,0,0,0,0,0)	(0,0,0,0,0,0,0,0)	$7A$	13271040	28
		$f_2=1$	(1,1,1,1,1,1,1,1)	(0,1,0,0,0,1,0,0)	$14A$	13271040	28
		$f_3=1$	(1,0,1,1,1,1,1,1)	(1,1,0,0,1,0,1,1)	$14B$	13271040	28
		$f_4=1$	(0,0,1,0,1,0,1,1)	(1,0,0,0,1,1,1,1)	$14C$	13271040	28
$8A$	4	$f_1=1$	(0,0,0,0,0,0,0,0)	(0,0,0,0,0,0,0,0)	$8E$	5806080	64
		$f_2=1$	(0,0,0,1,0,0,1,0)	(0,0,0,0,0,0,0,0)	$8F$	5806080	64
		$f_3=2$	(1,0,0,0,0,1,1,0)	(0,0,0,0,0,0,0,0)	$8G$	11612160	32
$8B$	4	$f_1=1$	(0,0,0,0,0,0,0,0)	(0,0,0,0,0,0,0,0)	$8H$	5806080	64
		$f_2=1$	(0,0,0,1,0,0,0,1)	(0,0,0,0,0,0,0,0)	$8I$	5806080	64
		$f_3=2$	(1,1,1,1,1,1,1,1)	(0,0,0,0,0,0,0,0)	$8J$	11612160	32
$9A$	1	$f_1=1$	(0,0,0,0,0,0,0,0)	(0,0,0,0,0,0,0,0)	$9A$	41287680	9
$10A$	1	$f_1=1$	(0,0,0,0,0,0,0,0)	(0,0,0,0,0,0,0,0)	$10A$	37158912	10
$12A$	1	$f_1=1$	(0,0,0,0,0,0,0,0)	(0,0,0,0,0,0,0,0)	$12E$	15482880	24
$12B$	1	$f_1=1$	(0,0,0,0,0,0,0,0)	(0,0,0,0,0,0,0,0)	$12F$	15482880	24
$12C$	4	$f_1=1$	(0,0,0,0,0,0,0,0)	(0,0,0,0,0,0,0,0)	$12G$	7741440	48
		$f_2=1$	(1,1,1,1,1,1,1,1)	(0,0,0,0,0,0,0,0)	$12H$	7741440	48
		$f_3=1$	(1,1,1,0,0,1,0,0)	(0,0,0,0,0,0,0,0)	$12I$	7741440	48
		$f_4=1$	(1,0,1,0,0,1,1,0)	(0,0,0,0,0,0,0,0)	$12J$	7741440	48
$15A$	1	$f_1=1$	(0,0,0,0,0,0,0,0)	(0,0,0,0,0,0,0,0)	$15A$	24772608	15

7.2 The Inertia Groups of $2^8{:}Sp_6(2)$

We know that when $Sp_6(2)$ acts on the conjugacy classes of 2^8, it forms three orbits of lengths 1, 120 and 135. Thus by Brauer's theorem (Theorem 2.5.7) $Sp_6(2)$ acting on $Irr(2^8)$ will also produce three orbits of length 1, s and t such that $s+t=255$. From ATLAS by checking the indices of maximal subgroups of $Sp_6(2)$, we obtain that $s=120$ and $t=135$. We deduce that there are three inertia groups $\bar{H}_i = 2^8{:}H_i$ of indices 1, 120 and 135 in $2^8{:}Sp_6(2)$ respectively where $i \in \{1,2,3\}$ and $H_i \leq Sp_6(2)$. We observe that $H_1 = Sp_6(2)$, $H_2 = U_3(3){:}2$ and $H_3 = 2^6{:}L_3(2)$. We can also show that

$$H_2 = <\alpha_1, \beta_1>, \alpha_1 \in 3C, \beta_1 \in 8B$$

and

$$H_3 = <\alpha_2, \beta_2>, \alpha_2 \in 2B, \beta_2 \in 7A$$

where $2B$, $3C$, $7A$ and $8B$ are conjugacy classes of elements of $Sp_6(2)$.

The groups $U_3(3){:}2$ and $2^6{:}L_3(2)$ are maximal subgroups of $Sp_6(2)$ of indices 120 and 135 respectively. Now by using direct matrix conjugation in $Sp_6(2)$ and the permutation characters of $H_2 = U_3(3){:}2$ and $H_3 = 2^6{:}L_3(2)$ in $Sp_6(2)$ of degrees 120 and 135 respectively we obtain the fusions of the inertia factors H_2 and H_3 into $Sp_6(2)$.

Table 7.2: The fusion of $U_3(3){:}2$ into $Sp_6(2)$

$[g]_{SP(6,2)}$	$1A$	$2A$	$2B$	$2C$	$2D$	$3A$	$3B$	$3C$	$4A$	$4B$	$4C$	$4D$	$4E$
$[h]_{U_3(3):2}$													
$1A$	$\boxed{120}$												
$2A$		120	$\boxed{24}$	8	2								
$2B$		480	96	32	$\boxed{8}$								
$3A$						10	$\boxed{3}$						
$3B$						120	36	$\boxed{6}$					
$4A$									$\boxed{4}$	2	2		
$4B$									$\boxed{8}$	4	4		
$4C$									12	6	6	$\boxed{4}$	1
$\chi(SP(6,2)\vert U_3(3){:}2)$	120	0	24	0	8	0	3	6	12	0	0	4	0

Table 7.2: The fusion of $U_3(3){:}2$ into $Sp_6(2)$ (continued)

$[g]_{Sp_6(2)}$	$5A$	$6A$	$6B$	$6C$	$6D$	$6E$	$6F$	$6G$	$7A$	$8A$	$8B$	$9A$	$10A$
$[h]_{U_3(3):2}$													
$6A$		6	6	$\boxed{3}$	2								
$6B$		24	24	12	8	6	6	$\boxed{2}$					
$7A$									$\boxed{1}$				
$8A$										2	$\boxed{2}$		
$8B$										$\boxed{2}$	2		
$\chi(SP(6,2)\vert U_3(3){:}2)$	0	0	0	3	0	0	0	2	1	2	2	0	0

Table 7.2: The fusion of $U_3(3){:}2$ into $Sp_6(2)$ (continued)

$[g]_{SP(6,2)}$	$12A$	$12B$	$12C$	$15A$
$12A$	2	2	$\boxed{1}$	
$12B$	2	2	$\boxed{1}$	
$12C$	2	2	$\boxed{1}$	
$15A$				
$\chi(Sp_6(2)\vert U_3(3){:}2)$	0	0	3	0

Table 7.3: The fusion of $2^6{:}L_3(2)$ into $Sp_6(2)$

$[g]_{Sp_6(2)}$ / $[h]_{2^6:L_3(2)}$	1A	2A	2B	2C	2D	3A	3B	3C	4A	4B	4C	4D	4E
1A	135												
2A		15	3	1									
2B		15	3	1									
2C		45	9	3									
2D		60	12	4	1								
2E		180	36	12	3								
2F		180	36	12	3								
2G		360	72	24	6								
3A						180	54	9					
4A									3			1	
4B									3			1	
4C									6	3	3	2	
4D									6	3	3	2	
4E									6	3	3	2	
4F									12	6	6	4	1
4G									24	12	12	8	2
4H									24	12	12	8	2
$\chi(Sp_6(2)\vert 2^6{:}L_3(2))$	135	15	39	15	7	0	0	9	3	3	3	11	3

Table 7.3: The fusion of $2^6{:}L_3(2)$ into $Sp_6(2)$ (continued)

$[g]_{SP(6,2)}$ / $[h]_{2^6:L_3(2)}$	5A	6A	6B	6C	6D	6E	6F	6G	7A	8A	8B
6A		12	12	6	4	3	3	1			
6B		12	12	6	4	3	3	1			
6C		12	12	6	4	3	3	1			
7A									1		
7B									1		
8A										1	1
8B										1	1
$\chi(SP(6,2)\vert 2^6{:}L_3(2))$	0	0	0	0	0	3	3	1	2	1	1

7.3 The Fischer-Clifford Matrices of $2^8{:}Sp_6(2)$

For each conjugacy class $[g]$ of $Sp_6(2)$ with representative $g \in Sp_6(2)$, we construct the corresponding Fischer-Clifford matrix $M(g)$ of $2^8{:}Sp_6(2)$ by using the properties of Fischer-Clifford matrices which are given in Chapter 5 (Subsection 5.1.1 and Section 5.2) together with fusions given in Table 7.2 and Table 7.3.

Table 7.4: The Fischer-Clifford matrices of $2^8{:}Sp_6(2)$

$M(g)$	$M(g)$	$M(g)$
$M(1A) = \begin{pmatrix} 1 & 1 & 1 \\ 120 & 8 & -8 \\ 135 & -9 & 7 \end{pmatrix}$	$M(2A) = \begin{pmatrix} 1 & 1 \\ 15 & -1 \end{pmatrix}$	$M(2B) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 24 & 8 & -8 & 0 \\ 3 & 3 & 3 & -1 \\ 36 & -12 & 4 & 0 \end{pmatrix}$
$M(2C) = \begin{pmatrix} 1 & 1 & 1 \\ 3 & 3 & -1 \\ 12 & -4 & 0 \end{pmatrix}$	$M(2D) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 8 & -8 & 0 & 0 \\ 1 & 1 & 1 & -1 \\ 6 & 6 & -2 & 0 \end{pmatrix}$	$M(3A) = \begin{pmatrix} 1 \end{pmatrix}$
$M(3B) = \begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$	$M(3C) = \begin{pmatrix} 1 & 1 & 1 \\ 6 & 2 & -2 \\ 9 & -3 & 1 \end{pmatrix}$	$M(4A) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 4 & 4 & -4 & 0 \\ 8 & -8 & 0 & 0 \\ 3 & 3 & 3 & -1 \end{pmatrix}$
$M(4B) = \begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$	$M(4C) = \begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$	$M(4D) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 4 & 4 & -4 & 0 & 0 \\ 1 & 1 & 1 & 1 & -1 \\ 2 & 2 & 2 & -2 & 0 \\ 8 & -8 & 0 & 0 & 0 \end{pmatrix}$
$M(4E) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & -1 \\ 2 & -2 & 0 \end{pmatrix}$	$M(5A) = \begin{pmatrix} 1 \end{pmatrix}$	$M(6A) = \begin{pmatrix} 1 \end{pmatrix}$
$M(6B) = \begin{pmatrix} 1 \end{pmatrix}$	$M(6C) = \begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$	$M(6D) = \begin{pmatrix} 1 \end{pmatrix}$
$M(6E) = \begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$	$M(6F) = \begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$	$M(6G) = \begin{pmatrix} 1 & 1 & 1 \\ 2 & -2 & 0 \\ 1 & 1 & -1 \end{pmatrix}$
$M(7A) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & -1 & -1 \\ 1 & -1 & -1 & 1 \\ 1 & -1 & 1 & -1 \end{pmatrix}$	$M(8A) = \begin{pmatrix} 1 & 1 & 1 \\ 2 & -2 & 0 \\ 1 & 1 & -1 \end{pmatrix}$	$M(8B) = \begin{pmatrix} 1 & 1 & 1 \\ 2 & -2 & 0 \\ 1 & 1 & -1 \end{pmatrix}$
$M(9A) = \begin{pmatrix} 1 \end{pmatrix}$	$M(10A) = \begin{pmatrix} 1 \end{pmatrix}$	$M(12A) = \begin{pmatrix} 1 \end{pmatrix}$
$M(12B) = \begin{pmatrix} 1 \end{pmatrix}$	$M(12C) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & -1 & -1 \\ 1 & -1 & -1 & 1 \\ 1 & -1 & 1 & -1 \end{pmatrix}$	$M(15A) = \begin{pmatrix} 1 \end{pmatrix}$

We use the above Fischer-Clifford matrices and the character tables of inertia factor groups $Sp_6(2)$, H_2 and H_3, together with the fusion of H_2 and H_3 into $Sp_6(2)$, to obtain the character table of $2^8{:}Sp_6(2)$. The set of irreducible characters of $2^8{:}Sp_6(2)$ will be partitioned into three blocks B_1, B_2 and B_3 corresponding to the inertia factors $H_1 = Sp_6(2)$, H_2 and H_3 respectively. The complete character table of $2^8{:}Sp_6(2)$ is displayed in Table 7.5. Please note that the centralizers of the elements of $2^8{:}Sp_6(2)$ were listed in the last column of Table 7.1. The character table of $2^8{:}Sp_6(2)$ is stored in GAP Version 4r2.

Table 7.5: The character table of $2^8{:}Sp_6(2)$

	$1A$			$2A$		$2B$				$2C$			$2D$			
	$1A$	$2A$	$2B$	$2C$	$4A$	$2D$	$2E$	$2F$	$4B$	$2G$	$4C$	$4D$	$2H$	$4E$	$4F$	$4G$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	7	7	7	-5	-5	-1	-1	-1	-1	3	3	3	-1	-1	-1	-1
χ_3	15	15	15	-5	-5	7	7	7	7	3	3	3	-1	-1	-1	-1
χ_4	21	21	21	-11	-11	5	5	5	5	5	5	5	-3	-3	-3	-3
χ_5	21	21	21	9	9	-3	-3	-3	-3	1	1	1	-3	-3	-3	-3
χ_6	27	27	27	15	15	3	3	3	3	7	7	7	3	3	3	3
χ_7	35	35	35	-5	-5	3	3	3	3	-5	-5	-5	3	3	3	3
χ_8	35	35	35	15	15	11	11	11	11	7	7	7	3	3	3	3
χ_9	56	56	56	-24	-24	-8	-8	-8	-8	8	8	8	0	0	0	0
χ_{10}	70	70	70	-10	-10	-10	-10	-10	-10	6	6	6	-2	-2	-2	-2
χ_{11}	84	84	84	4	4	20	20	20	20	4	4	4	4	4	4	4
χ_{12}	105	105	105	-35	-35	1	1	1	1	5	5	5	1	1	1	1
χ_{13}	105	105	105	5	5	17	17	17	17	-3	-3	-3	-7	-7	-7	-7
χ_{14}	105	105	105	25	25	-7	-7	-7	-7	9	9	9	1	1	1	1
χ_{15}	120	120	120	40	40	-8	-8	-8	-8	8	8	8	0	0	0	0
χ_{16}	168	168	168	40	40	8	8	8	8	8	8	8	8	8	8	8
χ_{17}	189	189	189	-51	-51	-3	-3	-3	-3	13	13	13	-3	-3	-3	-3
χ_{18}	189	189	189	21	21	-3	-3	-3	-3	-11	-11	-11	-3	-3	-3	-3
χ_{19}	189	189	189	-39	-39	21	21	21	21	1	1	1	-3	-3	-3	-3
χ_{20}	210	210	210	10	10	-14	-14	-14	-14	10	10	10	2	2	2	2
χ_{21}	210	210	210	50	50	2	2	2	2	2	2	2	-6	-6	-6	-6
χ_{22}	216	216	216	-24	-24	24	24	24	24	8	8	8	0	0	0	0
χ_{23}	280	280	280	40	40	24	24	24	24	8	8	8	0	0	0	0
χ_{24}	280	280	280	-40	-40	-8	-8	-8	-8	-8	-8	-8	8	8	8	8
χ_{25}	315	315	315	-45	-45	-21	-21	-21	-21	3	3	3	3	3	3	3
χ_{26}	336	336	336	-16	-16	16	16	16	16	-16	-16	-16	0	0	0	0
χ_{27}	378	378	378	-30	-30	-6	-6	-6	-6	2	2	2	-6	-6	-6	-6
χ_{28}	405	405	405	45	45	-27	-27	-27	-27	-3	-3	-3	-3	-3	-3	-3
χ_{29}	420	420	420	20	20	4	4	4	4	-12	-12	-12	4	4	4	4
χ_{30}	512	512	512	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7.5: The character table of $2^8{:}Sp_6(2)$ (continued)

	$3A$	$3B$		$3C$			$4A$				$4B$		$4C$	
	$3A$	$3B$	$6A$	$3C$	$6B$	$6C$	$4H$	$4I$	$4J$	$4K$	$4L$	$8A$	$4M$	$8B$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	4	-2	-2	1	1	1	3	3	3	3	-3	-3	1	1
χ_3	0	-3	-3	3	3	3	-1	-1	-1	-1	1	1	-3	-3
χ_4	6	3	3	0	0	0	1	1	1	1	-3	-3	-3	-3
χ_5	6	3	3	0	0	0	5	5	5	5	3	3	-1	-1
χ_6	9	0	0	0	0	0	3	3	3	3	5	5	1	1
χ_7	5	-1	-1	2	2	2	7	7	7	7	-1	-1	-1	-1
χ_8	5	-1	-1	2	2	2	-1	-1	-1	-1	1	1	5	5
χ_9	11	2	2	2	2	2	0	0	0	0	-4	-4	4	4
χ_{10}	-5	7	7	1	1	1	2	2	2	2	2	2	2	2
χ_{11}	-6	3	3	3	3	3	4	4	4	4	0	0	0	0
χ_{12}	15	-3	-3	-3	-3	-3	5	5	5	5	-5	-5	-1	-1
χ_{13}	0	6	6	3	3	3	-3	-3	-3	-3	-1	-1	3	3
χ_{14}	0	6	6	3	3	3	-3	-3	-3	-3	-3	-3	-3	-3
χ_{15}	15	-6	-6	0	0	0	0	0	0	0	4	4	-4	-4
χ_{16}	6	6	6	-3	-3	-3	0	0	0	0	0	0	0	0
χ_{17}	9	0	0	0	0	0	-3	-3	-3	-3	1	1	1	1
χ_{18}	9	0	0	0	0	0	9	9	9	9	1	1	1	1
χ_{19}	9	0	0	0	0	0	-3	-3	-3	-3	-1	-1	-5	-5
χ_{20}	-15	-6	-6	3	3	3	6	6	6	6	-2	-2	-2	-2
χ_{21}	15	3	3	0	0	0	-2	-2	-2	-2	2	2	2	2
χ_{22}	-9	0	0	0	0	0	0	0	0	0	4	4	-4	-4
χ_{23}	-5	-8	-8	-2	-2	-2	0	0	0	0	-4	-4	4	4
χ_{24}	10	10	10	1	1	1	0	0	0	0	0	0	0	0
χ_{25}	0	-9	-9	0	0	0	-5	-5	-5	-5	3	3	3	3
χ_{26}	6	-6	-6	0	0	0	0	0	0	0	0	0	0	0
χ_{27}	-9	0	0	0	0	0	6	6	6	6	2	2	2	2
χ_{28}	0	0	0	0	0	0	-3	-3	-3	-3	-3	-3	-3	-3
χ_{29}	0	-3	-3	3	3	3	-4	-4	-4	-4	0	0	0	0
χ_{30}	-16	8	8	-4	-4	-4	0	0	0	0	0	0	0	0

Table 7.5: The character table of $2^8{:}Sp_6(2)$ (continued)

	$4D$					$4E$			$5A$	$6A$	$6B$	$6C$		$6D$
	$4N$	$4O$	$4P$	$4Q$	$4R$	$4S$	$8C$	$8D$	$5A$	$6D$	$6E$	$6F$	$6G$	$6H$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	-1	-1	-1	-1	-1	1	1	1	2	-2	2	2	2	0
χ_3	3	3	3	3	3	1	1	1	0	-2	-2	1	1	0
χ_4	1	1	1	1	1	1	1	1	1	-2	2	-1	-1	2
χ_5	1	1	1	1	1	-1	-1	-1	1	0	0	3	3	-2
χ_6	-1	-1	-1	-1	-1	1	1	1	2	3	3	0	0	1
χ_7	-1	-1	-1	-1	-1	-1	-1	-1	0	1	-3	3	3	1
χ_8	3	3	3	3	3	1	1	1	0	3	-1	-1	-1	1
χ_9	0	0	0	0	0	0	0	0	1	-3	1	-2	-2	-1
χ_{10}	2	2	2	2	2	-2	-2	-2	0	-1	-1	-1	-1	3
χ_{11}	4	4	4	4	4	0	0	0	-1	-2	2	-1	-1	-2
χ_{12}	1	1	1	1	1	-1	-1	-1	0	1	1	1	1	-1
χ_{13}	1	1	1	1	1	-1	-1	-1	0	2	2	2	2	0
χ_{14}	-3	-3	-3	-3	-3	1	1	1	0	4	-4	2	2	0
χ_{15}	0	0	0	0	0	0	0	0	0	1	1	-2	-2	-1
χ_{16}	0	0	0	0	0	0	0	0	-2	-2	2	2	2	2
χ_{17}	-3	-3	-3	-3	-3	1	1	1	-1	-3	-3	0	0	1
χ_{18}	1	1	1	1	1	1	1	1	-1	-3	-3	0	0	1
χ_{19}	1	1	1	1	1	-1	-1	-1	-1	3	3	0	0	1
χ_{20}	-2	-2	-2	-2	-2	-2	-2	-2	0	1	1	-2	-2	1
χ_{21}	-2	-2	-2	-2	-2	-2	-2	-2	0	-1	-1	-1	-1	-1
χ_{22}	0	0	0	0	0	0	0	0	1	-3	-3	0	0	-1
χ_{23}	0	0	0	0	0	0	0	0	0	1	-3	0	0	-1
χ_{24}	0	0	0	0	0	0	0	0	0	2	-2	-2	-2	-2
χ_{25}	3	3	3	3	3	-1	-1	-1	0	0	0	3	3	0
χ_{26}	0	0	0	0	0	0	0	0	1	2	-2	-2	-2	2
χ_{27}	-2	-2	-2	-2	-2	2	2	2	-2	3	3	0	0	-1
χ_{28}	5	5	5	5	5	1	1	1	0	0	0	0	0	0
χ_{29}	-4	-4	-4	-4	-4	0	0	0	0	-4	4	1	1	0
χ_{30}	0	0	0	0	0	0	0	0	2	0	0	0	0	0

Table 7.5: The character table of $2^8{:}Sp_6(2)$ (continued)

	$6E$		$6F$		$6G$			$7A$				$8A$		
	$6I$	$12A$	$6J$	$12B$	$6K$	$12C$	$12D$	$7A$	$14A$	$14B$	$14C$	$8E$	$8F$	$8G$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	-1	-1	1	1	-1	-1	-1	0	0	0	0	-1	-1	-1
χ_3	1	1	1	1	-1	-1	-1	1	1	1	1	1	1	1
χ_4	2	2	-2	-2	0	0	0	0	0	0	0	-1	-1	-1
χ_5	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1
χ_6	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1	1
χ_7	0	0	-2	-2	0	0	0	0	0	0	0	1	1	1
χ_8	2	2	0	0	0	0	0	0	0	0	0	-1	-1	-1
χ_9	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0
χ_{10}	-1	-1	-1	-1	1	1	1	0	0	0	0	0	0	0
χ_{11}	-1	-1	1	1	1	1	1	0	0	0	0	0	0	0
χ_{12}	1	1	1	1	1	1	1	0	0	0	0	1	1	1
χ_{13}	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	1	1	1
χ_{14}	-1	-1	1	1	1	1	1	0	0	0	0	-1	-1	-1
χ_{15}	-2	-2	-2	-2	0	0	0	1	1	1	1	0	0	0
χ_{16}	-1	-1	1	1	-1	-1	-1	0	0	0	0	0	0	0
χ_{17}	0	0	0	0	0	0	0	0	0	0	0	1	1	1
χ_{18}	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1
χ_{19}	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1
χ_{20}	1	1	1	1	-1	-1	-1	0	0	0	0	0	0	0
χ_{21}	2	2	2	2	0	0	0	0	0	0	0	0	0	0
χ_{22}	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0	0
χ_{23}	0	0	-2	-2	0	0	0	0	0	0	0	0	0	0
χ_{24}	1	1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0
χ_{25}	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1
χ_{26}	-2	-2	2	2	0	0	0	0	0	0	0	0	0	0
χ_{27}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{28}	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1	1
χ_{29}	1	1	-1	-1	1	1	1	0	0	0	0	0	0	0
χ_{30}	0	0	0	0	0	0	0	1	1	1	1	0	0	0

Table 7.5: The character table of $2^8{:}Sp_6(2)$ (continued)

	$8B$			$9A$	$10A$	$12A$	$12B$	$12C$				$15A$
	$8H$	$8I$	$8J$	$9A$	$10A$	$12E$	$12F$	$12G$	$12H$	$12I$	$12J$	$15A$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	1	1	0	0	-2	0	0	0	0	-1
χ_3	-1	-1	-1	0	0	-2	0	-1	-1	-1	-1	0
χ_4	-1	-1	-1	0	-1	0	0	1	1	1	1	1
χ_5	1	1	1	0	-1	0	2	-1	-1	-1	-1	1
χ_6	-1	-1	-1	0	0	-1	1	0	0	0	0	-1
χ_7	1	1	1	-1	0	-1	-1	1	1	1	1	0
χ_8	1	1	1	-1	0	1	-1	-1	-1	-1	-1	0
χ_9	0	0	0	-1	1	-1	1	0	0	0	0	1
χ_{10}	0	0	0	1	0	-1	-1	-1	-1	-1	-1	0
χ_{11}	0	0	0	0	-1	0	0	1	1	1	1	-1
χ_{12}	-1	-1	-1	0	0	1	-1	-1	-1	-1	-1	0
χ_{13}	-1	-1	-1	0	0	2	0	0	0	0	0	0
χ_{14}	-1	-1	-1	0	0	0	0	0	0	0	0	0
χ_{15}	0	0	0	0	0	1	-1	0	0	0	0	0
χ_{16}	0	0	0	0	0	0	0	0	0	0	0	1
χ_{17}	1	1	1	0	-1	1	1	0	0	0	0	-1
χ_{18}	-1	-1	-1	0	1	1	1	0	0	0	0	-1
χ_{19}	1	1	1	0	1	-1	1	0	0	0	0	-1
χ_{20}	0	0	0	0	0	1	1	0	0	0	0	0
χ_{21}	0	0	0	0	0	-1	-1	1	1	1	1	0
χ_{22}	0	0	0	0	1	1	-1	0	0	0	0	1
χ_{23}	0	0	0	1	0	-1	1	0	0	0	0	0
χ_{24}	0	0	0	1	0	0	0	0	0	0	0	0
χ_{25}	-1	-1	-1	0	0	0	0	1	1	1	1	0
χ_{26}	0	0	0	0	-1	0	0	0	0	0	0	1
χ_{27}	0	0	0	0	0	-1	-1	0	0	0	0	1
χ_{28}	1	1	1	0	0	0	0	0	0	0	0	0
χ_{29}	0	0	0	0	0	0	0	-1	-1	-1	-1	0
χ_{30}	0	0	0	-1	0	0	0	0	0	0	0	-1

Table 7.5: The character table of $2^8{:}Sp_6(2)$ (continued)

	$1A$			$2A$		$2B$				$2C$			$2D$			
	$1A$	$2A$	$2B$	$2C$	$4A$	$2D$	$2E$	$2F$	$4B$	$2G$	$4C$	$4D$	$2H$	$4E$	$4F$	$4G$
χ_{31}	120	8	-8	0	0	24	8	-8	0	0	0	0	8	-8	0	0
χ_{32}	120	8	-8	0	0	24	8	-8	0	0	0	0	-8	8	0	0
χ_{33}	720	48	-48	0	0	-48	-16	16	0	0	0	0	0	0	0	0
χ_{34}	720	48	-48	0	0	-48	-16	16	0	0	0	0	0	0	0	0
χ_{35}	840	56	-56	0	0	-24	-8	8	0	0	0	0	8	-8	0	0
χ_{36}	840	56	-56	0	0	-24	-8	8	0	0	0	0	-8	8	0	0
χ_{37}	1680	112	-112	0	0	-48	-16	16	0	0	0	0	16	-16	0	0
χ_{38}	1680	112	-112	0	0	-48	-16	16	0	0	0	0	-16	16	0	0
χ_{39}	1680	112	-112	0	0	144	48	-48	0	0	0	0	0	0	0	0
χ_{40}	2520	168	-168	0	0	120	40	-40	0	0	0	0	-24	24	0	0
χ_{41}	2520	168	-168	0	0	120	40	-40	0	0	0	0	24	-24	0	0
χ_{42}	3240	216	-216	0	0	72	24	-24	0	0	0	0	24	-24	0	0
χ_{43}	3240	216	-216	0	0	72	24	-24	0	0	0	0	-24	24	0	0
χ_{44}	5040	336	-336	0	0	48	16	-16	0	0	0	0	0	0	0	0
χ_{45}	6720	448	-448	0	0	-192	-64	64	0	0	0	0	0	0	0	0
χ_{46}	7680	512	-512	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{47}	135	-9	7	15	-1	39	-9	7	-1	15	-1	-1	7	7	-1	-1
χ_{48}	405	-27	21	45	-3	-27	21	5	-3	-3	13	-3	-3	-3	5	-3
χ_{49}	405	-27	21	45	-3	-27	21	5	-3	-3	13	-3	-3	-3	5	-3
χ_{50}	810	-54	42	90	-6	90	-6	26	-6	42	10	-6	18	18	2	-6
χ_{51}	945	-63	49	-75	5	105	-39	9	1	-3	13	-3	-7	-7	1	1
χ_{52}	945	-63	49	-15	1	129	-15	33	-7	33	-15	1	-7	-7	1	1
χ_{53}	945	-63	49	-75	5	-39	9	-7	1	45	-3	-3	-7	-7	1	1
χ_{54}	945	-63	49	105	-7	-15	33	17	-7	9	25	-7	1	1	9	-7
χ_{55}	945	-63	49	-15	1	-15	33	17	-7	-15	1	1	17	17	-7	1
χ_{56}	1080	-72	56	120	-8	24	24	24	-8	24	24	-8	8	8	8	-8
χ_{57}	1890	-126	98	-150	10	66	-30	2	2	42	10	-6	-14	-14	2	2
χ_{58}	1890	-126	98	-30	2	114	18	50	-14	18	-14	2	10	10	-6	2
χ_{59}	2835	-189	147	-45	3	-45	99	51	-21	-45	3	3	3	3	-5	3
χ_{60}	2835	-189	147	-225	15	-117	27	-21	3	39	23	-9	3	3	-5	3
χ_{61}	2835	-189	147	-225	15	27	-21	-5	3	-9	39	-9	3	3	-5	3
χ_{62}	2835	-189	147	-45	3	99	51	67	-21	3	-13	3	-21	-21	3	3
χ_{63}	2835	-189	147	135	-9	27	-21	-5	3	63	-17	-1	3	3	-5	3
χ_{64}	2835	-189	147	135	-9	-117	27	-21	3	15	-1	-1	-21	-21	3	3
χ_{65}	2835	-189	147	135	-9	27	-21	-5	3	-33	15	-1	-21	-21	3	3
χ_{66}	2835	-189	147	135	-9	171	-69	11	3	15	-1	-1	3	3	-5	3
χ_{67}	3780	-252	196	-60	4	-156	36	-28	4	36	-28	4	4	4	4	-4
χ_{68}	3780	-252	196	-60	4	132	-60	4	4	-60	4	4	4	4	4	-4
χ_{69}	5670	-378	294	270	-18	-90	6	-26	6	-18	14	-2	6	6	-10	6
χ_{70}	7560	-504	392	-120	8	-24	-24	-24	8	-24	-24	8	8	8	8	-8

Table 7.5: The character table of $2^8{:}Sp_6(2)$ (continued)

	$3A$	$3B$		$3C$			$4A$				$4B$		$4C$	
	$3A$	$3B$	$6A$	$3C$	$6B$	$6C$	$4H$	$4I$	$4J$	$4K$	$4L$	$8A$	$4M$	$8B$
χ_{31}	0	3	-1	6	2	-2	12	-4	-4	0	0	0	0	0
χ_{32}	0	3	-1	6	2	-2	-4	12	-4	0	0	0	0	0
χ_{33}	0	-9	3	0	0	0	-8	-8	8	0	0	0	0	0
χ_{34}	0	-9	3	0	0	0	-8	-8	8	0	0	0	0	0
χ_{35}	0	-6	2	6	2	-2	-12	36	-12	0	0	0	0	0
χ_{36}	0	-6	2	6	2	-2	36	-12	-12	0	0	0	0	0
χ_{37}	0	15	-5	-6	-2	2	-8	24	-8	0	0	0	0	0
χ_{38}	0	15	-5	-6	-2	2	24	-8	-8	0	0	0	0	0
χ_{39}	0	-12	4	12	4	-4	-8	-8	8	0	0	0	0	0
χ_{40}	0	9	-3	0	0	0	12	-4	-4	0	0	0	0	0
χ_{41}	0	9	-3	0	0	0	-4	12	-4	0	0	0	0	0
χ_{42}	0	0	0	0	0	0	36	-12	-12	0	0	0	0	0
χ_{43}	0	0	0	0	0	0	-12	36	-12	0	0	0	0	0
χ_{44}	0	18	-6	0	0	0	-24	-24	24	0	0	0	0	0
χ_{45}	0	6	-2	12	4	-4	0	0	0	0	0	0	0	0
χ_{46}	0	-24	8	-12	-4	4	0	0	0	0	0	0	0	0
χ_{47}	0	0	0	9	-3	1	3	3	3	-1	3	-1	3	-1
χ_{48}	0	0	0	0	0	0	-3	-3	-3	1	-3	1	-3	1
χ_{49}	0	0	0	0	0	0	-3	-3	-3	1	-3	1	-3	1
χ_{50}	0	0	0	0	0	0	6	6	6	-2	6	-2	6	-2
χ_{51}	0	0	0	9	-3	1	-3	-3	-3	1	3	-1	-9	3
χ_{52}	0	0	0	9	-3	1	-3	-3	-3	1	-3	1	-3	1
χ_{53}	0	0	0	9	-3	1	9	9	9	-3	-9	3	3	-1
χ_{54}	0	0	0	9	-3	1	-3	-3	-3	1	-3	1	-3	1
χ_{55}	0	0	0	9	-3	1	9	9	9	-3	-3	1	-3	1
χ_{56}	0	0	0	-9	3	-1	0	0	0	0	0	0	0	0
χ_{57}	0	0	0	-9	3	-1	6	6	6	-2	-6	2	-6	2
χ_{58}	0	0	0	-9	3	-1	6	6	6	-2	-6	2	-6	2
χ_{59}	0	0	0	0	0	0	3	3	3	-1	3	-1	3	-1
χ_{60}	0	0	0	0	0	0	3	3	3	-1	-3	1	9	-3
χ_{61}	0	0	0	0	0	0	-9	-9	-9	3	9	-3	-3	1
χ_{62}	0	0	0	0	0	0	-9	-9	-9	3	3	-1	3	-1
χ_{63}	0	0	0	0	0	0	3	3	3	-1	9	-3	-3	1
χ_{64}	0	0	0	0	0	0	15	15	15	-5	9	-3	-3	1
χ_{65}	0	0	0	0	0	0	3	3	3	-1	-3	1	9	-3
χ_{66}	0	0	0	0	0	0	-9	-9	-9	3	-3	1	9	-3
χ_{67}	0	0	0	9	-3	1	-12	-12	-12	4	0	0	0	0
χ_{68}	0	0	0	9	-3	1	12	12	12	-4	0	0	0	0
χ_{69}	0	0	0	0	0	0	-6	-6	-6	2	-6	2	-6	2
χ_{70}	0	0	0	-9	3	-1	0	0	0	0	0	0	0	0

Table 7.5: The character table of $2^8{:}Sp_6(2)$ (continued)

	$4D$					$4E$			$5A$	$6A$	$6B$	$6C$		$6D$
	$4N$	$4O$	$4P$	$4Q$	$4R$	$4S$	$8C$	$8D$	$5A$	$6D$	$6E$	$6F$	$6G$	$6H$
χ_{31}	4	4	-4	0	0	0	0	0	0	0	0	3	-1	0
χ_{32}	4	4	-4	0	0	0	0	0	0	0	0	3	-1	0
χ_{33}	8	8	-8	0	0	0	0	0	0	0	0	3	-1	0
χ_{34}	8	8	-8	0	0	0	0	0	0	0	0	3	-1	0
χ_{35}	-4	-4	4	0	0	0	0	0	0	0	0	6	-2	0
χ_{36}	-4	-4	4	0	0	0	0	0	0	0	0	6	-2	0
χ_{37}	8	8	-8	0	0	0	0	0	0	0	0	3	-1	0
χ_{38}	8	8	-8	0	0	0	0	0	0	0	0	3	-1	0
χ_{39}	8	8	-8	0	0	0	0	0	0	0	0	0	0	0
χ_{40}	4	4	-4	0	0	0	0	0	0	0	0	-3	1	0
χ_{41}	4	4	-4	0	0	0	0	0	0	0	0	-3	1	0
χ_{42}	-4	-4	4	0	0	0	0	0	0	0	0	0	0	0
χ_{43}	-4	-4	4	0	0	0	0	0	0	0	0	0	0	0
χ_{44}	-8	-8	8	0	0	0	0	0	0	0	0	6	-2	0
χ_{45}	0	0	0	0	0	0	0	0	0	0	0	-6	2	0
χ_{46}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{47}	11	-5	3	-1	-1	3	-1	-1	0	0	0	0	0	0
χ_{48}	5	-11	-3	1	1	1	-3	1	0	0	0	0	0	0
χ_{49}	5	-11	-3	1	1	1	-3	1	0	0	0	0	0	0
χ_{50}	6	6	6	-2	-2	2	2	-2	0	0	0	0	0	0
χ_{51}	9	-7	1	5	-3	-1	3	-1	0	0	0	0	0	0
χ_{52}	13	-3	5	-7	1	1	-3	1	0	0	0	0	0	0
χ_{53}	-11	5	-3	1	1	3	-1	-1	0	0	0	0	0	0
χ_{54}	-11	5	-3	1	1	-3	1	1	0	0	0	0	0	0
χ_{55}	-7	9	1	5	-3	-3	1	1	0	0	0	0	0	0
χ_{56}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{57}	-2	-2	-2	6	-2	2	2	-2	0	0	0	0	0	0
χ_{58}	6	6	6	-2	-2	-2	-2	2	0	0	0	0	0	0
χ_{59}	3	-13	-5	7	-1	3	-1	-1	0	0	0	0	0	0
χ_{60}	7	-9	-1	-5	3	-3	1	1	0	0	0	0	0	0
χ_{61}	-5	11	3	-1	-1	1	-3	1	0	0	0	0	0	0
χ_{62}	-9	7	-1	-5	3	-1	3	-1	0	0	0	0	0	0
χ_{63}	-17	-1	-9	3	3	1	-3	1	0	0	0	0	0	0
χ_{64}	11	-5	3	-1	-1	-3	1	1	0	0	0	0	0	0
χ_{65}	-1	15	7	3	-5	1	-3	1	0	0	0	0	0	0
χ_{66}	3	-13	-5	7	-1	-3	1	1	0	0	0	0	0	0
χ_{67}	4	4	4	4	-4	0	0	0	0	0	0	0	0	0
χ_{68}	-4	-4	-4	-4	4	0	0	0	0	0	0	0	0	0
χ_{69}	2	2	2	-6	2	2	2	-2	0	0	0	0	0	0
χ_{70}	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7.5: The character table of $2^8{:}Sp_6(2)$ (continued)

	$6E$		$6F$		$6G$			$7A$				$8A$		
	$6I$	$12A$	$6J$	$12B$	$6K$	$12C$	$12D$	$7A$	$14A$	$14B$	$14C$	$8E$	$8F$	$8G$
χ_{31}	0	0	0	0	2	-2	0	1	1	-1	-1	2	-2	0
χ_{32}	0	0	0	0	-2	2	0	1	1	-1	-1	2	-2	0
χ_{33}	0	0	0	0	0	0	0	-1	-1	1	1	0	0	0
χ_{34}	0	0	0	0	0	0	0	-1	-1	1	1	0	0	0
χ_{35}	0	0	0	0	2	-2	0	0	0	0	0	-2	2	0
χ_{36}	0	0	0	0	-2	2	0	0	0	0	0	-2	2	0
χ_{37}	0	0	0	0	-2	2	0	0	0	0	0	0	0	0
χ_{38}	0	0	0	0	2	-2	0	0	0	0	0	0	0	0
χ_{39}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{40}	0	0	0	0	0	0	0	0	0	0	0	-2	2	0
χ_{41}	0	0	0	0	0	0	0	0	0	0	0	-2	2	0
χ_{42}	0	0	0	0	0	0	0	-1	-1	1	1	2	-2	0
χ_{43}	0	0	0	0	0	0	0	-1	-1	1	1	2	-2	0
χ_{44}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{45}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{46}	0	0	0	0	0	0	0	1	1	-1	-1	0	0	0
χ_{47}	3	-1	3	-1	1	1	-1	2	-2	0	0	1	1	-1
χ_{48}	0	0	0	0	0	0	0	-1	1	A	$-A$	1	1	-1
χ_{49}	0	0	0	0	0	0	0	-1	1	$-A$	A	1	1	-1
χ_{50}	0	0	0	0	0	0	0	-2	2	0	0	0	0	0
χ_{51}	-3	1	3	-1	-1	-1	1	0	0	0	0	1	1	-1
χ_{52}	3	-1	-3	1	-1	-1	1	0	0	0	0	-1	-1	1
χ_{53}	-3	1	3	-1	-1	-1	1	0	0	0	0	-1	-1	1
χ_{54}	3	-1	3	-1	1	1	-1	0	0	0	0	-1	-1	1
χ_{55}	3	-1	-3	1	-1	-1	1	0	0	0	0	1	1	-1
χ_{56}	-3	1	-3	1	-1	-1	1	2	-2	0	0	0	0	0
χ_{57}	3	-1	-3	1	1	1	-1	0	0	0	0	0	0	0
χ_{58}	-3	1	3	-1	1	1	-1	0	0	0	0	0	0	0
χ_{59}	0	0	0	0	0	0	0	0	0	0	0	-1	-1	1
χ_{60}	0	0	0	0	0	0	0	0	0	0	0	1	1	-1
χ_{61}	0	0	0	0	0	0	0	0	0	0	0	-1	-1	1
χ_{62}	0	0	0	0	0	0	0	0	0	0	0	1	1	-1
χ_{63}	0	0	0	0	0	0	0	0	0	0	0	1	1	-1
χ_{64}	0	0	0	0	0	0	0	0	0	0	0	-1	-1	1
χ_{65}	0	0	0	0	0	0	0	0	0	0	0	1	1	-1
χ_{66}	0	0	0	0	0	0	0	0	0	0	0	-1	-1	1
χ_{67}	-3	1	-3	1	1	1	-1	0	0	0	0	0	0	0
χ_{68}	-3	1	-3	1	1	1	-1	0	0	0	0	0	0	0
χ_{69}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{70}	3	-1	3	-1	-1	-1	1	0	0	0	0	0	0	0

Table 7.5: The character table of $2^8{:}Sp_6(2)$ (continued)

	$8B$			$9A$	$10A$	$12A$	$12B$	$12C$				$15A$
	$8H$	$8I$	$8J$	$9A$	$10A$	$12E$	$12F$	$12G$	$12H$	$12I$	$12J$	$15A$
χ_{31}	2	-2	0	0	0	0	0	3	-1	-1	-1	0
χ_{32}	-2	2	0	0	0	0	0	-1	3	-1	-1	0
χ_{33}	0	0	0	0	0	0	0	1	1	B	C	0
χ_{34}	0	0	0	0	0	0	0	1	1	C	B	0
χ_{35}	-2	2	0	0	0	0	0	0	0	0	0	0
χ_{36}	2	-2	0	0	0	0	0	0	0	0	0	0
χ_{37}	0	0	0	0	0	0	0	1	-3	1	1	0
χ_{38}	0	0	0	0	0	0	0	-3	1	1	1	0
χ_{39}	0	0	0	0	0	0	0	-2	-2	2	2	0
χ_{40}	-2	2	0	0	0	0	0	3	-1	-1	-1	0
χ_{41}	2	-2	0	0	0	0	0	-1	3	-1	-1	0
χ_{42}	-2	2	0	0	0	0	0	0	0	0	0	0
χ_{43}	2	-2	0	0	0	0	0	0	0	0	0	0
χ_{44}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{45}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{46}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{47}	1	1	-1	0	0	0	0	0	0	0	0	0
χ_{48}	1	1	-1	0	0	0	0	0	0	0	0	0
χ_{49}	1	1	-1	0	0	0	0	0	0	0	0	0
χ_{50}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{51}	-1	-1	1	0	0	0	0	0	0	0	0	0
χ_{52}	-1	-1	1	0	0	0	0	0	0	0	0	0
χ_{53}	1	1	-1	0	0	0	0	0	0	0	0	0
χ_{54}	-1	-1	1	0	0	0	0	0	0	0	0	0
χ_{55}	1	1	-1	0	0	0	0	0	0	0	0	0
χ_{56}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{57}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{58}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{59}	-1	-1	1	0	0	0	0	0	0	0	0	0
χ_{60}	-1	-1	1	0	0	0	0	0	0	0	0	0
χ_{61}	1	1	-1	0	0	0	0	0	0	0	0	0
χ_{62}	1	1	-1	0	0	0	0	0	0	0	0	0
χ_{63}	-1	-1	1	0	0	0	0	0	0	0	0	0
χ_{64}	1	1	-1	0	0	0	0	0	0	0	0	0
χ_{65}	-1	-1	1	0	0	0	0	0	0	0	0	0
χ_{66}	1	1	-1	0	0	0	0	0	0	0	0	0
χ_{67}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{70}	0	0	0	0	0	0	0	0	0	0	0	0

$A = \sqrt{-7}\,, \quad B = -1 + 2\sqrt{-3}\,, \quad C = -1 - 2\sqrt{-3}$

7.4 The Fusion of $2^8{:}Sp_6(2)$ into $2^8{:}O_8^+(2)$

We use the results of Section 7.1 and Chapter 2 (Section 2.2) to compute the power maps of the elements of $2^8{:}Sp_6(2)$ which we list in Table 7.6 below.

Table 7.6: The power maps of the elements of $2^8{:}Sp_6(2)$

$[g]_{Sp_6(2)}$	$[x]_{2^8:Sp_6(2)}$	2	3	5	7	$[g]_{Sp_6(2)}$	$[x]_{2^8:Sp_6(2)}$	2	3	5	7
1A	1A					2A	2C	1A			
	2A	1A					4A	2B			
	2B	1A									
2B	2D	1A				2C	2G	1A			
	2E	1A					4C	2B			
	2F	1A					4D	2B			
	4B	2B									
2D	2H	1A				3A	3A		1A		
	4E	2B									
	4F	2B									
	4G	2A									
3B	3B		1A			3C	3C		1A		
	6A	3B	2A				6B	3C	2A		
							6C	3C	2B		
4A	4H	2D				4B	4L	2G			
	4I	2D					8A	4C			
	4J	2D									
	4K	2E									
4C	4M	2G				4D	4N	2D			
	8B	4C					4O	2D			
							4P	2D			
							4Q	2E			
							4R	2F			
4E	4S	2G				5A	5A			1A	
	8C	4C									
	8D	4D									
6A	6D	3A	2C			6B	6E	3A	2D		
6C	6F	3B	2D			6D	6H	3A	2G		
	6G	3B	2E								
6E	6I	3C	2D			6F	6J	3C	2C		
	12A	6C	4B				12B	6C	4A		
6G	6K	3C	2H			7A	7A				1A
	12C	6C	4E				14A	7A			2A
	12D	6B	4G				14B	7A			2B
							14C	7A			2B

Table 7.6: The power maps of the elements of $2^8{:}Sp_6(2)$ (continued)

$[g]_{Sp_6(2)}$	$[x]_{2^8:Sp_6(2)}$	2	3	5	7	$[g]_{Sp_6(2)}$	$[x]_{2^8:Sp_6(2)}$	2	3	5	7
$8A$	$8E$	$4H$				$8B$	$8H$	$4N$			
	$8F$	$4I$					$8I$	$4O$			
	$8G$	$4K$					$8J$	$4Q$			
$9A$	$9A$		$3B$			$10A$	$10A$	$5A$		$2C$	
$12A$	$12E$	$6H$	$4L$			$12B$	$12F$	$6H$	$4M$		
$12C$	$12G$	$6F$	$4H$			$15A$	$15A$		$5A$	$3A$	
	$12H$	$6F$	$4I$								
	$12I$	$6F$	$4J$								
	$12J$	$6F$	$4J$								

We compute the fusion map of $Sp_6(2)$ into $O_8^+(2)$ using GAP. We give the complete fusion map of $Sp_6(2)$ into $O_8^+(2)$ in Table 7.7.

Table 7.7: The fusion of $Sp_6(2)$ into $O_8^+(2)$

$[g]_{Sp_6(2)}$	$\longrightarrow$	$[h]_{O_8^+(2)}$	$[g]_{Sp_6(2)}$	$\longrightarrow$	$[h]_{O_8^+(2)}$
$1A$		$1A$	$2A$		$2B$
$2B$		$2A$	$2C$		$2B$
$2D$		$2E$	$3A$		$3A$
$3B$		$3D$	$3C$		$3E$
$4A$		$4A$	$4B$		$4C$
$4C$		$4C$	$4D$		$4B$
$4E$		$4C$	$5A$		$5A$
$6A$		$6D$	$6B$		$6A$
$6C$		$6G$	$6D$		$6D$
$6E$		$6H$	$6F$		$6K$
$6G$		$6N$	$7A$		$7A$
$8A$		$8A$	$8B$		$8B$
$9A$		$9A$	$10A$		$10A$
$12A$		$12E$	$12B$		$12E$
$12C$		$12D$	$15A$		$15A$

This fusion will also help us to determine the fusion map from $2^8{:}Sp_6(2)$ to $2^8{:}O_8^+(2)$. The power maps of $2^8{:}O_8^+(2)$ are given in GAP. In order to complete the fusion of $2^8{:}Sp_6(2)$ into $2^8{:}O_8^+(2)$ we sometimes use the technique of set intersection, as we used in Chapter 6 (Section 6.8). For more details regarding the technique of set intersection we refer to Moori [72] and Mpono [88].

We give the complete list of class fusions of $2^8{:}Sp_6(2)$ into $2^8{:}O_8^+(2)$ in Table 7.8.

Table 7.8: The fusion of $2^8{:}Sp_6(2)$ into $2^8{:}O_8^+(2)$

$[g]_{Sp_6(2)}$	$[x]_{2^8:Sp_6(2)}$ $\longrightarrow$	$[h]_{2^8:O_8^+(2)}$	$[g]_{Sp_6(2)}$	$[x]_{2^8:Sp_6(2)}$ $\longrightarrow$	$[h]_{2^8:O_8^+(2)}$
1A	1A	1A	2A	2C	2H
	2A	2A		4A	4E
	2B	2B			
2B	2D	2C	2C	2G	2H
	2E	2D		4C	4E
	2F	2E		4D	4E
	4B	4A			
2D	2H	2J	3A	3A	3B
	4E	4G			
	4F	4H			
	4G	4I			
3B	3B	3D	3C	3C	3E
	6A	6C		6B	6D
				6C	6E
4A	4H	4J	4B	4L	4V
	4I	4K		8A	8C
	4J	4K			
	4K	4L			
4C	4M	4V	4D	4N	4M
	8B	8C		4O	4N
				4P	4O
				4Q	4P
				4R	4Q
4E	4S	4V	5A	5A	5B
	8C	8C			
	8D	8C			
6A	6D	6E	6B	6E	6H
6C	6F	6N	6D	6H	6L
	6G	6O			
6E	6I	6S	6F	6J	6V
	12A	12E		12B	12I
6G	6K	6X	7A	7A	7A
	12C	12K		14A	14A
	12D	12L		14B	14B
				14C	14C
8A	8E	8G	8B	8H	8J
	8F	8H		8I	8K
	8G	8I		8J	8L
9A	9A	9B	10A	10A	10D
12A	12E	12U	12B	12F	12U
12C	12G	12Q	15A	15A	15B
	12H	12R			
	12I	12R			
	12J	12R			

Since $2^8{:}Sp_6(2) \leq 2^8{:}O_8^+(2)$ and $2^8{:}O_8^+(2)$ is a maximal subgroup of $O_{10}^+(2)$, we have $2^8{:}Sp_6(2) \leq O_{10}^+(2)$.

The group $2^{10+16}{\cdot}O_{10}^+(2)$ is a maximal subgroup of the sporadic simple group *Monster*. Let D be the factor $2^{16}{:}D_5(2)$ of this maximal subgroup. Fischer [33] showed that a group S of the form $2^8{:}Sp_6(2)$ is one of the inertia factors of D. The group S is a maximal subgroup of $2^8{:}O_8^+(2)$ and it is not isomorphic to our group. Infact Fischer [33] showed that the inertia factors of S are $Sp_6(2)$, $2^5{:}S_6$, $W(E_6)'$, $Sp_6(2)$, $2^5{:}S_6$, and A_8. As the group S has 168 conjugacy classes of elements, therefore the group $\bar{G} = 2^8{:}Sp_6(2)$ that has been studied in this chapter is not isomorphic to S. Note that our group $\bar{G}$ has only 70 conjugacy classes of elements.

Chapter 8

A Maximal Subgroup of Fi_{24}'

The Fischer group Fi_{24}' is the largest sporadic simple Fischer group of order

$$1255205709190661721292800 = 2^{21}.3^{16}.5^{2}.7^{3}.11.13.17.23.29 \ .$$

The group Fi_{24}' is the derived subgroup of the Fischer 3-transposition group Fi_{24} discovered by Bernd Fischer [30]. There are five classes of elements of order 3 in Fi_{24}' as represented in ATLAS by $3A$, $3B$, $3C$, $3D$ and $3E$. A subgroup of Fi_{24}' of order 3 is called of type $3X$, where $X \in \{A, B, C, D, E\}$, if it is generated by an element in the class $3X$. There are six classes of maximal 3-local subgroups of Fi_{24}' as determined by Wilson in [111]. In this chapter we shall determine the Fischer-Clifford matrices and conjugacy classes of one of these maximal 3-local subgroups $\bar{G} := N_{Fi_{24}'}(<N>) \cong 3^{7}{\cdot}O_{7}(3)$, where $N \cong 3^{7}$ is the natural orthogonal module for $\bar{G}/N \cong O_{7}(3)$ with 364 subgroups of type $3B$ corresponding to the totally isotropic points. The group $\bar{G}$ is a non-split extension of N by $G \cong O_{7}(3)$. In Section 8.1 we discuss the action of G on N. Section 8.2 deals with the inertia groups of $\bar{G}$. We also compute the projective characters of one of the inertia factors corresponding to the factor set α of order 3, which will be required in Section 8.4. The fusions of the inertia factors into G is obtained in Section 8.3. In Section 8.4 we are concerned with the Fischer-Clifford matrices and the conjugacy classes of $\bar{G}$.

8.1 The Action of $O_7(3)$ on 3^7

We know that $O_7(3)$ acts naturally on 3^7. The action of $O_7(3)$ on 3^7 gives rise to four orbits of lengths 1, 702, 728 and 756 and hence four point stabilizes $O_7(3)$, $2U_4(3)$, $3^5{:}U_4(2)$ and $L_4(3)$ respectively. Let $\chi(O_7(3)|2U_4(3))$, $\chi(O_7(3)|3^5{:}U_4(2))$ and $\chi(O_7(3)|L_4(3))$ be the permutation characters of $O_7(3)$ on $2U_4(3)$, $3^5{:}U_4(2)$ and $L_4(3)$ respectively. Then using GAP [104] and by considering the fact that $\chi(O_7(3)|3^7)(g) = 3^n$ for all $g \in O_7(3)$ and for some $n \in \{0, 1, \dots, 7\}$, we obtain that

$$\begin{aligned}\chi(O_7(3)|2U_4(3)) &= 1a + 78a + 168a + 182a + 273a,\\ \chi(O_7(3)|3^5{:}U_4(2)) &= 1a + 91a + 168a + 195a + 273a,\\ \chi(O_7(3)|L_4(3)) &= 1a + 105a + 182a + 195a + 273a,\end{aligned}$$

where $1a$, $78a$, $91a$, $105a$, $168a$, $182a$, $195a$ and $273a$ are irreducible characters of $O_7(3)$ of degrees 1, 91, 105, 168, 182, 195 and 273 respectively. Then we have

$$\begin{aligned}\chi(O_7(3)|3^7) &= 1 + I_{2U_4(3)}^{O_7(3)} + I_{3^5:U_4(2)}^{O_7(3)} + I_{L_4(3)}^{O_7(3)}\\ &= 1a + 1a + 91a + 168a + 195a + 273a + 1a + 105a + 182a + 195a + 273a\\ &\quad +1a + 105a + 182a + 195a + 273a\\ &= 4 \times 1a + 91a + 2 \times 105a + 168a + 2 \times 182a + 3 \times 195a + 3 \times 273a\end{aligned}$$

where $I_{2U_4(3)}^{O_7(3)}$, $I_{3^5:U_4(2)}^{O_7(3)}$ and $I_{L_4(3)}^{O_7(3)}$ are the identity characters of $2U_4(3)$, $3^5{:}U_4(2)$ and $L_4(3)$ respectively induced to $O_7(3)$. For each class representative $g \in O_7(3)$, $\chi(O_7(3)|3^7)(g)$ will give us the number of fixed points k which we provide in Table 8.1.

8.2 The Inertia Groups of $3^7{\cdot}O_7(3)$

When $O_7(3)$ acts on the conjugacy classes of 3^7 it produces four orbits of lengths 1, 702, 728 and 756. Hence by Brauer's theorem (Theorem 2.5.7) $O_7(3)$ acting on $Irr(3^7)$ will also produce four orbits of lengths $1, s, t$ and u such that $s+t+u = 2186$. Now by checking the indices of the maximal subgroups of $O_7(3)$ given in the ATLAS, we can see that the only possibility is that $s = 702$, $t = 728$ and $u = 756$. We deduce that the four inertia groups are $\bar{H}_i = 3^7{:}H_i$ of indices 1, 702, 728 and 756 in $3^7{\cdot}O_7(3)$ respectively, where $i \in \{1, 2, 3, 4\}$ and $H_i \leq O_7(3)$ are the inertia factors. We also observed that the inertia factors are $H_1 = O_7(3)$, $H_2 = 2U_4(3)$, $H_3 = 3^5{:}U_4(2)$ and $H_4 = L_4(3)$ of indices 1, 702, 728 and 756 in $O_7(3)$ respectively. The (ordinary) character tables of H_1, H_2, H_3 and H_4 are given in the GAP [104]. As we will see in Section 8.4 that we need to use the projective characters of $H_2 = 2U_4(3)$. Since these projective characters are not available in GAP [104] and ATLAS we have to compute them here. The first step to find projective characters of a group is to find its Schur multiplier. In [47], D. Holt has developed a package called *Cohomolo* for calculating Schur multipliers of finite groups which is now available in GAP4. It calculates the p-th part of the Schur multiplier of a finite group for each prime p dividing the order of the group. Using Cohomolo package we calculate the Schur multiplier of $H_2 = 2U_4(3)$ for each primes dividing the order of H_2. There are four primes dividing the order of H_2 and we obtained that the Schur multiplier for the sylow p-subgroups ($p = 2, 3$) are cyclic groups of order 2 and 3 respectively. Since the sylow p-subgroups for $p = 5$ and 7 are cyclic, by Theorem 3.1.3(ii) we deduce that the Schur multiplier for these subgroups are trivial. Hence we obtained that the Schur multiplier of H_2 is the cyclic group of order 6. The projective characters of H_2 with factor set α^{-1} where $\alpha^3 \sim 1$, can be obtained from ordinary characters of the threefold proper covering group $3.H_2$ of H_2. We will see later in Section 8.4 that the projective characters of H_2 with factor set β^{-1} where $\beta^2 \sim 1$ are not required for our computations. We list the complete projective characters of H_2 corresponding to the factor set α^{-1} in Table 8.2. In Section 8.4 we will use these projective characters to compute the irreducible characters of $\bar{G} = 3^7{\cdot}O_7(3)$. Note that Table 8.2 indicates that classes $3C$, $6C$, $3D$, $6D$, $9C$, $18C$, $9D$ and $18D$ are not α^{-1}-regular by Theorem 3.3.5(iii). Thus H_2 has 31 α^{-1}-regular classes and 31 irreducible projective characters with factor set α^{-1}, as required by Theorem 3.3.5(i).

Table 8.1

$[g]_{O_7(3)}$	$1A$	$2A$	$2B$	$2C$	$3A$	$3B$	$3C$	$3D$	$3E$	$3F$	$3G$	$4A$
$\chi(O_7(3)\mid 2U_4(3))$	702	2	90	6	54	90	72	0	0	18	0	0
$\chi(O_7(3)\mid 3^5{:}U4(2))$	728	0	80	8	80	62	98	26	26	8	8	0
$\chi(O_7(3)\mid L_4(3))$	756	0	72	12	108	90	72	0	0	0	18	2
k	2187	3	243	27	243	243	243	27	27	9	27	3

$[g]_{O_7(3)}$	$4B$	$4C$	$4D$	$5A$	$6A$	$6B$	$6C$	$6D$	$6E$	$6F$	$6G$	$6H$
$\chi(O_7(3)\mid 2U_4(3))$	6	2	12	12	2	2	2	18	0	12	6	6
$\chi(O_7(3)\mid 3^5{:}U4(2))$	8	0	8	8	0	0	0	8	2	2	8	14
$\chi(O_7(3)\mid L_4(3))$	12	0	6	6	0	0	0	0	0	12	12	6
k	27	3	27	27	3	1	3	27	3	27	27	27

$[g]_{O_7(3)}$	$6I$	$6J$	$6K$	$6L$	$6M$	$6N$	$6O$	$6P$	$7A$	$8A$	$8B$	$9A$
$\chi(O_7(3)\mid 2U_4(3))$	6	6	2	0	0	0	0	0	2	0	2	12
$\chi(O_7(3)\mid 3^5{:}U4(2))$	8	8	0	2	2	2	2	2	0	0	0	2
$\chi(O_7(3)\mid L_4(3))$	12	12	0	0	0	0	0	0	0	2	0	12
k	27	27	1	3	3	3	3	3	3	3	3	27

$[g]_{O_7(3)}$	$9B$	$9C$	$9D$	$10A$	$10B$	$12A$	$12B$	$12C$	$12D$	$12E$	$12F$	$12G$
$\chi(O_7(3)\mid 2U_4(3))$	6	0	0	0	2	0	6	0	0	2	0	0
$\chi(O_7(3)\mid 3^5{:}U4(2))$	14	2	2	0	0	2	8	0	0	0	2	2
$\chi(O_7(3)\mid L_4(3))$	6	0	0	2	0	0	12	2	2	0	0	0
k	27	3	3	3	3	3	27	3	3	3	3	3

$[g]_{O_7(3)}$	$12H$	$13A$	$13B$	$14A$	$15A$	$18A$	$18B$	$18C$	$18D$	$20A$
$\chi(O_7(3)\mid 2U_4(3))$	0	0	0	2	0	2	2	2	0	0
$\chi(O_7(3)\mid 3^5{:}U4(2))$	2	0	0	0	2	0	0	0	2	0
$\chi(O_7(3)\mid L_4(3))$	0	2	2	0	0	0	0	0	0	2
k	3	3	3	3	3	3	3	3	3	3

Table 8.2: Projective characters of $H_2 = 2U_4(3)$ with factor set α^{-1}

	$1A$	$2A$	$2B$	$2C$	$3A$	$6A$	$3B$	$6B$	$3C$	$6C$	$3D$	$6D$	$4A$	$4B$
χ_1	15	15	-1	-1	6	6	3	3	0	0	0	0	3	3
χ_2	21	21	5	5	3	3	6	6	0	0	0	0	1	1
χ_3	105	105	9	9	15	15	3	3	0	0	0	0	1	1
χ_4	105	105	-7	-7	15	15	3	3	0	0	0	0	5	5
χ_5	105	105	9	9	-12	-12	12	12	0	0	0	0	1	1
χ_6	210	210	2	2	3	3	15	15	0	0	0	0	-2	-2
χ_7	315	315	-5	-5	-36	-36	9	9	0	0	0	0	3	3
χ_8	336	336	16	16	-6	-6	6	6	0	0	0	0	0	0
χ_9	360	360	8	8	-18	-18	-9	-9	0	0	0	0	0	0
χ_{10}	360	360	8	8	-18	-18	-9	-9	0	0	0	0	0	0
χ_{11}	384	384	0	0	24	24	12	12	0	0	0	0	0	0
χ_{12}	420	420	4	4	33	33	-6	-6	0	0	0	0	4	4
χ_{13}	630	630	6	6	9	9	-9	-9	0	0	0	0	2	2
χ_{14}	729	729	9	9	0	0	0	0	0	0	0	0	-3	-3
χ_{15}	756	756	-12	-12	27	27	0	0	0	0	0	0	-4	-4
χ_{16}	945	945	-15	-15	-27	-27	0	0	0	0	0	0	1	1
χ_{17}	6	-6	-2	2	-3	3	3	-3	0	0	0	0	2	-2
χ_{18}	84	-84	4	-4	-15	15	6	-6	0	0	0	0	4	-4
χ_{19}	120	-120	-8	8	-6	6	15	-15	0	0	0	0	0	0
χ_{20}	126	-126	-10	10	18	-18	9	-9	0	0	0	0	2	-2
χ_{21}	210	-210	-6	6	-24	24	-3	3	0	0	0	0	6	-6
χ_{22}	270	-270	6	-6	27	-27	0	0	0	0	0	0	2	-2
χ_{23}	270	-270	6	-6	27	-27	0	0	0	0	0	0	2	-2
χ_{24}	336	-336	16	-16	-6	6	6	-6	0	0	0	0	0	0
χ_{25}	384	-384	0	0	24	-24	12	-12	0	0	0	0	0	0
χ_{26}	420	-420	-12	12	-21	21	12	-12	0	0	0	0	-4	4
χ_{27}	630	-630	-18	18	9	-9	-9	9	0	0	0	0	2	-2
χ_{28}	630	-630	-2	2	9	-9	-9	9	0	0	0	0	-2	2
χ_{29}	630	-630	-2	2	9	-9	-9	9	0	0	0	0	-2	2
χ_{30}	840	-840	8	-8	12	-12	6	-6	0	0	0	0	0	0
χ_{31}	840	-840	8	-8	-42	42	-3	3	0	0	0	0	0	0

Table 8.2: Projective characters of $H_2 = 2U_4(3)$ with factor set α^{-1} (continued)

	$4C$	$5A$	$10A$	$6E$	$6F$	$6G$	$6H$	$6I$	$6J$	$7A$	$14A$	$7B$	$14B$
χ_1	-1	0	0	2	2	-1	-1	2	2	1	1	1	1
χ_2	1	1	1	-1	-1	2	2	2	2	0	0	0	0
χ_3	1	0	0	3	3	3	3	0	0	0	0	0	0
χ_4	1	0	0	-1	-1	-1	-1	2	2	0	0	0	0
χ_5	1	0	0	0	0	0	0	0	0	0	0	0	0
χ_6	-2	0	0	-1	-1	-1	-1	2	2	0	0	0	0
χ_7	-1	0	0	4	4	1	1	-2	-2	0	0	0	0
χ_8	0	1	1	-2	-2	-2	-2	-2	-2	0	0	0	0
χ_9	0	0	0	2	2	-1	-1	2	2	A	A	$\bar{A}$	$\bar{A}$
χ_{10}	0	0	0	2	2	-1	-1	2	2	$\bar{A}$	$\bar{A}$	A	A
χ_{11}	0	-1	-1	0	0	0	0	0	0	-1	-1	-1	-1
χ_{12}	0	0	0	1	1	-2	-2	-2	-2	0	0	0	0
χ_{13}	-2	0	0	-3	-3	3	3	0	0	0	0	0	0
χ_{14}	1	-1	-1	0	0	0	0	0	0	1	1	1	1
χ_{15}	0	1	1	3	3	0	0	0	0	0	0	0	0
χ_{16}	1	0	0	-3	-3	0	0	0	0	0	0	0	0
χ_{17}	0	1	-1	1	-1	1	-1	-2	2	-1	1	-1	1
χ_{18}	0	-1	1	1	-1	-2	2	-2	2	0	0	0	0
χ_{19}	0	0	0	-2	2	1	-1	-2	2	1	-1	1	-1
χ_{20}	0	1	-1	2	-2	-1	1	2	-2	0	0	0	0
χ_{21}	0	0	0	0	0	3	-3	0	0	0	0	0	0
χ_{22}	0	0	0	3	-3	0	0	0	0	$-A$	A	$-\bar{A}$	$\bar{A}$
χ_{23}	0	0	0	3	-3	0	0	0	0	$-\bar{A}$	$\bar{A}$	$-A$	A
χ_{24}	0	1	-1	-2	2	-2	2	-2	2	0	0	0	0
χ_{25}	0	-1	1	0	0	0	0	0	0	-1	1	-1	1
χ_{26}	0	0	0	3	-3	0	0	0	0	0	0	0	0
χ_{27}	0	0	0	-3	3	-3	3	0	0	0	0	0	0
χ_{28}	0	0	0	1	-1	1	-1	-2	2	0	0	0	0
χ_{29}	0	0	0	1	-1	1	-1	-2	2	0	0	0	0
χ_{30}	0	0	0	-4	4	2	-2	2	-2	0	0	0	0
χ_{31}	0	0	0	2	-2	-1	1	2	-2	0	0	0	0

Table 8.2: Projective characters of $H_2 = 2U_4(3)$ with factor set α^{-1} (continued)

	$8A$	$8B$	$9A$	$18A$	$9B$	$18B$	$9C$	$18C$	$9D$	$18D$	$12A$	$12B$
χ_1	1	1	C	C	$\bar{C}$	$\bar{C}$	0	0	0	0	0	0
χ_2	-1	-1	$\bar{C}$	$\bar{C}$	C	C	0	0	0	0	1	1
χ_3	1	1	$-\bar{C}$	$-\bar{C}$	$-C$	$-C$	0	0	0	0	1	1
χ_4	-1	-1	$-\bar{C}$	$-\bar{C}$	$-C$	$-C$	0	0	0	0	-1	-1
χ_5	1	1	D	D	$-D$	$-D$	0	0	0	0	-2	-2
χ_6	0	0	$-C$	$-C$	$-\bar{C}$	$-\bar{C}$	0	0	0	0	1	1
χ_7	-1	-1	0	0	0	0	0	0	0	0	0	0
χ_8	0	0	$-D$	$-D$	D	D	0	0	0	0	0	0
χ_9	0	0	0	0	0	0	0	0	0	0	0	0
χ_{10}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{11}	0	0	C	C	$\bar{C}$	$\bar{C}$	0	0	0	0	0	0
χ_{12}	0	0	D	D	$-D$	$-D$	0	0	0	0	1	1
χ_{13}	0	0	0	0	0	0	0	0	0	0	-1	-1
χ_{14}	-1	-1	0	0	0	0	0	0	0	0	0	0
χ_{15}	0	0	0	0	0	0	0	0	0	0	-1	-1
χ_{16}	1	1	0	0	0	0	0	0	0	0	1	1
χ_{17}	0	0	D	$-D$	$-D$	D	0	0	0	0	-1	1
χ_{18}	0	0	$-C$	C	$-\bar{C}$	$\bar{C}$	0	0	0	0	1	-1
χ_{19}	0	0	$\bar{C}$	$-\bar{C}$	C	$-C$	0	0	0	0	0	0
χ_{20}	0	0	0	0	0	0	0	0	0	0	2	-2
χ_{21}	0	0	$-D$	D	D	$-D$	0	0	0	0	0	0
χ_{22}	0	0	0	0	0	0	0	0	0	0	-1	1
χ_{23}	0	0	0	0	0	0	0	0	0	0	-1	1
χ_{24}	0	0	$-D$	D	D	$-D$	0	0	0	0	0	0
χ_{25}	0	0	C	$-C$	$\bar{C}$	$-\bar{C}$	0	0	0	0	0	0
χ_{26}	0	0	$-\bar{C}$	$\bar{C}$	$-C$	C	0	0	0	0	-1	1
χ_{27}	0	0	0	0	0	0	0	0	0	0	-1	1
χ_{28}	B	$-B$	0	0	0	0	0	0	0	0	1	-1
χ_{29}	$-B$	B	0	0	0	0	0	0	0	0	1	-1
χ_{30}	0	0	$-C$	C	$-\bar{C}$	$\bar{C}$	0	0	0	0	0	0
χ_{31}	0	0	$\bar{C}$	$-\bar{C}$	C	$-C$	0	0	0	0	0	0

$$A = (-1+\sqrt{-7})/2, \quad \bar{A} = (-1-\sqrt{-7})/2, \quad B = 2\sqrt{-1},$$
$$C = (-3-\sqrt{-3})/2, \quad \bar{C} = (-3+\sqrt{-3})/2, \quad D = \sqrt{-3}.$$

8.3 The Fusion of Inertia Factor Groups into $O_7(3)$

Using the permutation characters of $O_7(3)$ on $H_2 = 2U_4(3)$, $H_3 = 3^5{:}U_4(2)$ and $H_4 = L_4(3)$ of degrees 702, 728 and 756 respectively we are able to obtain partial fusions of $H_2 = 2U_4(3)$, $H_3 = 3^5{:}U_4(2)$ and $H_4 = L_4(3)$ into $O_7(3)$. We completed the fusions by using direct matrix conjugation in $O_7(3)$. We follow the techniques already discussed and used in Chapters 6 and 7 for fusions. The complete fusions of $2U_4(3)$, $3^5{:}U_4(2)$ and $L_4(3)$ into $O_7(3)$ are given in Tables 8.3, 8.4 and 8.5 respectively.

Table 8.3: The fusion of $2U_4(3)$ into $O_7(3)$

$[h]_{2U_4(3)}$	$\longrightarrow$	$[g]_{O_7(3)}$	$[h]_{2U_4(3)}$	$\longrightarrow$	$[g]_{O_7(3)}$	$[h]_{2U_4(3)}$	$\longrightarrow$	$[g]_{O_7(3)}$
1A		1A	2A		2A	2B		2C
2C		2B	3A		3A	3B		3C
3C		3B	3D		3F	4A		4B
4B		4C	4C		4D	5A		5A
6A		6A	6B		6C	6C		6B
6D		6K	6E		6G	6F		6D
6G		6J	6H		6F	6I		6I
6J		6H	7A		7A	7B		7A
8A		8B	8B		8B	9A		9B
9B		9B	9C		9A	9D		9A
10A		10B	12A		12B	12B		12E
14A		14A	14B		14A	18A		18C
18B		18C	18C		18B	18D		18A

Table 8.4: The fusion of $3^5{:}U_4(2)$ into $O_7(3)$

$[h]_{3^5:U_4(2)}$	$\longrightarrow$	$[g]_{O_7(3)}$	$[h]_{3^5:U_4(2)}$	$\longrightarrow$	$[g]_{O_7(3)}$	$[h]_{3^5:U_4(2)}$	$\longrightarrow$	$[g]_{O_7(3)}$
1A		1A	2A		2C	2B		2B
3A		3B	3B		3A	3C		3C
3D		3A	3E		3D	3F		3E
3G		3G	3H		3A	3I		3D
3J		3E	3K		3G	3L		3B
3M		3G	3N		3G	3O		3F
3P		3C	3Q		3F	3R		3F
3S		3G	3T		3D	3U		3E
4A		4B	4B		4D	5A		5A
6A		6E	6B		6F	6C		6D
6D		6H	6E		6G	6F		6M
6G		6L	6H		6G	6I		6M
6J		6L	6K		6I	6L		6P
6M		6I	6N		6P	6O		6J
6P		6O	6Q		6N	6R		6H
9A		9A	9B		9B	9C		9B
9D		9D	9E		9C	9F		9B
9G		9D	9H		9C	12A		12A
12B		12A	12C		12H	12D		12B
12E		12G	12F		12F	12G		12B
12H		12G	12I		12F	15A		15A
15B		15A	18A		18D			

Table 8.5: The fusion of $L_4(3)$ into $O_7(3)$

$[h]_{L_4(3)}$	$\longrightarrow$	$[g]_{O_7(3)}$	$[h]_{L_4(3)}$	$\longrightarrow$	$[g]_{O_7(3)}$	$[h]_{L_4(3)}$	$\longrightarrow$	$[g]_{O_7(3)}$
1A		1A	2A		2B	2B		2C
3A		3A	3B		3B	3C		3C
3D		3G	4A		4A	4B		4B
4C		4D	5A		5A	6A		6H
6B		6F	6C		6G	6D		6I
6E		6J	8A		8A	9A		9B
9B		9A	10A		10A	12A		12D
12B		12C	12C		12B	13A		13A
13B		13A	13C		13B	13D		13B
20A		20A	20B		20A			

8.4 The Fischer-Clifford Matrices of $3^7{\cdot}O_7(3)$

Having obtained the fusions of the inertia factors $2U_4(3)$, $3^5{:}U_4(2)$ and $L_4(3)$ into $O_7(3)$ (Tables 8.3, 8.4 and 8.5) together with properties of the Fischer-Clifford matrices discussed in Section 5.1.1, and following similar arguments given for the group $2^6{\cdot}U_4(2)$ in Section 5.5, we are able to compute the Fischer-Clifford matrices of the non-split extension $3^7{\cdot}O_7(3)$.

Consider the coset corresponding to the identity of $O_7(3)$. Clearly this is a split coset, and since the action of $O_7(3)$ on $Irr(N)$ is self-dual, we can easily determine the column weights and hence the orders of the centralizers for the classes of elements of $3^7{\cdot}O_7(3)$ corresponding to this coset. We used the results given in Subsection 5.1.1 and Section 5.2 to complete the entries of the rows of $M(1A)$. We obtain four conjugacy classes of elements of $\bar{G} = 3^7{\cdot}O_7(3)$ of orders 1, 3, 3 and 3 respectively corresponding to the identity coset. We have the following Fischer-Clifford matrix for the identity of $O_7(3)$

$$M(1A) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 702 & 0 & -27 & 27 \\ 728 & 26 & -1 & -28 \\ 756 & -27 & 27 & 0 \end{pmatrix}.$$

Let $Irr(Fi'_{24}) = \{\psi_i : 1 \leq i \leq 108\}$ be the set of irreducible characters of Fi'_{24} as listed in the ATLAS. Then we have

$[x]_{Fi'_{24}}$	$1A$	$3A$	$3B$	$3C$
ψ_2	8671	247	-77	85
ψ_3	57477	534	615	210
ψ_4	249458	370	2705	869

Let $\gamma_1, \gamma_2, \gamma_3$ and γ_4 be the rows of the Fischer-Clifford matrix $M(1A)$. Since $\langle(\psi_2)_N, 1_N\rangle = 91$, $\langle(\psi_3)_N, 1_N\rangle = 483$ and $\langle(\psi_4)_N, 1_N\rangle = 1392$ we have the decompositions $(\psi_2)_N = 91\gamma_1 + 6\gamma_2 + 6\gamma_3$, $(\psi_3)_N = 483\gamma_1 + 21\gamma_2 + 30\gamma_3 + 27\gamma_4$ and $(\psi_4)_N = 1392\gamma_1 + 105\gamma_2 + 145\gamma_3 + 91\gamma_4$. Now by considering the coefficients of γ_2, we deduce that there are characters $\chi_1, \chi_2, \chi_3 \in Irr(\bar{G})$, with $deg(\chi_1) = 6 \times 702 = 4212$, $deg(\chi_2) = 21 \times 702 = 14742$ and $deg(\chi_3) = 105 \times 702 = 73710$. Let $[\ x_1\ x_2\ \ldots\ x_s\ ]$ be the transpose of the partial entries for the projective characters of $H_2 = 2U_4(3)$ on $1A \in O_7(3)$. Then $C_2(1A)M_2(1A)$ is a $s \times 4$ matrix with the entries of the first column $702x_1 = 4212$, $702x_2 = 14742$ and $702x_3 = 73710$. Hence $x_1 = 6$, $x_2 = 21$ and $x_3 = 105$. This shows that the partial projective character table of H_2 that we need to use should contain characters $\hat{\beta}_{21}$, $\hat{\beta}_{22}$ and $\hat{\beta}_{23}$ of degrees 6, 21 and 105 respectively. Now by checking the ordinary character table of $H_2 = 2U_4(3)$ which is available in GAP and ATLAS we can see that $\hat{\beta}_{21}$, $\hat{\beta}_{22}$ and $\hat{\beta}_{23}$ do not come from the ordinary characters of H_2 as there is no ordinary character of degree 6 in H_2. Since the Schur multiplier of H_2 is the cyclic group of order 6 so three distinct projective character tables occur corresponding to the factor sets β^{-1}, α^{-1} and δ^{-1} with $\beta^2 \sim 1$, $\alpha^3 \sim 1$ and $\delta^6 \sim 1$. Now by Lemma 3.2.6 we know that each irreducible projective character with a factor set ω has its degree divisible by $o([\omega])$. Since $o([\beta]) = 2$ and 2 does not divide 21 and since $o([\delta]) = 6$ and 6 does not divide 105, we deduce that $\hat{\beta}_{21}$, $\hat{\beta}_{22}$ and $\hat{\beta}_{23}$ belong to the projective characters of H_2 with factor set α^{-1} such that $\alpha^3 \sim 1$. Hence we need to use the projective characters of H_2 with factor set α^{-1} (see Table 8.2) to obtain the irreducible characters of $\bar{G} = 3^7{\cdot}O_7(3)$ corresponding to this inertia factor.

Similarly by considering the coefficients of γ_3 in the decompositions of $(\psi_2)_N$, $(\psi_3)_N$ and $(\psi_4)_N$ we obtain that there are irreducible characters of $\bar{G}$ of degrees 4368, 21840, 7280, 10920 and 65520. Let $[\ y_1\ y_2\ \ldots\ y_t]$ be the transpose of the partial entries for the projective character table of $H_3 = 3^5{:}U_4(2)$ on $1A$. Then $C_3(1A)M_3(1A)$ is a $t \times 4$ matrix and we obtain that $y_1 = 6$, $y_2 = 30$, $y_3 = 10$, $y_4 = 15$ and $y_5 = 90$. This shows that the partial projective character table of H_3 that we need to use should contain characters $\hat{\beta}_{31}$, $\hat{\beta}_{32}$, $\hat{\beta}_{33}$, $\hat{\beta}_{34}$ and $\hat{\beta}_{35}$ of degrees 6, 30, 10, 15 and 90 respectively. Since the Schur multiplier of $H_3 = 3^5{:}U_4(2)$ is also the cyclic group of order 6, again three distinct projective character tables occur. Now by similar arguments as for H_2 we deduce that $\hat{\beta}_{31}$, $\hat{\beta}_{32}$, $\hat{\beta}_{33}$, $\hat{\beta}_{34}$, and $\hat{\beta}_{35}$ come from the ordinary characters of H_3. Hence we need to use the ordinary characters of H_3. The character table of $H_3 = 3^5{:}U_4(2)$ is available in GAP [104].

Finally by considering the coefficients of γ_4 in the decompositions of $(\psi_3)_N$ and $(\psi_4)_N$, it can be shown that the partial projective character table of $H_4 = L_4(3)$ which we have to use contain a character of degree 1. Hence this partial projective character table comes from the ordinary characters of $H_4 = L_4(3)$.

To summarize, for our computations of Fischer-Clifford matrices we need to use the projective characters of $H_2 = 2U_4(3)$ (Table 8.2) corresponding to the factor set α^{-1} with $\alpha^3 \sim 1$, the ordinary characters of $H_1 = O_7(3)$, $H_3 = 3^5{:}U_4(2)$ and $H_4 = L_4(3)$. This forces the shape of all Fischer-Clifford matrices by the results of Subsection 5.1.1. We produce altogether 183 conjugacy classes of elements of $\bar{G}$.

We use the results of Subsection 5.1.1 and Sections 5.2, 5.3 and 5.4 to compute the entries of the Fischer-Clifford matrices of $\bar{G}$ for split cosets. The fusion of $\bar{G}$ into Fi'_{24} together with the restriction of characters of Fi'_{24} to $\bar{G}$ forces the signs of the Fischer-Clifford matrices and the orders of the elements of $\bar{G}$.

For example consider the conjugacy class $3A$ of $O_7(3)$. Let $g \in 3A$. Since there are fusions from α-regular class $3A$ of H_2 and from classes of H_3 and H_4 into $3A$ of $O_7(3)$, we deduce that the coset $\bar{g}N$ is a split coset. Using similar techniques as we used in the example given in Section 5.5, and in Section 6.7, we obtain the following form of the Fischer-Clifford matrix $M(3A)$ with the possibility of change of signs for rows.

	306110016	25509168	1417176	51018336	34012224	34012224
1259712	1	1	1	1	1	1
23328	54	0	0	27	−27	−27
157464	8	8	−1	8	8	8
34992	36	9	0	−18	$18\alpha - 9\bar{\alpha}$	$-9\alpha + 18\bar{\alpha}$
34992	36	9	0	−18	$-9\alpha + 18\bar{\alpha}$	$18\alpha - 9\bar{\alpha}$
11664	108	−27	0	0	27	27
	1	12	216	6	4	4

where $\alpha = (-1+\sqrt{-3})/2$ and $\bar{\alpha} = (-1-\sqrt{-3})/2$

Let $3D$, $3E$, $3F$, $3G$, $3H$ and $3I$ be conjugacy classes of $\bar{G}$ obtained corresponding to this coset. First suppose that the above matrix is the Fischer-Clifford matrix $M(3A)$ as it is. Then by considering the restriction of $\psi_2 \in Irr(Fi'_{24})$ to $\bar{G}$, we notice that there will be no fusion from $3D$ class of $\bar{G}$ into Fi'_{24}. Hence this is not the required Fischer-Clifford matrix and the sign of the rows have to be changed. Now if we multiply the rows 4 and 5 by $\alpha = (-1+\sqrt{-3})/2$ and $\bar{\alpha} = (-1-\sqrt{-3})/2$ respectively, then the resulting character table of $\bar{G}$ does not satisfy the congruence relations (Lemma 5.2.8(iii)). By checking various other possibilities we deduce that rows 4 and 5 have to be multiplied by $\bar{\alpha}$ and α respectively in order to get the proper character table of $\bar{G}$. Hence

$$M(3A) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ 54 & 0 & 0 & 27 & -27 & -27 \\ 8 & 8 & -1 & 8 & 8 & 8 \\ 36\bar{\alpha} & 9\bar{\alpha} & 0 & -18\bar{\alpha} & 18-9\alpha & -9+18\alpha \\ 36\alpha & 9\alpha & 0 & -18\alpha & -9\bar{\alpha}+18 & 18\bar{\alpha}-9 \\ 108 & -27 & 0 & 0 & 27 & 27 \end{pmatrix}$$

Now consider the coset corresponding to the class $3B$ of $O_7(3)$. This is a non-split coset since there is a fusion from α-irregular class $3C$ of H_2. Using Programme C (Section 5.4) we find the appropriate column weights. We obtained the centralizer orders of the relevant classes by considering these column weights and by using the restriction of irreducible characters of Fi'_{24} to $\bar{G}$. We have the matrix corresponding to this coset in the following shape

	7085880	2834352	708588	262440
174960	1	1	1	1
87480	2	a	f	m
2916	−30	b	g	n
1944	45	c	h	p
	2	5	20	54

Notice that the restriction of irreducible characters of Fi'_{24} to $\bar{G}$ determine the entries for the first column. We find the remaining entries of $M(3B)$ using properties of the Fischer-Clifford matrices discussed in Subsection 5.1.1. We have

$$M(3B) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 2 & 2 & 2 & -1 \\ -30 & 24 & -3 & 0 \\ 45 & 18 & -9 & 0 \end{pmatrix}.$$

We used similar type of arguments to compute all other Fischer-Clifford matrices and conjugacy classes of $\bar{G}$. The complete list of Fischer-Clifford matrices and conjugacy classes of $\bar{G}$ are given in Tables 8.6 and 8.7 respectively.

Table 8.6: The Fischer-Clifford matrices of $3^7{\cdot}O_7(3)$

$M(g)$	$M(g)$
$M(1A) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 702 & 0 & -27 & 27 \\ 728 & 26 & -1 & -28 \\ 756 & -27 & 27 & 0 \end{pmatrix}$	$M(2A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(2B) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 90 & -9 & 0 & 9 \\ 80 & 8 & -10 & -1 \\ 72 & 0 & 9 & -9 \end{pmatrix}$	$M(2C) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 6 & 3 & -3 & 0 \\ 8 & -4 & -1 & 2 \\ 12 & 0 & 3 & -3 \end{pmatrix}$
$M(3A) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ 54 & 0 & 0 & 27 & -27 & -27 \\ 8 & 8 & -1 & 8 & 8 & 8 \\ 36\bar{\alpha} & 9\bar{\alpha} & 0 & -18\bar{\alpha} & 18-9\alpha & -9+18\alpha \\ 36\alpha & 9\alpha & 0 & -18\alpha & -9\bar{\alpha}+18 & 18\bar{\alpha}-9 \\ 108 & -27 & 0 & 0 & 27 & 27 \end{pmatrix}$	$M(3B) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 2 & 2 & 2 & -1 \\ -30 & 24 & -3 & 0 \\ 45 & 18 & -9 & 0 \end{pmatrix}$
$M(3C) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 72 & -9 & 0 & 18 & -9 \\ 2 & 2 & -1 & 2 & 2 \\ 96 & 15 & 0 & -12 & -12 \\ 72 & -9 & 0 & -9 & 18 \end{pmatrix}$	$M(3D) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & \alpha & \bar{\alpha} \\ 1 & 1 & \bar{\alpha} & \alpha \\ 24 & -3 & 0 & 0 \end{pmatrix}$
$M(3E) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & \alpha & \bar{\alpha} \\ 1 & 1 & \bar{\alpha} & \alpha \\ 24 & -3 & 0 & 0 \end{pmatrix}$	$M(3F) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 4 & -2 & -2 & 1 \\ 2 & -1 & 2 & -1 \\ 2 & 2 & -1 & -1 \end{pmatrix}$
$M(3G) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 2\bar{\alpha} & -1 & -\alpha & -\bar{\alpha} & 2\alpha & 2 & 2\bar{\alpha} \\ 2\alpha & -1 & -\bar{\alpha} & -\alpha & 2\bar{\alpha} & 2 & 2\alpha \\ \alpha & 1 & \bar{\alpha} & \alpha & \bar{\alpha} & 1 & \alpha \\ \bar{\alpha} & 1 & \alpha & \bar{\alpha} & \alpha & 1 & \bar{\alpha} \\ 2 & -1 & -1 & -1 & 2 & 2 & 2 \\ 18 & 0 & 0 & 0 & 0 & 0 & -9 \end{pmatrix}$	$M(4A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$

Table 8.6: The Fischer-Clifford matrices of $3^7{\cdot}O_7(3)$ (continued)

$M(g)$	$M(g)$
$M(4B)=\begin{pmatrix}1&1&1&1\\6&3&-3&0\\8&-4&-1&2\\12&0&3&-3\end{pmatrix}$	$M(4C)=\begin{pmatrix}1&1\\2&-1\end{pmatrix}$
$M(4D)=\begin{pmatrix}1&1&1&1\\12&0&3&-3\\8&-4&-1&2\\6&3&-3&0\end{pmatrix}$	$M(5A)=\begin{pmatrix}1&1&1&1\\12&0&3&-3\\8&-4&-1&2\\6&3&-3&0\end{pmatrix}$
$M(6A)=\begin{pmatrix}1&1\\2&-1\end{pmatrix}$	$M(6B)=\begin{pmatrix}1\end{pmatrix}$
$M(6C)=\begin{pmatrix}1&1\\2&-1\end{pmatrix}$	$M(6D)=\begin{pmatrix}1&1&1\\18&-9&0\\8&8&-1\end{pmatrix}$
$M(6E)=\begin{pmatrix}1&1\\2&-1\end{pmatrix}$	$M(6F)=\begin{pmatrix}1&1&1&1\\12&-6&3&0\\2&2&2&-1\\12&3&-6&0\end{pmatrix}$
$M(6G)=\begin{pmatrix}1&1&1&1&1\\6&-3&-3&3&0\\4\bar{\alpha}&-1+2\alpha&2-\alpha&-2\bar{\alpha}&\bar{\alpha}\\4\alpha&2\bar{\alpha}-1&-\bar{\alpha}+2&-2\alpha&\alpha\\12&3&3&0&-3\end{pmatrix}$	$M(6H)=\begin{pmatrix}1&1&1&1&1\\6&6&-3&-3&0\\2&2&2&2&-1\\12&-6&-6&3&0\\6&-3&6&-3&0\end{pmatrix}$
$M(6I)=\begin{pmatrix}1&1&1&1&1\\6&-3&-3&3&0\\4\bar{\alpha}&-1+2\alpha&2-\alpha&-2\bar{\alpha}&\bar{\alpha}\\4\alpha&2\bar{\alpha}-1&-\bar{\alpha}+2&-2\alpha&\alpha\\12&3&3&0&-3\end{pmatrix}$	$M(6J)=\begin{pmatrix}1&1&1&1\\6&3&-3&0\\8&-4&-1&2\\12&0&3&-3\end{pmatrix}$
$M(6K)=\begin{pmatrix}1\end{pmatrix}$	$M(6L)=\begin{pmatrix}1&1&1\\1&\alpha&\bar{\alpha}\\1&\bar{\alpha}&\alpha\end{pmatrix}$
$M(6M)=\begin{pmatrix}1&1&1\\1&\alpha&\bar{\alpha}\\1&\bar{\alpha}&\alpha\end{pmatrix}$	$M(6N)=\begin{pmatrix}1&1\\2&-1\end{pmatrix}$
$M(6O)=\begin{pmatrix}1&1\\2&-1\end{pmatrix}$	$M(6P)=\begin{pmatrix}1&1&1\\1&\alpha&\bar{\alpha}\\1&\bar{\alpha}&\alpha\end{pmatrix}$
$M(7A)=\begin{pmatrix}1&1&1\\1&\alpha&\bar{\alpha}\\1&\bar{\alpha}&\alpha\end{pmatrix}$	$M(8A)=\begin{pmatrix}1&1\\2&-1\end{pmatrix}$
$M(8B)=\begin{pmatrix}1&1&1\\1&\alpha&\bar{\alpha}\\1&\bar{\alpha}&\alpha\end{pmatrix}$	$M(9A)=\begin{pmatrix}1&1&1\\-1&-1&2\\6&-3&0\end{pmatrix}$

Table 8.6: The Fischer-Clifford matrices of $3^7{\cdot}O_7(3)$ (continued)

$M(g)$	$M(g)$
$M(9B) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 3\alpha & 3\bar{\alpha} & 3 & 0 & 3\bar{\alpha} & 3 & 3\alpha \\ 3\bar{\alpha} & 3\alpha & 3 & 0 & 3\alpha & 3 & 3\bar{\alpha} \\ 2 & 2 & 2 & -1 & 2 & 2 & 2 \\ 6\alpha & -3 & -3\bar{\alpha} & 0 & 6 & 6\bar{\alpha} & -3\alpha \\ 6\bar{\alpha} & -3 & -3\alpha & 0 & 6 & 6\alpha & -3\bar{\alpha} \\ 6 & -3 & -3 & 0 & 6 & 6 & -3 \end{pmatrix}$	$M(9C) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$
$M(9D) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$	$M(10A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(10B) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(12A) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$
$M(12B) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 6 & -3 & -3 & 3 & 0 \\ 4\bar{\alpha} & -1+2\alpha & 2-\alpha & -2\bar{\alpha} & \bar{\alpha} \\ 4\alpha & 2\bar{\alpha}-1 & -\bar{\alpha}+2 & -2\alpha & \alpha \\ 12 & 3 & 3 & 0 & -3 \end{pmatrix}$	$M(12C) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(12D) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(12E) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(12F) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$	$M(12G) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$
$M(12H) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(13A) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$
$M(13B) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$	$M(14A) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$
$M(15A) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$	$M(18A) = \begin{pmatrix} 1 \end{pmatrix}$
$M(18B) = \begin{pmatrix} 1 \end{pmatrix}$	$M(18C) = \begin{pmatrix} 1 & 1 & 1 \\ -1 & -1 & 2 \\ 6 & -3 & 0 \end{pmatrix}$
$M(18D) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(20A) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$

$\alpha = (-1+\sqrt{-3}\,)/2, \quad \bar{\alpha} = (-1-\sqrt{-3}\,)/2$

Table 8.7: The conjugacy classes of $3^7{\cdot}O_7(3)$

$[g]_{O_7(3)}$	$[x]_{3^7\cdot O_7(3)}$	$\lvert C_{3^7\cdot O_7(3)}(x)\rvert$	$\longrightarrow$ Fi'_{24}
$1A$	$1A$	10028164124160	$1A$
	$3A$	13264767360	$3A$
	$3B$	13774950720	$3B$
	$3C$	14285134080	$3C$
$2A$	$2A$	39191040	$2B$
	$6A$	19595520	$6B$
$2B$	$2B$	50388480	$2A$
	$6B$	559872	$6F$
	$6C$	699840	$6A$
	$6D$	629856	$6D$
$2C$	$2C$	373248	$2B$
	$6E$	62208	$6I$
	$6F$	46656	$6E$
	$6G$	31104	$6D$
$3A$	$3D$	153055008	$3D$
	$3E$	12754584	$3C$
	$3F$	708588	$3D$
	$3G$	25509168	$3B$
	$3H$	38263752	$3D$
	$3I$	38263752	$3A$
$3B$	$3J$	7085880	$3B$
	$3K$	2834352	$3C$
	$3L$	708588	$3D$
	$9A$	262440	$9B$
$3C$	$3M$	34012224	$3A$
	$3N$	1062882	$3D$
	$9B$	209952	$9C$
	$3O$	1417176	$3C$
	$3P$	1417176	$3D$
$3D$	$9C$	472392	$9A$
	$9D$	59049	$9D$
	$9E$	52488	$9C$
	$3Q$	52488	$3E$
$3E$	$9F$	472392	$9A$
	$9G$	59049	$9D$
	$9H$	52488	$9C$
	$3R$	52488	$3E$
$3F$	$3S$	26244	$3E$
	$9I$	13122	$9E$
	$9J$	13122	$9E$
	$9K$	6561	$9D$

Table 8.7: The conjugacy classes of $3^7{\cdot}O_7(3)$ (continued)

$[g]_{O_7(3)}$	$[x]_{3^7\cdot O_7(3)}$	$\lvert C_{3^7\cdot O_7(3)}(x)\rvert$	$\longrightarrow$ Fi'_{24}
$3G$	$9L$	39366	$9A$
	$9M$	6561	$9C$
	$9N$	6561	$9E$
	$9O$	6561	$9B$
	$3T$	13122	$3D$
	$9P$	13122	$9E$
	$9Q$	19683	$9D$
$4A$	$4A$	8640	$4B$
	$12A$	4320	$12D$
$4B$	$4B$	31104	$4A$
	$12B$	5184	$12E$
	$12C$	3888	$12B$
	$12D$	2592	$12A$
$4C$	$4C$	1152	$4C$
	$12E$	576	$12K$
$4D$	$4D$	5184	$4B$
	$12F$	648	$12D$
	$12G$	864	$12G$
	$12H$	432	$12L$
$5A$	$5A$	3240	$5A$
	$15A$	540	$15A$
	$15B$	405	$15B$
	$15C$	270	$15C$
$6A$	$6H$	69984	$6H$
	$6I$	34992	$6E$
$6B$	$6J$	3888	$6I$
$6C$	$6K$	11664	$6D$
	$6L$	5832	$6J$
$6D$	$6M$	69984	$6G$
	$6N$	34992	$6C$
	$6O$	2916	$6G$
$6E$	$6P$	5184	$6D$
	$18A$	2592	$18A$
$6F$	$6Q$	23328	$6A$
	$6R$	5832	$6F$
	$6S$	5832	$6G$
	$18B$	1296	$18B$
$6G$	$6T$	23328	$6J$
	$6U$	5832	$6D$
	$6V$	5832	$6J$
	$6W$	3888	$6E$
	$6X$	1944	$6I$

Table 8.7: The conjugacy classes of $3^7{\cdot}O_7(3)$ (continued)

$[g]_{O_7(3)}$	$[x]_{3^7\cdot O_7(3)}$	$\lvert C_{3^7\cdot O_7(3)}(x)\rvert$	$\longrightarrow$ Fi'_{24}
$6H$	$6Y$	11664	$6F$
	$6Z$	5832	$6C$
	$6AA$	5832	$6F$
	$6AB$	2916	$6G$
	$18C$	648	$18D$
$6I$	$6AC$	11664	$6B$
	$6AD$	2916	$6E$
	$6AE$	2916	$6H$
	$6AF$	1944	$6I$
	$6AG$	972	$6J$
$6J$	$6AH$	11664	$6D$
	$6AI$	1944	$6H$
	$6AJ$	1458	$6J$
	$6AK$	972	$6I$
$6K$	$6AL$	324	$6K$
$6L$	$18D$	648	$18C$
	$18E$	648	$18A$
	$6AM$	648	$6K$
$6M$	$18F$	648	$18C$
	$18G$	648	$18A$
	$6AN$	648	$6K$
$6N$	$6AO$	324	$6K$
	$18H$	162	$18E$
$6O$	$6AP$	324	$6K$
	$18I$	162	$18E$
$6P$	$18J$	162	$18E$
	$18K$	162	$18C$
	$6AQ$	162	$6J$
$7A$	$7A$	42	$7B$
	$21A$	42	$21C$
	$21B$	42	$21D$
$8A$	$8A$	48	$8A$
	$24A$	24	$24A$
$8B$	$8B$	48	$8C$
	$24B$	48	$24F$
	$24C$	48	$24G$
$9A$	$9R$	1458	$9B$
	$9S$	729	$9E$
	$9T$	972	$9F$

Table 8.7: The conjugacy classes of $3^7{\cdot}O_7(3)$ (continued)

$[g]_{O_7(3)}$	$[x]_{3^7\cdot O_7(3)}$	$\lvert C_{3^7\cdot O_7(3)}(x)\rvert$	$\longrightarrow$ Fi'_{24}
$9B$	$9U$	4374	$9E$
	$9V$	2187	$9C$
	$9W$	2187	$9D$
	$9X$	243	$9F$
	$9Y$	4374	$9C$
	$9Z$	4374	$9A$
	$9AA$	2187	$9E$
$9C$	$27A$	81	$27B$
	$27B$	81	$27C$
	$27C$	81	$27A$
$9D$	$27D$	81	$27C$
	$27E$	81	$27B$
	$27F$	81	$27A$
$10A$	$10A$	120	$10A$
	$30A$	60	$30A$
$10B$	$10B$	60	$10B$
	$30B$	30	$30B$
$12A$	$12I$	432	$12C$
	$36A$	432	$36A$
	$36B$	432	$36B$
$12B$	$12J$	3888	$12F$
	$12K$	972	$12A$
	$12L$	972	$12F$
	$12M$	648	$12B$
	$12N$	324	$12E$
$12C$	$12O$	216	$12D$
	$12P$	108	$12L$
$12D$	$12Q$	216	$12L$
	$12R$	108	$12G$
$12E$	$12S$	144	$12M$
	$12T$	72	$12H$
$12F$	$36C$	108	$36C$
	$36D$	108	$36B$
	$12U$	108	$12I$
$12G$	$36E$	108	$36C$
	$36F$	108	$36A$
	$12V$	108	$12J$
$12H$	$12W$	72	$12L$
	$36G$	36	$36D$
$13A$	$13A$	39	$13A$
	$39A$	39	$39A$
	$39B$	39	$39A$

Table 8.7: The conjugacy classes of $3^7{\cdot}O_7(3)$ (continued)

$[g]_{O_7(3)}$	$[x]_{3^7 \cdot O_7(3)}$	$\lvert C_{3^7 \cdot O_7(3)}(x)\rvert$	$\longrightarrow$ Fi'_{24}
$13B$	$13B$	39	$13A$
	$39C$	39	$39B$
	$39D$	39	$39B$
$14A$	$14A$	42	$14B$
	$42A$	42	$42B$
	$42B$	42	$42C$
$15A$	$15D$	45	$15B$
	$45A$	45	$45A$
	$45B$	45	$45B$
$18A$	$18L$	108	$18G$
$18B$	$18M$	108	$18H$
$18C$	$18N$	162	$18C$
	$18O$	162	$18E$
	$18P$	162	$18A$
$18D$	$18Q$	108	$18F$
	$18R$	54	$18D$
$20A$	$20A$	60	$20A$
	$60A$	60	$60A$
	$60B$	60	$60A$

The character table of $\bar{G} = 3^7{\cdot}O_7(3)$ can be obtained by using the Fischer-Clifford matrices (Table 8.6), the projective characters of the inertia factors $H_2 = 2U_4(3)$ with factor set α^{-1} (Table 8.2) and the ordinary character tables of $H_3 = 3^5{:}U_4(2)$ and $H_4 = L_4(3)$ together with the fusions of H_2, H_3 and H_4 into $O_7(3)$ (Tables 8.3, 8.4 and 8.5). The full character table of $3^7{\cdot}O_7(3)$ is available in GAP [104].

Chapter 9

A Maximal Subgroup of Fi_{24}

The Fischer group $Fi_{24} = Aut(Fi'_{24})$ is the largest 3-transposition sporadic group of order

$$1255205709190661721292800 = 2^{22}.3^{16}.5^{2}.7^{3}.11.13.17.23.29 \quad .$$

Fi_{24} is generated by a conjugacy class of 306936 transpositions. Wilson in [111] completely determined all the maximal 3-local subgroups of Fi_{24}. In Chapter 8 we computed the conjugacy classes and Fischer-Clifford matrices of the non-split extension $3^7{\cdot}O_7(3)$, which is a maximal 3-local subgroup of Fi'_{24}. In this chapter we construct the conjugacy classes and the character table of the non-split extension $3^7{\cdot}(O_7(3){:}2)$ which is a maximal 3-local subgroup of the automorphism group Fi_{24} of index 125168046080. Let $\bar{G} = 3^7{\cdot}(O_7(3){:}2)$ be the non-split extension of $N = 3^7$ by $G = O_7(3){:}2$, where N is the vector space of dimension 7 over $GF(3)$ on which G acts naturally. Using the technique of the Fischer-Clifford matrices which was fully discussed in Chapter 5 we construct the character table of $3^7{\cdot}(O_7(3){:}2)$. We use the properties of the Fischer-Clifford matrices which has been discussed in Chapter 5 (Subsection 5.1.1, Sections 5.2, 5.3 and 5.4). In Section 9.1 we study the action of $O_7(3){:}2$ on N. In Sections 9.2 and 9.3 we are concerned with the inertia groups of $\bar{G}$ and the fusions of inertia factors into $O_7(3){:}2$. In Section 9.4 we determine the Fischer-Clifford matrices and conjugacy classes of $\bar{G}$. For each conjugacy class $[g]$ of $O_7(3){:}2$ with representative $g \in O_7(3){:}2$, we construct the corresponding Fischer-Clifford matrix $M(g)$. The Fischer-Clifford matrices and conjugacy classes of $\bar{G}$ are given in Tables 9.6 and 9.7. Finally in Section 9.8 we discuss the fusions of $\bar{G}$ into Fi_{24}. However the fusion map of $3^7{\cdot}O_7(3)$ into $\bar{G}$ will be crucial in determining the fusion map of $\bar{G}$ into Fi_{24}. This will help to determine those classes of the elements of $\bar{G}$ that fuse into Fi_{24}. Those conjugacy classes of elements of $\bar{G}$ which contain classes of $3^7{\cdot}O_7(3)$ will fuse into Fi'_{24} and others will fuse into $Fi_{24} - Fi'_{24}$. The fusion map of $\bar{G}$ into Fi_{24} will be fully determined.

Küsefong proved in [64] that there exists at most one non-split extension of $O_7(3)$ by its natural module. Recently Kitazume [62] constructed the non-split extension $3^7{\cdot}(O_7(3){:}2)$ using some Moufang loop (non-associative version of groups) of order 81, which has been introduced by Griess [41] in order to construct some trilinear form and Jordon algebra. Griess [40] observed that such a group is realized as a maximal subgroup of the Fischer group Fi_{24}. For detailed information about the Moufang loop and the construction of $3^7{\cdot}(O_7(3){:}2)$ using Moufang loop, interested readers are refereed to [62], [41] and [64].

9.1 The Action of $O_7(3){:}2$ on 3^7

We known that $SO_7(3) \cong O_7(3){:}2$. By using GAP we construct the group $O_7(3){:}2$ and then act $O_7(3){:}2$ on 3^7. The action of $O_7(3){:}2$ on the conjugacy classes of $N = 3^7$ produces four orbits Δ_1, Δ_2, Δ_3 and Δ_4 such that $|\Delta_1| = 1$, $|\Delta_2| = 702$, $|\Delta_3| = 728$ and $|\Delta_4| = 756$. For $d_i \in \Delta_i$ $(1 \leq i \leq 4)$, let K_i be the point stabilizer of d_i in $O_7(3){:}2$. Then by using GAP we constructed the subgroups K_1, K_2, K_3 and K_4 and we observed that $K_1 \cong O_7(3){:}2$, $K_2 \cong 2U_4(3){:}2$, $K_3 \cong 3^5{:}U_4(2){:}2$ and $K_4 \cong L_4(3) \times 2$. The number of conjugacy classes of elements of K_2, K_3 and K_4 are 66, 73 and 58 respectively. Now by considering the maximal subgroups of $O_7(3){:}2$ (as given in ATLAS) we obtained that $K_2 \leq M_2 = 2U_4(3).(2^2)_{122}$, $K_3 \leq M_3 = 3^5{:}(U_4(2){:}2 \times 2)$ and $K_4 \leq M_4 = L_4(3){:}2_2 \times 2$. We constructed M_2, M_3 and M_4 inside $O_7(3){:}2$ and observed that each M_2, M_3 and M_4 has three different types of subgroups of the forms $2U_4(3){:}2$, $3^5{:}U_4(2{:}2$ and $L_4(3){:}2$ respectively. Let the three different subgroups in M_2 of type $2U_4(3){:}2$ be denoted by K_{21}, K_{22} and K_{23} having 63, 63 and 66 conjugacy classes respectively. Since the number of conjugacy classes of K_{23} is 66, hence $K_2 \cong K_{23}$. Similarly let the three subgroups in M_3 of type $3^5{:}U_4(2){:}2$ be K_{31}, K_{32} and K_{33} having 73, 76 and 91 conjugacy classes respectively. Since K_{31} has 73 conjugacy classes, we deduce that $K_3 \cong K_{31}$. Let K_{41}, K_{42} and K_{43} be three subgroups in M_4 of type $L_4(3){:}2$ having 49, 49 and 58 conjugacy classes respectively. As the number of conjugacy classes of K_{43} is equal to 58, we obtained that $K_4 \cong K_{43}$.

By using GAP and by considering the fact that $\chi(O_7(3){:}2 \mid 3^7)(g) = 3^n$ for all $g \in O_7(3){:}2$ and for some $n \in \{0, 1, \ldots, 7\}$ we determine the permutation characters of $O_7(3){:}2$ on K_{ij} $(2 \leq i \leq 4)$ and $(1 \leq j \leq 3)$ as following:

$$
\begin{aligned}
\chi(O_7(3){:}2 \mid K_{21}) &= 1ab + 168ab + 182ab, \\
\chi(O_7(3){:}2 \mid K_{22}) &= 1a + 78a + 168a + 182a + 273a, \\
\chi(O_7(3){:}2 \mid K_{23}) &= 1a + 78b + 168a + 182a + 273b, \\
\chi(O_7(3){:}2 \mid K_{31}) &= 1a + 91b + 168a + 195a + 273b, \\
\chi(O_7(3){:}2 \mid K_{32}) &= 1ab + 168ab + 195ab, \\
\chi(O_7(3){:}2 \mid K_{33}) &= 1a + 91a + 168a + 195a + 273a, \\
\chi(O_7(3){:}2 \mid K_{41}) &= 1ab + 182ab + 195ab, \\
\chi(O_7(3){:}2 \mid K_{42}) &= 1a + 105a + 182a + 195a + 273a, \\
\chi(O_7(3){:}2 \mid K_{43}) &= 1a + 105b + 182a + 195a + 273b,
\end{aligned}
$$

where $1ab$, $78ab$, $91ab$, $105ab$, $168ab$, $182ab$, $195ab$ and $273ab$ are irreducible characters of $O_7(3){:}2$ of degrees 1, 78, 91, 105, 168, 182, 195 and 273 respectively. Then we have

$$\begin{aligned}\chi(O_7(3){:}2 \mid 3^7) &= 1 + I_{K_2}^{O_7(3):2} + I_{K_2}^{O_7(3):2} + I_{K_3}^{O_7(3):2} \\ &= 1a + 1a + 78b + 168a + 182a + 273b + 1a + 91b + 168a + 195a + 273b \\ &\quad +1a + 105b + 182a + 195a + 273b \\ &= 4 \times 1a + 78b + 91b + 105b + 2 \times 168a + 2 \times 182a + 2 \times 195a + 3 \times 273b\end{aligned}$$

where $I_{K_2}^{O_7(3):2}$, $I_{K_3}^{O_7(3):2}$ and $I_{K_4}^{O_7(3):2}$ are the identity characters of K_2, K_3 and K_4 respectively induced to $O_7(3){:}2$. Thus for each class representative $g \in O_7(3){:}2$, the values of $\chi(O_7(3){:}2 \mid 3^7)(g)$ will give us the number of fixed points.

9.2 The Inertia Groups of $3^7{\cdot}(O_7(3){:}2)$

From Section 9.1 we know that $O_7(3){:}2$ acting on 3^7 produces four orbits of lengths 1, 702, 728 and 756 with corresponding point stabilizers K_1, K_2, K_3 and K_4 respectively. Hence by Brauer's theorem (Theorem 2.5.7) $O_7(3){:}2$ acting on $Irr(3^7)$ will also produce four orbits of lengths 1, s, t and u such that $s + t + u = 2186$. Now by checking the indices of the maximal subgroup of $O_7(3){:}2$ given in ATLAS we observed that the only possibility is that $s = 702$, $t = 728$ and $t = 756$. Let H_i be the i-th inertia factor. Then $H_1 = O_7(3){:}2$ and $H_i \in \{K_{i1}, K_{i2}, K_{i3}\}$ for $2 \leq i \leq 4$. By using character tables of K_{ij} $(2 \leq i \leq 4)$ and $(1 \leq j \leq 3)$, the values of the permutation characters $\chi(O_7(3){:}2 \mid K_{ij})$ and the fact that $\chi(O_7(3){:}2 \mid Irr(3^7))(g) = 3^n$ for all $g \in O_7(3){:}2$ and for some $n \in \{0, 1, \ldots, 7\}$ we deduce that $H_2 \cong K_{22}$, $H_3 \cong K_{33}$ and $H_4 \cong K_{42}$. In Table 9.1 we list the values of $\chi(O_7(3){:}2 \mid Irr(3^7))$, which we shall need for the determination of column weights m's of the Fischer-Clifford matrices of $\bar{G}$ in Section 9.4.

As we will see in Section 9.4 that we need to use irreducible projective characters of H_2 and ordinary irreducible characters of $H_1 = O_7(3){:}2$, H_3 and H_4 in order to compute the irreducible characters of $\bar{G} = 3^7{\cdot}(O_7(3){:}2)$. The character table of H_1 is available in GAP and ATLAS, but the projective character table of H_2 and the ordinary character tables of H_3 and H_4 are not available in GAP and ATLAS and hence we compute them here. Using GAP we compute the ordinary irreducible characters of H_3 and H_4 which are given in Tables 1 and 2 of Appendix B respectively. For the computation of projective characters of H_2 we first compute its Schur multiplier. Using Cohomolo package we obtain that the Schur multiplier of H_2 is the cyclic group of order 6. Hence three distinct projective character tables corresponding to the factor sets α^{-1}, β^{-1} and δ^{-1} such that $\beta^2 \sim 1$, $\alpha^3 \sim 1$ and $\delta^6 \sim 1$ occur but we compute here only the projective characters of H_2 corresponding to the factor set α^{-1} such that $\alpha^3 \sim 1$ as the projective characters of H_2 corresponding to the factor sets β^{-1} and δ^{-1} with $\beta^2 \sim 1$ and $\delta^6 \sim 1$ are not required for our computations. From the results of Section 3.2, the projective characters of H_2 corresponding to the factor set α^{-1} with $\alpha^3 \sim 1$ can be obtained from the proper covering group $3.H_2$ of H_2. Using similar techniques as we used for our computations for the projective characters of $2U_4(3)$ in Section 8.2 we computed the projective characters of H_2 which are listed in Table 9.2. Note that in Table 9.2 the classes $3C$, $6C$, $3D$, $6D$, $9C$, $18C$, $6S$, $6T$, $6U$ and $6V$ are not α^{-1}-regular. Hence H_2 has 53 irreducible projective characters with the same number of α^{-1}-regular classes as asserted by Theorem 3.3.5(i).

9.3 The Fusion of H_2, H_3 and H_4 into $O_7(3){:}2$

The inertia factors H_2, H_3 and H_4 are subgroups of $O_7(3){:}2$ of indices 702, 728 and 756 respectively. Using the permutation characters of $O_7(3){:}2$ of degrees 702, 728 and 756 together with the fact that $\chi(O_7(3){:}2 \mid 3^7)(g) = 3^n$ for all $g \in O_7(3){:}2$ and some $n \in \{0, 1, \ldots, 7\}$ we compute the fusions of H_2, H_3 and H_4 into $O_7(3){:}2$. The complete fusions of the inertia factors H_2, H_3 and H_4 into $O_7(3){:}2$ are given in Tables 9.3, 9.4 and 9.4 respectively.

Table 9.1

$[g]_{O_7(3):2}$	$1A$	$2A$	$2B$	$2C$	$3A$	$3B$	$3C$	$3D$	$3E$	$3F$	$4A$	$4B$	$4C$
$\chi(O_7(3){:}2 \mid H_2)$	702	2	90	6	54	90	72	0	18	0	0	6	2
$\chi(O_7(3){:}2 \mid H_3)$	728	0	80	8	80	62	98	26	8	8	0	8	0
$\chi(O_7(3){:}2 \mid H_4)$	756	0	72	12	108	90	72	0	0	18	2	12	0
k	2187	3	243	27	243	243	243	27	27	27	3	27	3

$[g]_{O_7(3):2}$	$4D$	$5A$	$6A$	$6B$	$6C$	$6D$	$6E$	$6F$	$6G$	$6H$	$6I$	$6J$	$6K$
$\chi(O_7(3){:}2 \mid H_2)$	12	12	2	2	2	18	0	12	6	6	6	6	2
$\chi(O_7(3){:}2 \mid H_3)$	8	8	0	0	0	8	2	2	8	14	8	8	0
$\chi(O_7(3){:}2 \mid H_4)$	6	6	0	0	0	0	0	12	12	6	12	12	0
k	27	27	3	3	3	27	3	27	27	27	27	27	3

$[g]_{O_7(3):2}$	$6L$	$6M$	$6N$	$7A$	$8A$	$8B$	$9A$	$9B$	$9C$	$10A$	$10B$	$12A$	$12B$
$\chi(O_7(3){:}2 \mid H_2)$	0	0	0	2	0	2	12	6	0	0	2	0	6
$\chi(O_7(3){:}2 \mid H_3)$	2	2	2	0	0	0	2	14	2	0	0	2	8
$\chi(O_7(3){:}2 \mid H_4)$	0	0	0	0	2	0	12	6	0	2	0	0	12
k	3	3	3	3	3	3	27	27	3	3	3	3	27

$[g]_{O_7(3):2}$	$12C$	$12D$	$12E$	$12F$	$12G$	$13A$	$13B$	$14A$	$15A$	$18A$	$18B$	$18C$	$20A$
$\chi(O_7(3){:}2 \mid H_2)$	0	0	2	0	0	0	0	2	0	2	2	0	0
$\chi(O_7(3){:}2 \mid H_3)$	0	0	0	2	0	0	0	0	2	0	0	2	0
$\chi(O_7(3){:}2 \mid H_4)$	2	2	0	0	2	2	2	0	0	0	0	0	2
k	3	3	3	3	3	3	3	3	3	3	3	3	3

$[g]_{O_7(3):2}$	$2D$	$2E$	$2F$	$4E$	$4F$	$4G$	$4H$	$4I$	$6O$	$6P$	$6Q$	$6R$	$6S$
$\chi(O_7(3){:}2 \mid H_2)$	234	2	30	0	0	24	4	2	18	18	36	30	2
$\chi(O_7(3){:}2 \mid H_3)$	260	4	20	0	0	32	0	4	44	26	26	20	4
$\chi(O_7(3){:}2 \mid H_4)$	234	2	30	0	0	24	4	2	18	36	18	30	2
k	729	9	81	1	1	81	9	9	81	81	81	81	9

$[g]_{O_7(3):2}$	$6T$	$6U$	$6V$	$6W$	$6X$	$6Y$	$6Z$	$8C$	$8D$	$10C$	$10D$	$10E$	$12H$
$\chi(O_7(3){:}2 \mid H_2)$	2	6	0	2	0	6	0	0	4	0	4	2	0
$\chi(O_7(3){:}2 \mid H_3)$	4	2	2	4	8	2	2	0	0	0	0	4	0
$\chi(O_7(3){:}2 \mid H_4)$	2	0	6	2	0	0	6	0	4	0	4	2	0
k	9	9	9	9	9	9	9	1	9	1	9	9	1

$[g]_{O_7(3):2}$	$12I$	$12J$	$12K$	$12L$	$12M$	$12N$	$12O$	$12P$	$12Q$	$18D$	$18E$	$18F$	$20B$
$\chi(O_7(3){:}2 \mid H_2)$	0	0	0	0	6	0	4	2	0	0	6	2	0
$\chi(O_7(3){:}2 \mid H_3)$	0	0	0	8	2	2	0	4	0	2	2	4	0
$\chi(O_7(3){:}2 \mid H_4)$	0	0	0	0	0	6	4	2	0	6	0	2	0
k	1	1	1	9	9	9	9	9	1	9	9	9	1

$[g]_{O_7(3):2}$	$24A$	$26A$	$26B$	$28A$	$28B$	$30A$	$36A$
$\chi(O_7(3){:}2 \mid H_2)$	0	0	0	0	0	0	0
$\chi(O_7(3){:}2 \mid H_3)$	0	0	0	0	0	0	0
$\chi(O_7(3){:}2 \mid H_4)$	0	0	0	0	0	0	0
k	1	1	1	1	1	1	1

Table 9.2: Projective characters of H_2 with factor set α^{-1}

	1A	2A	2B	2C	3A	6A	3B	6B	3C	6C	3D	6D	4A	4B	4C	5A	10A
χ_1	15	15	-1	-1	6	6	3	3	0	0	0	0	3	3	-1	0	0
χ_2	15	15	-1	-1	6	6	3	3	0	0	0	0	3	3	-1	0	0
χ_3	21	21	5	5	3	3	6	6	0	0	0	0	1	1	1	1	1
χ_4	21	21	5	5	3	3	6	6	0	0	0	0	1	1	1	1	1
χ_5	105	105	9	9	15	15	3	3	0	0	0	0	1	1	1	0	0
χ_6	105	105	9	9	15	15	3	3	0	0	0	0	1	1	1	0	0
χ_7	105	105	-7	-7	15	15	3	3	0	0	0	0	5	5	1	0	0
χ_8	105	105	-7	-7	15	15	3	3	0	0	0	0	5	5	1	0	0
χ_9	105	105	9	9	-12	-12	12	12	0	0	0	0	1	1	1	0	0
χ_{10}	105	105	9	9	-12	-12	12	12	0	0	0	0	1	1	1	0	0
χ_{11}	210	210	2	2	3	3	15	15	0	0	0	0	-2	-2	-2	0	0
χ_{12}	210	210	2	2	3	3	15	15	0	0	0	0	-2	-2	-2	0	0
χ_{13}	315	315	-5	-5	-36	-36	9	9	0	0	0	0	3	3	-1	0	0
χ_{14}	315	315	-5	-5	-36	-36	9	9	0	0	0	0	3	3	-1	0	0
χ_{15}	336	336	16	16	-6	-6	6	6	0	0	0	0	0	0	0	1	1
χ_{16}	336	336	16	16	-6	-6	6	6	0	0	0	0	0	0	0	1	1
χ_{17}	720	720	16	16	-36	-36	-18	-18	0	0	0	0	0	0	0	0	0
χ_{18}	384	384	0	0	24	24	12	12	0	0	0	0	0	0	0	-1	-1
χ_{19}	384	384	0	0	24	24	12	12	0	0	0	0	0	0	0	-1	-1
χ_{20}	420	420	4	4	33	33	-6	-6	0	0	0	0	4	4	0	0	0
χ_{21}	420	420	4	4	33	33	-6	-6	0	0	0	0	4	4	0	0	0
χ_{22}	630	630	6	6	9	9	-9	-9	0	0	0	0	2	2	-2	0	0
χ_{23}	630	630	6	6	9	9	-9	-9	0	0	0	0	2	2	-2	0	0
χ_{24}	729	729	9	9	0	0	0	0	0	0	0	0	-3	-3	1	-1	-1
χ_{25}	729	729	9	9	0	0	0	0	0	0	0	0	-3	-3	1	-1	-1
χ_{26}	756	756	-12	-12	27	27	0	0	0	0	0	0	-4	-4	0	1	1
χ_{27}	756	756	-12	-12	27	27	0	0	0	0	0	0	-4	-4	0	1	1
χ_{28}	945	945	-15	-15	-27	-27	0	0	0	0	0	0	1	1	1	0	0
χ_{29}	945	945	-15	-15	-27	-27	0	0	0	0	0	0	1	1	1	0	0
χ_{30}	6	-6	-2	2	-3	3	3	-3	0	0	0	0	2	-2	0	1	-1
χ_{31}	6	-6	-2	2	-3	3	3	-3	0	0	0	0	2	-2	0	1	-1
χ_{32}	84	-84	4	-4	-15	15	6	-6	0	0	0	0	4	-4	0	-1	1
χ_{33}	84	-84	4	-4	-15	15	6	-6	0	0	0	0	4	-4	0	-1	1
χ_{34}	120	-120	-8	8	-6	6	15	-15	0	0	0	0	0	0	0	0	0
χ_{35}	120	-120	-8	8	-6	6	15	-15	0	0	0	0	0	0	0	0	0
χ_{36}	126	-126	-10	10	18	-18	9	-9	0	0	0	0	2	-2	0	1	-1
χ_{37}	126	-126	-10	10	18	-18	9	-9	0	0	0	0	2	-2	0	1	-1
χ_{38}	210	-210	-6	6	-24	24	-3	3	0	0	0	0	6	-6	0	0	0
χ_{39}	210	-210	-6	6	-24	24	-3	3	0	0	0	0	6	-6	0	0	0
χ_{40}	540	-540	12	-12	54	-54	0	0	0	0	0	0	4	-4	0	0	0
χ_{41}	336	-336	16	-16	-6	6	6	-6	0	0	0	0	0	0	0	1	-1
χ_{42}	336	-336	16	-16	-6	6	6	-6	0	0	0	0	0	0	0	1	-1
χ_{43}	384	-384	0	0	24	-24	12	-12	0	0	0	0	0	0	0	-1	1
χ_{44}	384	-384	0	0	24	-24	12	-12	0	0	0	0	0	0	0	-1	1
χ_{45}	420	-420	-12	12	-21	21	12	-12	0	0	0	0	-4	4	0	0	0
χ_{46}	420	-420	-12	12	-21	21	12	-12	0	0	0	0	-4	4	0	0	0
χ_{47}	630	-630	-18	18	9	-9	-9	9	0	0	0	0	2	-2	0	0	0
χ_{48}	630	-630	-18	18	9	-9	-9	9	0	0	0	0	2	-2	0	0	0
χ_{49}	1260	-1260	-4	4	18	-18	-18	18	0	0	0	0	-4	4	0	0	0
χ_{50}	840	-840	8	-8	12	-12	6	-6	0	0	0	0	0	0	0	0	0
χ_{51}	840	-840	8	-8	12	-12	6	-6	0	0	0	0	0	0	0	0	0
χ_{52}	840	-840	8	-8	-42	42	-3	3	0	0	0	0	0	0	0	0	0
χ_{53}	840	-840	8	-8	-42	42	-3	3	0	0	0	0	0	0	0	0	0

Table 9.2: Projective characters of H_2 with factor set α^{-1} (continued)

	$6E$	$6F$	$6G$	$6H$	$6I$	$6J$	$7A$	$14A$	$8A$	$9A$	$18A$	$9B$	$18B$	$9C$	$18C$	$12A$
χ_1	2	2	-1	-1	2	2	1	1	1	A	A	$\bar{A}$	$\bar{A}$	0	0	0
χ_2	2	2	-1	-1	2	2	1	1	1	A	A	$\bar{A}$	$\bar{A}$	0	0	0
χ_3	-1	-1	2	2	2	2	0	0	-1	$\bar{A}$	$\bar{A}$	A	A	0	0	1
χ_4	-1	-1	2	2	2	2	0	0	-1	$\bar{A}$	$\bar{A}$	A	A	0	0	1
χ_5	3	3	3	3	0	0	0	0	1	$-\bar{A}$	$-\bar{A}$	$-A$	$-A$	0	0	1
χ_6	3	3	3	3	0	0	0	0	1	$-\bar{A}$	$-\bar{A}$	$-A$	$-A$	0	0	1
χ_7	-1	-1	-1	-1	2	2	0	0	-1	$-\bar{A}$	$-\bar{A}$	$-A$	$-A$	0	0	-1
χ_8	-1	-1	-1	-1	2	2	0	0	-1	$-\bar{A}$	$-\bar{A}$	$-A$	$-A$	0	0	-1
χ_9	0	0	0	0	0	0	0	0	1	B	B	$-B$	$-B$	0	0	-2
χ_{10}	0	0	0	0	0	0	0	0	1	B	B	$-B$	$-B$	0	0	-2
χ_{11}	-1	-1	-1	-1	2	2	0	0	0	$-A$	$-A$	$-\bar{A}$	$-\bar{A}$	0	0	1
χ_{12}	-1	-1	-1	-1	2	2	0	0	0	$-A$	$-A$	$-\bar{A}$	$-\bar{A}$	0	0	1
χ_{13}	4	4	1	1	-2	-2	0	0	-1	0	0	0	0	0	0	0
χ_{14}	4	4	1	1	-2	-2	0	0	-1	0	0	0	0	0	0	0
χ_{15}	-2	-2	-2	-2	-2	-2	0	0	0	$-B$	$-B$	B	B	0	0	0
χ_{16}	-2	-2	-2	-2	-2	-2	0	0	0	$-B$	$-B$	B	B	0	0	0
χ_{17}	4	4	-2	-2	4	4	-1	-1	0	0	0	0	0	0	0	0
χ_{18}	0	0	0	0	0	0	-1	-1	0	B	B	$\bar{B}$	$\bar{B}$	0	0	0
χ_{19}	0	0	0	0	0	0	-1	-1	0	A	A	$\bar{A}$	$\bar{A}$	0	0	0
χ_{20}	1	1	-2	-2	-2	-2	0	0	0	B	B	$-B$	$-B$	0	0	1
χ_{21}	1	1	-2	-2	-2	-2	0	0	0	B	B	$-B$	$-B$	0	0	1
χ_{22}	-3	-3	3	3	0	0	0	0	0	0	0	0	0	0	0	-1
χ_{23}	-3	-3	3	3	0	0	0	0	0	0	0	0	0	0	0	-1
χ_{24}	0	0	0	0	0	0	1	1	-1	0	0	0	0	0	0	0
χ_{25}	0	0	0	0	0	0	1	1	-1	0	0	0	0	0	0	0
χ_{26}	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	-1
χ_{27}	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	-1
χ_{28}	-3	-3	0	0	0	0	0	0	1	0	0	0	0	0	0	1
χ_{29}	-3	-3	0	0	0	0	0	0	1	0	0	0	0	0	0	1
χ_{30}	1	-1	1	-1	-2	2	-1	1	0	B	$-B$	$-B$	B	0	0	-1
χ_{31}	1	-1	1	-1	-2	2	-1	1	0	B	$-B$	$-B$	B	0	0	-1
χ_{32}	1	-1	-2	2	-2	2	0	0	0	$-A$	A	$-\bar{A}$	$\bar{A}$	0	0	1
χ_{33}	1	-1	-2	2	-2	2	0	0	0	$-A$	A	$-\bar{A}$	$\bar{A}$	0	0	1
χ_{34}	-2	2	1	-1	-2	2	1	-1	0	$\bar{A}$	$-\bar{A}$	A	$-A$	0	0	0
χ_{35}	-2	2	1	-1	-2	2	1	-1	0	$\bar{A}$	$-\bar{A}$	A	$-A$	0	0	0
χ_{36}	2	-2	-1	1	2	-2	0	0	0	0	0	0	0	0	0	2
χ_{37}	2	-2	-1	1	2	-2	0	0	0	0	0	0	0	0	0	2
χ_{38}	0	0	3	-3	0	0	0	0	0	$-B$	B	B	$-B$	0	0	0
χ_{39}	0	0	3	-3	0	0	0	0	0	$-B$	B	B	$-B$	0	0	0
χ_{40}	6	-6	0	0	0	0	1	-1	0	0	0	0	0	0	0	-2
χ_{41}	-2	2	-2	2	-2	2	0	0	0	$-B$	B	B	$-B$	0	0	0
χ_{42}	-2	2	-2	2	-2	2	0	0	0	$-B$	B	B	$-B$	0	0	0
χ_{43}	0	0	0	0	0	0	-1	1	0	A	$-A$	$\bar{A}$	$-\bar{A}$	0	0	0
χ_{44}	0	0	0	0	0	0	-1	1	0	A	$-A$	$\bar{A}$	$-\bar{A}$	0	0	0
χ_{45}	3	-3	0	0	0	0	0	0	0	$-\bar{A}$	$\bar{A}$	$-A$	A	0	0	-1
χ_{46}	3	-3	0	0	0	0	0	0	0	$-\bar{A}$	$\bar{A}$	$-A$	A	0	0	-1
χ_{47}	-3	3	-3	3	0	0	0	0	0	0	0	0	0	0	0	-1
χ_{48}	-3	3	-3	3	0	0	0	0	0	0	0	0	0	0	0	-1
χ_{49}	2	-2	2	-2	-4	4	0	0	0	0	0	0	0	0	0	2
χ_{50}	-4	4	2	-2	2	-2	0	0	0	$-A$	A	$-\bar{A}$	$\bar{A}$	0	0	0
χ_{51}	-4	4	2	-2	2	-2	0	0	0	$-A$	A	$-\bar{A}$	$\bar{A}$	0	0	0
χ_{52}	2	-2	-1	1	2	-2	0	0	0	$\bar{A}$	$-\bar{A}$	A	$-A$	0	0	0
χ_{53}	2	-2	-1	1	2	-2	0	0	0	$\bar{A}$	$-\bar{A}$	A	$-A$	0	0	0

Table 9.2: Projective characters of H_2 with factor set α^{-1} (continued)

	12B	2D	2E	2F	4D	4E	4F	6K	6L	6M	6N	6O	6P	6Q	6R
χ_{1}	0	5	5	-3	1	1	1	C	C	$\bar{C}$	$\bar{C}$	2	2	-1	-1
χ_{2}	0	-5	-5	3	-1	-1	-1	-C	-C	-$\bar{C}$	-$\bar{C}$	-2	-2	1	1
χ_{3}	1	11	11	3	-1	3	3	D	D	$\bar{D}$	$\bar{D}$	2	2	2	2
χ_{4}	1	-11	-11	-3	1	-3	-3	-D	-D	-$\bar{D}$	-$\bar{D}$	-2	-2	-2	-2
χ_{5}	1	25	25	9	1	1	1	-D	-D	-$\bar{D}$	-$\bar{D}$	4	4	1	1
χ_{6}	1	-25	-25	-9	-1	-1	-1	D	D	$\bar{D}$	$\bar{D}$	-4	-4	-1	-1
χ_{7}	-1	5	5	-3	1	1	1	E	E	$\bar{E}$	$\bar{E}$	2	2	-1	-1
χ_{8}	-1	-5	-5	3	-1	-1	-1	-E	-E	-$\bar{E}$	-$\bar{E}$	-2	-2	1	1
χ_{9}	-2	35	35	3	3	3	3	F	F	$\bar{F}$	$\bar{F}$	-4	-4	2	2
χ_{10}	-2	-35	-35	-3	-3	-3	-3	-F	-F	-$\bar{F}$	-$\bar{F}$	4	4	-2	-2
χ_{11}	1	50	50	-6	-2	2	2	G	G	$\bar{G}$	$\bar{G}$	2	2	-1	-1
χ_{12}	1	-50	-50	6	2	-2	-2	-G	-G	-$\bar{G}$	-$\bar{G}$	-2	-2	1	1
χ_{13}	0	45	45	-3	-3	1	1	0	0	0	0	-6	-6	-3	-3
χ_{14}	0	-45	-45	3	3	-1	-1	0	0	0	0	6	6	3	3
χ_{15}	0	64	64	0	0	0	0	-F	-F	-$\bar{F}$	-$\bar{F}$	-2	-2	4	4
χ_{16}	0	-64	-64	0	0	0	0	F	F	$\bar{F}$	$\bar{F}$	2	2	-4	-4
χ_{17}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{18}	0	64	64	0	0	0	0	H	H	$\bar{H}$	$\bar{H}$	4	4	-2	-2
χ_{19}	0	-64	-64	0	0	0	0	-H	-H	-$\bar{H}$	-$\bar{H}$	-4	-4	2	2
χ_{20}	1	20	20	-12	-4	0	0	I	I	$\bar{I}$	$\bar{I}$	2	2	2	2
χ_{21}	1	-20	-20	12	4	0	0	-I	-I	$\bar{I}$	$\bar{I}$	-2	-2	-2	-2
χ_{22}	-1	30	30	6	2	2	2	J	J	$\bar{J}$	$\bar{J}$	0	0	-3	-3
χ_{23}	-1	-30	-30	-6	-2	-2	-2	-J	-J	-$\bar{J}$	-$\bar{J}$	0	0	3	3
χ_{24}	0	81	81	9	-3	-3	-3	0	0	0	0	0	0	0	0
χ_{25}	0	-81	-81	-9	3	3	3	0	0	0	0	0	0	0	0
χ_{26}	-1	36	36	-12	4	0	0	9	9	9	9	0	0	0	0
χ_{27}	-1	-36	-36	12	-4	0	0	-9	-9	-9	-9	0	0	0	0
χ_{28}	1	45	45	-3	5	-3	-3	-9	-9	-9	-9	0	0	0	0
χ_{29}	1	-45	-45	3	-5	3	3	9	9	9	9	0	0	0	0
χ_{30}	1	4	-4	0	0	2	-2	K	-K	$\bar{K}$	-$\bar{K}$	-2	2	1	-1
χ_{31}	1	-4	4	0	0	-2	2	-K	K	-$\bar{K}$	$\bar{K}$	2	-2	-1	1
χ_{32}	-1	16	-16	0	0	0	0	L	-L	$\bar{L}$	-$\bar{L}$	-2	2	-2	2
χ_{33}	-1	-16	16	0	0	0	0	-L	L	-$\bar{L}$	$\bar{L}$	2	-2	2	-2
χ_{34}	0	40	-40	0	0	4	-4	M	-M	$\bar{M}$	-$\bar{M}$	-2	2	1	-1
χ_{35}	0	-40	40	0	0	-4	4	-M	M	-$\bar{M}$	$\bar{M}$	2	-2	-1	1
χ_{36}	-2	36	-36	0	0	2	-2	0	0	0	0	6	-6	3	-3
χ_{37}	-2	-36	36	0	0	-2	2	0	0	0	0	-6	6	-3	3
χ_{38}	0	20	-20	0	0	2	-2	N	-N	$\bar{N}$	-$\bar{N}$	-4	4	-1	1
χ_{39}	0	-20	20	0	0	-2	2	-N	N	-$\bar{N}$	$\bar{N}$	4	-4	1	-1
χ_{40}	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{41}	0	16	-16	0	0	0	0	O	-O	$\bar{O}$	-$\bar{O}$	-2	2	-2	2
χ_{42}	0	-16	16	0	0	0	0	-O	O	-$\bar{O}$	$\bar{O}$	2	-2	2	-2
χ_{43}	0	64	-64	0	0	0	0	H	-H	$\bar{H}$	-$\bar{H}$	4	-4	-2	2
χ_{44}	0	-64	64	0	0	0	0	-H	H	-$\bar{H}$	$\bar{H}$	-4	4	2	-2
χ_{45}	1	80	-80	0	0	0	0	P	-P	$\bar{P}$	-$\bar{P}$	-4	4	2	-2
χ_{46}	1	-80	80	0	0	0	0	-P	P	-$\bar{P}$	$\bar{P}$	4	-4	-2	2
χ_{47}	1	60	-60	0	0	-2	2	Q	-Q	$\bar{Q}$	-$\bar{Q}$	0	0	3	-3
χ_{48}	1	-60	60	0	0	2	-2	-Q	Q	-$\bar{Q}$	$\bar{Q}$	0	0	-3	3
χ_{49}	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{50}	0	80	-80	0	0	0	0	-H	H	-$\bar{H}$	$\bar{H}$	2	-2	-4	4
χ_{51}	0	-80	80	0	0	0	0	H	-H	$\bar{H}$	-$\bar{H}$	-2	2	4	-4
χ_{52}	0	40	-40	0	0	-4	4	M	-M	$\bar{M}$	-$\bar{M}$	-2	2	1	-1
χ_{53}	0	-40	40	0	0	4	-4	-M	M	-$\bar{M}$	$\bar{M}$	2	-2	-1	1

Table 9.2: Projective characters of H_2 with factor set α^{-1} (continued)

	6S	6T	6U	6V	8B	10B	10C	12C	12D	12E	12F	18D	18E	18F	18G
χ_1	0	0	0	0	-1	0	0	-2	-2	1	1	R	R	$\bar{R}$	$\bar{R}$
χ_2	0	0	0	0	1	0	0	2	2	-1	-1	$-R$	$-R$	$-\bar{R}$	$-\bar{R}$
χ_3	0	0	0	0	1	1	1	-1	-1	0	0	$\bar{R}$	$\bar{R}$	R	R
χ_4	0	0	0	0	-1	-1	-1	1	1	0	0	$-\bar{R}$	$-\bar{R}$	$-R$	$-R$
χ_5	0	0	0	0	1	0	0	1	1	1	1	$-\bar{R}$	$-\bar{R}$	$-R$	$-R$
χ_6	0	0	0	0	-1	0	0	-1	-1	-1	-1	$\bar{R}$	$\bar{R}$	R	R
χ_7	0	0	0	0	-1	0	0	1	1	1	1	$\bar{R}$	$\bar{R}$	R	R
χ_8	0	0	0	0	1	0	0	-1	-1	-1	-1	$-\bar{R}$	$-\bar{R}$	$-R$	$-R$
χ_9	0	0	0	0	-1	0	0	0	0	0	0	-1	-1	-1	-1
χ_{10}	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1
χ_{11}	0	0	0	0	0	0	0	1	1	-1	-1	R	R	$\bar{R}$	$\bar{R}$
χ_{12}	0	0	0	0	0	0	0	-1	-1	1	1	$-R$	$-R$	$-\bar{R}$	$-\bar{R}$
χ_{13}	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0
χ_{14}	0	0	0	0	-1	0	0	0	0	-1	-1	0	0	0	0
χ_{15}	0	0	0	0	0	-1	-1	0	0	0	0	1	1	1	1
χ_{16}	0	0	0	0	0	1	1	0	0	0	0	-1	-1	-1	-1
χ_{17}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{18}	0	0	0	0	0	-1	-1	0	0	0	0	$-R$	$-R$	$-\bar{R}$	$-\bar{R}$
χ_{19}	0	0	0	0	0	1	1	0	0	0	0	R	R	$\bar{R}$	$\bar{R}$
χ_{20}	0	0	0	0	0	0	0	-1	-1	0	0	-1	-1	-1	-1
χ_{21}	0	0	0	0	0	0	0	1	1	0	0	1	1	1	1
χ_{22}	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0
χ_{23}	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0
χ_{24}	0	0	0	0	-1	1	1	0	0	0	0	0	0	0	0
χ_{25}	0	0	0	0	1	-1	-1	0	0	0	0	0	0	0	0
χ_{26}	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0
χ_{27}	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	0
χ_{28}	0	0	0	0	1	0	0	-1	-1	0	0	0	0	0	0
χ_{29}	0	0	0	0	-1	0	0	1	1	0	0	0	0	0	0
χ_{30}	0	0	0	0	0	-1	1	B	$-B$	-1	1	1	-1	1	-1
χ_{31}	0	0	0	0	0	1	-1	$-B$	B	1	-1	-1	1	-1	1
χ_{32}	0	0	0	0	0	1	-1	B	$-B$	0	0	$-R$	R	$-\bar{R}$	$\bar{R}$
χ_{33}	0	0	0	0	0	-1	1	$-B$	B	0	0	R	$-R$	$\bar{R}$	$-\bar{R}$
χ_{34}	0	0	0	0	0	0	0	0	0	1	-1	$-\bar{R}$	$\bar{R}$	$-R$	R
χ_{35}	0	0	0	0	0	0	0	0	0	-1	1	$\bar{R}$	$-\bar{R}$	R	$-R$
χ_{36}	0	0	0	0	0	1	-1	0	0	-1	1	0	0	0	0
χ_{37}	0	0	0	0	0	-1	1	0	0	1	-1	0	0	0	0
χ_{38}	0	0	0	0	0	0	0	0	0	-1	1	-1	1	-1	1
χ_{39}	0	0	0	0	0	0	0	0	0	1	-1	1	-1	1	-1
χ_{40}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{41}	0	0	0	0	0	1	-1	0	0	0	0	1	-1	1	-1
χ_{42}	0	0	0	0	0	-1	1	0	0	0	0	-1	1	-1	1
χ_{43}	0	0	0	0	0	-1	1	0	0	0	0	$-R$	R	$-\bar{R}$	$\bar{R}$
χ_{44}	0	0	0	0	0	1	-1	0	0	0	0	R	$-R$	$\bar{R}$	$-\bar{R}$
χ_{45}	0	0	0	0	0	0	0	$-B$	B	0	0	$\bar{R}$	$-\bar{R}$	R	$-R$
χ_{46}	0	0	0	0	0	0	0	B	$-B$	0	0	$-\bar{R}$	$\bar{R}$	$-R$	R
χ_{47}	0	0	0	0	0	0	0	B	$-B$	1	-1	0	0	0	0
χ_{48}	0	0	0	0	0	0	0	$-B$	B	-1	1	0	0	0	0
χ_{49}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{50}	0	0	0	0	0	0	0	0	0	0	0	R	$-R$	$\bar{R}$	$-\bar{R}$
χ_{51}	0	0	0	0	0	0	0	0	0	0	0	$-R$	R	$-\bar{R}$	$\bar{R}$
χ_{52}	0	0	0	0	0	0	0	0	0	-1	1	$-\bar{R}$	$\bar{R}$	$-R$	R
χ_{53}	0	0	0	0	0	0	0	0	0	1	-1	$\bar{R}$	$-\bar{R}$	R	$-R$

$A = (-3 - \sqrt{-3})/2$ $\bar{A} = (-3 + \sqrt{-3})/2$ $B = \sqrt{-3}$ $C = 2 - 2\sqrt{-3}$
$\bar{C} = 2 + 2\sqrt{-3}$ $D = -1 - 2\sqrt{-3}$ $\bar{D} = -1 + 2\sqrt{-3}$ $E = -7 + 4\sqrt{-3}$
$\bar{E} = -7 - 4\sqrt{-3}$ $F = -4 - 2\sqrt{-3}$ $\bar{F} = -4 + 2\sqrt{-3}$ $G = -7 - 2\sqrt{-3}$
$\bar{G} = -7 + 2\sqrt{-3}$ $H = 4 - 4\sqrt{-3}$ $\bar{H} = 4 + 4\sqrt{-3}$ $I = -1 + 4\sqrt{-3}$
$\bar{I} = -1 - 4\sqrt{-3}$ $J = 3 + 6\sqrt{-3}$ $\bar{J} = 3 - 6\sqrt{-3}$ $K = -2 - \sqrt{-3}$
$\bar{K} = -2 + \sqrt{-3}$ $L = -8 - \sqrt{-3}$ $\bar{L} = -8 + \sqrt{-3}$ $M = -2 - 4\sqrt{-3}$
$\bar{M} = -2 + 4\sqrt{-3}$ $N = 8 + 4\sqrt{-3}$ $\bar{N} = 8 - 4\sqrt{-3}$ $O = 10 - 4\sqrt{-3}$
$\bar{O} = 10 + 4\sqrt{-3}$ $P = -4 + \sqrt{-3}$ $\bar{P} = -4 - \sqrt{-3}$ $Q = 6 + 3\sqrt{-3}$
$\bar{Q} = 6 - 3\sqrt{-3}$ $R = (1 - \sqrt{-3})/2$ $\bar{R} = (1 + \sqrt{-3})/2$

Table 9.3: The fusion of H_2 into $O_7(3)$:2

$[h]_{H_2}$	$\longrightarrow$	$[g]_{O_7(3):2}$	$[h]_{H_2}$	$\longrightarrow$	$[g]_{O_7(3):2}$	$[h]_{H_2}$	$\longrightarrow$	$[g]_{O_7(3):2}$	$[h]_{H_2}$	$\longrightarrow$	$[g]_{O_7(3):2}$
1A		1A	2A		2A	2B		2C	2C		2B
3A		3A	6A		6A	3B		3C	6B		6C
3C		3B	6C		6B	3D		3E	6D		6K
4A		4B	4B		4C	4C		4D	5A		5A
10A		10B	6E		6G	6F		6D	6G		6J
6H		6F	6I		6I	6J		6H	7A		7A
14A		14A	8A		8B	9A		9B	18A		18B
9B		9B	18B		18B	9C		9A	18C		18A
12A		12B	12B		12E	2D		2D	2E		2E
2F		2F	4D		4I	4E		4G	4F		4H
6K		6O	6L		6S	6M		6O	6N		6S
6O		6P	6P		6T	6Q		6Q	6R		6W
6S		6R	6T		6U	6U		6Y	6V		6Y
8B		8D	10B		10D	10C		10E	12C		12P
12D		12P	12E		12M	12F		12O	18D		18E
18E		18F	18F		18E	18G		18F			

Table 9.4: The fusion of H_3 into $O_7(3)$:2

$[h]_{H_3}$	$\longrightarrow$	$[g]_{O_7(3):2}$	$[h]_{H_3}$	$\longrightarrow$	$[g]_{O_7(3):2}$	$[h]_{H_3}$	$\longrightarrow$	$[g]_{O_7(3):2}$	$[h]_{H_3}$	$\longrightarrow$	$[g]_{O_7(3):2}$
1A		1A	3A		3C	3B		3B	3C		3A
2A		2E	12A		12M	12B		12L	12C		12N
4A		4G	12D		12G	4B		4D	2B		2F
6A		6U	6B		6V	6C		6F	6D		6D
6E		6H	2C		2B	12E		12A	4C		4B
4D		4I	6F		6Q	6G		6P	6H		6O
2D		2D	2E		2C	6I		6E	6J		6X
6K		6O	6L		6G	6M		6L	6N		6L
6O		6G	6P		6X	6Q		6O	6R		6S
3D		3F	3E		3D	3F		3A	3G		3F
3H		3D	3I		3A	6S		6S	18A		18E
6T		6X	6U		6Q	6V		6M	6W		6J
3J		3C	9A		9B	3K		3D	3L		3F
3M		3E	6X		6W	6Y		6T	9B		9A
3N		3F	3O		3E	3P		3F	3Q		3B
12F		12P	12G		12F	12H		12B	12I		12P
12J		12F	12K		12B	18B		18F	9C		9C
9D		9B	18C		18F	9E		9C	9F		9B
6Z		6Y	6AA		6Z	6AB		6Z	6AC		6R
18D		18C	6AD		6H	6AE		6N	6AF		6I
18E		18D	6AG		6X	6AH		6P	6AI		6I
6AJ		6N	18F		18D	6AK		6P	6AL		6X
15A		15A	5A		5A	10A		10E			

Table 9.5: The fusion of H_4 into $O_7(3){:}2$

$[h]_{H_4}$	$\longrightarrow$ $[g]_{O_7(3):2}$	$[h]_{H_4}$	$\longrightarrow$ $[g]_{O_7(3):2}$	$[h]_{H_4}$	$\longrightarrow$ $[g]_{O_7(3):2}$	$[h]_{H_4}$	$\longrightarrow$ $[g]_{O_7(3):2}$
$1A$	$1A$	$2A$	$2B$	$2B$	$2C$	$3A$	$3A$
$3B$	$3B$	$3C$	$3C$	$3D$	$3F$	$4A$	$4A$
$4B$	$4B$	$4C$	$4D$	$5A$	$5A$	$6A$	$6H$
$6B$	$6F$	$6C$	$6G$	$6D$	$6I$	$6E$	$6J$
$8A$	$8A$	$9A$	$9B$	$9B$	$9A$	$10A$	$10A$
$12A$	$12D$	$12B$	$12C$	$12C$	$12B$	$13A$	$13A$
$13B$	$13B$	$20A$	$20A$	$2C$	$2D$	$2D$	$2E$
$2E$	$2F$	$4D$	$4I$	$4E$	$4G$	$4F$	$4H$
$6F$	$6O$	$6G$	$6S$	$6H$	$6Q$	$6I$	$6T$
$6J$	$6P$	$6K$	$6W$	$6L$	$6R$	$6M$	$6V$
$6N$	$6Z$	$8B$	$8D$	$10B$	$10D$	$10C$	$10E$
$12D$	$12P$	$12E$	$12N$	$12F$	$12O$	$18A$	$18D$
$18B$	$18F$						

9.4 The Fischer-Clifford Matrices of $3^7{\cdot}(O_7(3){:}2)$

We use the fusions of the inertia factors H_2, H_3 and H_4 into $O_7(3){:}2$ (Tables 9.3, 9.4 and 9.5) together with properties of the Fischer-Clifford matrices discussed in Subsection 5.1.1, Sections 5.2, 5.3 and 5.5 to compute the Fischer-Clifford matrices of the non-split extension $\bar{G} = 3^7{\cdot}(O_7(3){:}2)$.

Consider the coset corresponding to the identity of $O_7(3){:}2$. Then, as in Section 8.4, we compute the entries of the Fischer-Clifford matrix $M(1A)$ corresponding to the identity of $O_7(3){:}2$. We have

$$M(1A) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 702 & 0 & -27 & 27 \\ 728 & 26 & -1 & -28 \\ 756 & -27 & 27 & 0 \end{pmatrix}.$$

We obtain four conjugacy classes of elements of $\bar{G}$ of orders 1, 3, 3 and 3 respectively corresponding to $M(1A)$.

Let $Irr(Fi_{24}) = \{\psi_i : 1 \leq i \leq 183\}$ be the set of irreducible characters of Fi_{24}' as listed in the ATLAS. Then we have

$[x]_{Fi_{24}'}$	$1A$	$3A$	$3B$	$3C$
ψ_2	8671	247	-77	85
ψ_4	57477	534	615	210
ψ_6	249458	370	2705	869

Let γ_1, γ_2, γ_3 and γ_4 be the rows of the Fischer-Clifford matrix $M(1A)$. Again since $\langle(\psi_2)_N, 1_N\rangle = 91$, $\langle(\psi_4)_N, 1_N\rangle = 483$ and $\langle(\psi_6)_N, 1_N\rangle = 1392$ we obtain the following decompositions

$$\begin{aligned}(\psi_2)_N &= 91\gamma_1 + 6\gamma_2 + 6\gamma_3,\\ (\psi_4)_N &= 483\gamma_1 + 21\gamma_2 + 30\gamma_3 + 27\gamma_4,\\ (\psi_6)_N &= 1392\gamma_1 + 105\gamma_2 + 145\gamma_3 + 91\gamma_4.\end{aligned}$$

Now by considering the coefficients of γ_2, γ_4 and γ_6 and following similar arguments given for the non-split extension $3^7{\cdot}O_7(3)$ in Section 8.4, it can be shown that for our computations of the Fischer-Clifford matrices and character table of the group $\bar{G} = 3^7{\cdot}(O_7(3){:}2)$ we need to use the projective characters of H_2 (Table 9.2) corresponding to the factor set α^{-1} with $\alpha^3 \sim 1$, the ordinary characters of $H_1 = O_7(3){:}2$, H_3 (Table 1, Appendix B) and H_4 (Table 2, Appendix B). Hence the number of irreducible characters and the conjugacy classes of $\bar{G} = 3^7{\cdot}(O_7(3){:}2)$ is equal to $|Irr(H_1)|+|IrrProj_{\alpha^{-1}}(H_2)|+|Irr(H_3)|+|Irr(H_4) = 98 + 53 + 91 + 49 = 291$ where $IrrProj_{\alpha^{-1}}(H_2)$ denotes the set of irreducible projective characters of H_2 with factor set α^{-1}.

We list the conjugacy classes of the elements of $\bar{G}$ in Table 9.7.

For each conjugacy class $[g]$ of $O_7(3){:}2$ with representative $g \in O_7(3){:}2$, we construct the corresponding Fischer-Clifford matrix $M(g)$. These Fischer-Clifford matrices are listed in Table 9.6.

Table 9.6: The Fischer-Clifford matrices of $3^7{\cdot}(O_7(3){:}2)$

$M(g)$	$M(g)$
$M(1A) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 702 & 0 & -27 & 27 \\ 728 & 26 & -1 & -28 \\ 756 & -27 & 27 & 0 \end{pmatrix}$	$M(2A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(2B) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 90 & -9 & 0 & 9 \\ 80 & 8 & -10 & -1 \\ 72 & 0 & 9 & -9 \end{pmatrix}$	$M(2C) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 6 & 3 & -3 & 0 \\ 8 & -4 & -1 & 2 \\ 12 & 0 & 3 & -3 \end{pmatrix}$
$M(3A) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ 54 & 0 & 0 & 27 & -27 & -27 \\ 8 & 8 & -1 & 8 & 8 & 8 \\ 36\bar{\alpha} & 9\bar{\alpha} & 0 & -18\bar{\alpha} & 18-9\alpha & -9+18\alpha \\ 36\alpha & 9\alpha & 0 & -18\alpha & -9\bar{\alpha}+18 & 18\bar{\alpha}-9 \\ 108 & -27 & 0 & 0 & 27 & 27 \end{pmatrix}$	$M(3B) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 2 & 2 & 2 & -1 \\ -30 & 24 & -3 & 0 \\ 45 & 18 & -9 & 0 \end{pmatrix}$
$M(3C) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 72 & -9 & 0 & 18 & -9 \\ 2 & 2 & -1 & 2 & 2 \\ 96 & 15 & 0 & -12 & -12 \\ 72 & -9 & 0 & -9 & 18 \end{pmatrix}$	$M(3D) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & \alpha & \bar{\alpha} \\ 1 & 1 & \bar{\alpha} & \alpha \\ 24 & -3 & 0 & 0 \end{pmatrix}$

Table 9.6: The Fischer-Clifford matrices of $3^7{\cdot}(O_7(3){:}2)$ (continued)

$M(g)$	$M(g)$
$M(3E) = \begin{pmatrix} 1 & 1 & 1 \\ 4 & -2 & 1 \\ 4 & 1 & -2 \end{pmatrix}$	$M(3F) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 2\bar{\alpha} & -1 & -\alpha & -\bar{\alpha} & 2\alpha & 2 & 2\bar{\alpha} \\ 2\alpha & -1 & -\bar{\alpha} & -\alpha & 2\bar{\alpha} & 2 & 2\alpha \\ 2 & -1 & -1 & -1 & 2 & 2 & 2 \\ \alpha & 1 & \bar{\alpha} & \alpha & \bar{\alpha} & 1 & \alpha \\ \bar{\alpha} & 1 & \alpha & \bar{\alpha} & \alpha & 1 & \bar{\alpha} \\ 18 & 0 & 0 & 0 & 0 & 0 & -9 \end{pmatrix}$
$M(4A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(4B) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 6 & 3 & -3 & 0 \\ 8 & -4 & -1 & 2 \\ 12 & 0 & 3 & -3 \end{pmatrix}$
$M(4C) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(4D) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 12 & 0 & 3 & -3 \\ 8 & -4 & -1 & 2 \\ 6 & 3 & -3 & 0 \end{pmatrix}$
$M(5A) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 12 & 0 & 3 & -3 \\ 8 & -4 & -1 & 2 \\ 6 & 3 & -3 & 0 \end{pmatrix}$	$M(6A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(6B) = \begin{pmatrix} 1 \end{pmatrix}$	$M(6C) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(6D) = \begin{pmatrix} 1 & 1 & 1 \\ 18 & -9 & 0 \\ 8 & 8 & -1 \end{pmatrix}$	$M(6E) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(6F) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 12 & -6 & 3 & 0 \\ 2 & 2 & 2 & -1 \\ 12 & 3 & -6 & 0 \end{pmatrix}$	$M(6G) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 6 & -3 & -3 & 3 & 0 \\ 4\alpha & -\bar{\alpha}+2 & 2\bar{\alpha}-1 & -2\alpha & \alpha \\ 4\bar{\alpha} & 2-\alpha & -1+2\alpha & -2\bar{\alpha} & \bar{\alpha} \\ 12 & 3 & 3 & 0 & -3 \end{pmatrix}$
$M(6H) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 6 & 6 & -3 & -3 & 0 \\ 2 & 2 & 2 & 2 & -1 \\ 12 & -6 & -6 & 3 & 0 \\ 6 & -3 & 6 & -3 & 0 \end{pmatrix}$	$M(6I) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 6 & -3 & -3 & 3 & 0 \\ 4\alpha & -\bar{\alpha}+2 & 2\bar{\alpha}-1 & -2\alpha & \alpha \\ 4\bar{\alpha} & 2-\alpha & -1+2\alpha & -2\bar{\alpha} & \bar{\alpha} \\ 12 & 3 & 3 & 0 & -3 \end{pmatrix}$
$M(6J) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 6 & 3 & -3 & 0 \\ 8 & -4 & -1 & 2 \\ 12 & 0 & 3 & -3 \end{pmatrix}$	$M(6K) = \begin{pmatrix} 1 \end{pmatrix}$
$M(6L) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$	$M(6M) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$

Table 9.6: The Fischer-Clifford matrices of $3^7{\cdot}(O_7(3){:}2)$ (continued)

$M(g)$	$M(g)$
$M(6N) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$	$M(7A) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$
$M(8A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(8B) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$
$M(9A) = \begin{pmatrix} 1 & 1 & 1 \\ -1 & -1 & 2 \\ 6 & -3 & 0 \end{pmatrix}$	$M(9B) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 3\alpha & 3\bar{\alpha} & 3 & 0 & 3\bar{\alpha} & 3 & 3\alpha \\ 3\bar{\alpha} & 3\alpha & 3 & 0 & 3\alpha & 3 & 3\bar{\alpha} \\ 2 & 2 & 2 & -1 & 2 & 2 & 2 \\ 6\alpha & -3 & -3\bar{\alpha} & 0 & 6 & 6\bar{\alpha} & -3\alpha \\ 6\bar{\alpha} & -3 & -3\alpha & 0 & 6 & 6\alpha & -3\bar{\alpha} \\ 6 & -3 & -3 & 0 & 6 & 6 & -3 \end{pmatrix}$
$M(9C) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$	$M(10A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(10B) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(12A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(12B) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 6 & -3 & -3 & 3 & 0 \\ 4\alpha & -\bar{\alpha}+2 & 2\bar{\alpha}-1 & -2\alpha & \alpha \\ 4\bar{\alpha} & 2-\alpha & -1+2\alpha & -2\bar{\alpha} & \bar{\alpha} \\ 12 & 3 & 3 & 0 & -3 \end{pmatrix}$	$M(12C) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(12D) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(12E) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(12F) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$	$M(12G) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(13A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(13B) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$
$M(14A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(15A) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$
$M(18A) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(18B) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$
$M(18C) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(20A) = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \alpha & \bar{\alpha} \\ 1 & \bar{\alpha} & \alpha \end{pmatrix}$

Table 9.6: The Fischer-Clifford matrices of $3^7{\cdot}(O_7(3){:}2)$ (continued)

$M(g)$	$M(g)$
$M(2D) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 234 & 18 & -9 & -9 \\ 260 & -10 & -10 & 17 \\ 234 & -9 & 18 & -9 \end{pmatrix}$	$M(2E) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 2 & 2 & -1 & -1 \\ 4 & -2 & -2 & 1 \\ 2 & -1 & 2 & -1 \end{pmatrix}$
$M(2F) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 30 & 3 & -6 & 3 \\ 20 & -7 & 2 & 2 \\ 30 & 3 & 3 & -6 \end{pmatrix}$	$M(4G) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 24 & 6 & -3 & -3 \\ 32 & -4 & -4 & 5 \\ 24 & -3 & 6 & -3 \end{pmatrix}$
$M(4E) = \begin{pmatrix} 1 \end{pmatrix}$	$M(4F) = \begin{pmatrix} 1 \end{pmatrix}$
$M(4H) = \begin{pmatrix} 1 & 1 & 1 \\ 4 & -2 & 1 \\ 4 & 1 & -2 \end{pmatrix}$	$M(4I) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 2 & 2 & -1 & -1 \\ 4 & -2 & -2 & 1 \\ 2 & -1 & 2 & -1 \end{pmatrix}$
$M(6O) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 9\bar{\alpha} & 9 & 9\alpha & 0 & 9 & 9\alpha & 9\bar{\alpha} \\ 9\alpha & 9 & 9\bar{\alpha} & 0 & 9 & 9\bar{\alpha} & 9\alpha \\ 8 & 8 & 8 & -1 & 8 & 8 & 8 \\ 18\bar{\alpha} & -9\alpha & -9 & 0 & 18\alpha & 18 & -9\bar{\alpha} \\ 18\alpha & -9\bar{\alpha} & -9 & 0 & 18\bar{\alpha} & 18 & -9\alpha \\ 18 & -9 & -9 & 0 & 18 & 18 & -9 \end{pmatrix}$	$M(6P) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ 18 & 0 & 0 & 9 & -9 & -9 \\ 2 & 2 & -1 & 2 & 2 & 2 \\ 12\bar{\alpha} & 3\bar{\alpha} & 0 & -6\bar{\alpha} & 6-3\alpha & -3+6\alpha \\ 12\alpha & 3\alpha & 0 & -6\alpha & -3\bar{\alpha}+6 & 6\bar{\alpha}-3 \\ 36 & -9 & 0 & 0 & 9 & 9 \end{pmatrix}$
$M(6Q) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 36 & 0 & 9 & -9 & 0 \\ 2 & 2 & 2 & 2 & -1 \\ 24 & -12 & -3 & 6 & 0 \\ 18 & 9 & -9 & 0 & 0 \end{pmatrix}$	$M(6R) = \begin{pmatrix} 1 & 1 & 1 \\ -10 & 8 & -1 \\ 15 & 6 & -3 \end{pmatrix}$
$M(6S) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ \alpha & 1 & \bar{\alpha} & \alpha & \bar{\alpha} & 1 \\ \bar{\alpha} & 1 & \alpha & \bar{\alpha} & \alpha & 1 \\ 2\alpha & 2\bar{\alpha} & 2 & -\alpha & -1 & -\bar{\alpha} \\ 2\bar{\alpha} & 2\alpha & 2 & -\bar{\alpha} & -1 & -\alpha \\ 2 & 2 & 2 & -1 & -1 & -1 \end{pmatrix}$	$M(6T) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 2 & 2 & -1 & -1 \\ 4 & -2 & -2 & 1 \\ 2 & -1 & 2 & -1 \end{pmatrix}$
$M(6U) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(6V) = \begin{pmatrix} 1 & 1 & 1 \\ 2 & 2 & -1 \\ 6 & -3 & 0 \end{pmatrix}$
$M(6W) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 2 & 2 & -1 & -1 \\ 4 & -2 & -2 & 1 \\ 2 & -1 & 2 & -1 \end{pmatrix}$	$M(6X) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ 2\alpha & 2 & 2\bar{\alpha} & -\alpha & -\bar{\alpha} & -1 \\ 2\bar{\alpha} & 2 & 2\alpha & -\bar{\alpha} & -\alpha & -1 \\ 2 & 2 & 2 & -1 & -1 & -1 \\ \alpha & 1 & \bar{\alpha} & \alpha & \bar{\alpha} & 1 \\ \bar{\alpha} & 1 & \alpha & \bar{\alpha} & \alpha & 1 \end{pmatrix}$
$M(6Y) = \begin{pmatrix} 1 & 1 \\ 2 & -1 \end{pmatrix}$	$M(8C) = \begin{pmatrix} 1 \end{pmatrix}$

Table 9.6: The Fischer-Clifford matrices of $3^7{\cdot}(O_7(3){:}2)$ (continued)

$M(g)$	$M(g)$
$M(6Z) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ \bar{\alpha} & \bar{\alpha} & 1 & \alpha \\ \alpha & \alpha & 1 & \bar{\alpha} \\ 6 & -3 & 0 & 0 \end{pmatrix}$	$M(8D) = \begin{pmatrix} 1 & 1 & 1 \\ 4 & -2 & 1 \\ 4 & 1 & -2 \end{pmatrix}$
$M(10C) = \begin{pmatrix} 1 \end{pmatrix}$	$M(10D) = \begin{pmatrix} 1 & 1 & 1 \\ 4 & -2 & 1 \\ 4 & 1 & -2 \end{pmatrix}$
$M(10E) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 2 & 2 & -1 & -1 \\ 4 & -2 & -2 & 1 \\ 2 & -1 & 2 & -1 \end{pmatrix}$	$M(12H) = \begin{pmatrix} 1 \end{pmatrix}$
$M(12I) = \begin{pmatrix} 1 \end{pmatrix}$	$M(12J) = \begin{pmatrix} 1 \end{pmatrix}$
$M(12K) = \begin{pmatrix} 1 \end{pmatrix}$	$M(12L) = \begin{pmatrix} 1 & 1 \\ 8 & -1 \end{pmatrix}$
$M(12M) = \begin{pmatrix} 1 & 1 & 1 \\ 6 & -3 & 0 \\ 2 & 2 & -1 \end{pmatrix}$	$M(12N) = \begin{pmatrix} 1 & 1 & 1 \\ 2 & 2 & -1 \\ 6 & -3 & 0 \end{pmatrix}$
$M(12O) = \begin{pmatrix} 1 & 1 & 1 \\ 4 & -2 & 1 \\ 4 & 1 & -2 \end{pmatrix}$	$M(12P) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ \alpha & 1 & \bar{\alpha} & \alpha & \bar{\alpha} & 1 \\ \bar{\alpha} & 1 & \alpha & \bar{\alpha} & \alpha & 1 \\ 2\bar{\alpha} & 2\alpha & 2 & -\bar{\alpha} & -1 & -\alpha \\ 2\alpha & 2\bar{\alpha} & 2 & -\alpha & -1 & -\bar{\alpha} \\ 2 & 2 & 2 & -1 & -1 & -1 \end{pmatrix}$
$M(12Q) = \begin{pmatrix} 1 \end{pmatrix}$	$M(18D) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ \bar{\alpha} & \bar{\alpha} & 1 & \alpha \\ \alpha & \alpha & 1 & \bar{\alpha} \\ 6 & -3 & 0 & 0 \end{pmatrix}$
$M(18E) = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 3 & 3\bar{\alpha} & 3\alpha & 0 \\ 3 & 3\alpha & 3\bar{\alpha} & 0 \\ 2 & 2 & 2 & -1 \end{pmatrix}$	$M(18F) = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ \alpha & 1 & \bar{\alpha} & \alpha & \bar{\alpha} & 1 \\ \bar{\alpha} & 1 & \alpha & \bar{\alpha} & \alpha & 1 \\ 2\bar{\alpha} & 2\alpha & 2 & -\bar{\alpha} & -1 & -\alpha \\ 2\alpha & 2\bar{\alpha} & 2 & -\alpha & -1 & -\bar{\alpha} \\ 2 & 2 & 2 & -1 & -1 & -1 \end{pmatrix}$
$M(20B) = \begin{pmatrix} 1 \end{pmatrix}$	$M(24A) = \begin{pmatrix} 1 \end{pmatrix}$
$M(26A) = \begin{pmatrix} 1 \end{pmatrix}$	$M(26B) = \begin{pmatrix} 1 \end{pmatrix}$
$M(28A) = \begin{pmatrix} 1 \end{pmatrix}$	$M(28B) = \begin{pmatrix} 1 \end{pmatrix}$
$M(30A) = \begin{pmatrix} 1 \end{pmatrix}$	$M(30B) = \begin{pmatrix} 1 \end{pmatrix}$

$\alpha = (-1+\sqrt{-3}\,)/2\,, \quad \bar{\alpha} = (-1-\sqrt{-3}\,)/2$

Table 9.7: The conjugacy classes of $3^7{\cdot}(O_7(3){:}2)$

$[g]_{O_7(3):2}$	$[x]_{3^7\cdot O_7(3):2}$	$\lvert C_{3^7\cdot O_7(3):2}(x)\rvert$	$[g]_{O_7(3):2}$	$[x]_{3^7\cdot O_7(3):2}$	$\lvert C_{3^7\cdot O_7(3):2}(x)\rvert$
1A	1A	20056328248320	2A	2A	78382080
	3A	26529534720		6A	39191040
	3B	27549901440			
	3C	28570268160			
2B	2B	100776960	2C	2C	746496
	6B	1119744		6E	124416
	6C	1399680		6F	93312
	6D	1259712		6G	62208
3A	3D	306110016	3B	3J	14171760
	3E	25509168		3K	5668704
	3F	1417176		3L	1417176
	3G	51018336		9A	524880
	3H	76527504			
	3I	76527504			
3C	3M	68024448	3D	9C	472392
	3N	2125764		9D	59049
	9B	419904		9E	52488
	3O	2834352		3Q	52488
	3P	2834352			
3E	3R	52488	3F	9H	78732
	9F	13122		9I	13122
	9G	13122		9J	13122
				9K	13122
				3S	26244
				9L	26244
				9M	39366
4A	4A	17280	4B	4B	62208
	12A	8640		12B	10368
				12C	7776
				12D	5184
4C	4C	2304	4D	4D	10368
	12E	1152		12F	1728
				12G	1296
				12H	864
5A	5A	6480	6A	6H	139968
	15A	1080		6I	69984
	15B	810		6J	7776
	15C	540			
6B	6K	23328	6C	6M	139968
	6L	11664		6N	69984
				6O	5832
6D	6P	10368	6E	6Q	46656
	18A	5184		6R	11664
				6S	11664
				18B	2592

Table 9.7: The conjugacy classes of $3^7{\cdot}(O_7(3){:}2)$ (continued)

$[g]_{O_7(3):2}$	$[x]_{3^7\cdot O_7(3):2}$	$\lvert C_{3^7\cdot O_7(3):2}(x)\rvert$	$[g]_{O_7(3):2}$	$[x]_{3^7\cdot O_7(3):2}$	$\lvert C_{3^7\cdot O_7(3):2}(x)\rvert$
$6F$	$6T$	46656	$6G$	$6Y$	23328
	$6U$	11664		$6Z$	11664
	$6V$	11664		$6AA$	11664
	$6W$	7776		$6AB$	5832
	$6X$	3888		$18C$	1296
$6H$	$6AC$	23328	$6I$	$6AH$	23328
	$6AD$	5832		$6AI$	3888
	$6AE$	5832		$6AJ$	2916
	$6AF$	3888		$6AK$	1944
	$6AG$	1944		$6AL$	648
$6J$	$18D$	648	$6K$	$6AN$	324
	$6AM$	648		$18F$	162
	$18E$	648			
$6L$	$18G$	324	$7A$	$7A$	84
	$6AO$	324		$21A$	42
	$18H$	324			
$8A$	$8A$	96	$8B$	$8B$	96
	$24A$	48		$24B$	48
$9A$	$9N$	2916	$9B$	$9Q$	8748
	$9O$	1458		$9R$	4374
	$9P$	1944		$9S$	4374
				$9T$	486
				$9U$	8748
				$9V$	8748
				$9W$	4374
$9C$	$27A$	81	$10A$	$10A$	240
	$27B$	81		$30A$	120
	$27C$	81			
$10B$	$10B$	120	$12A$	$12A$	864
	$30B$	60		$36A$	432
$12B$	$12J$	7776	$12C$	$12O$	432
	$12K$	1944		$12P$	216
	$12L$	1944			
	$12M$	1296			
	$12N$	648			
$12D$	$12Q$	432	$12D$	$12S$	288
	$12R$	216		$12T$	144
$12E$	$36B$	108	$12F$	$12V$	144
	$12U$	108		$36D$	72
	$36C$	108			
$13A$	$13A$	78	$13B$	$13B$	78
	$39A$	39		$39B$	39
$14A$	$14A$	84	$15A$	$15D$	90
	$42A$	42		$45A$	45

Table 9.7: The conjugacy classes of $3^7{\cdot}(O_7(3){:}2)$ (continued)

$[g]_{O_7(3):2}$	$[x]_{3^7\cdot O_7(3):2}$	$\|C_{3^7\cdot O_7(3):2}(x)\|$	$[g]_{O_7(3):2}$	$[x]_{3^7\cdot O_7(3):2}$	$\|C_{3^7\cdot O_7(3):2}(x)\|$
$18A$	$18I$	108	$18B$	$18J$	324
				$18K$	324
				$18L$	324
$18C$	$18M$	216	$20A$	$20A$	120
	$18N$	108		$60A$	60
$2D$	$2D$	1768635648	$2E$	$2E$	1866240
	$6AP$	75582720		$6AS$	933120
	$6AQ$	75582720		$6AT$	933120
	$6AR$	68024448		$6AU$	466560
$2F$	$2F$	2799360	$4G$	$4G$	373248
	$6AV$	139968		$12W$	15552
	$6AW$	93312		$12X$	15552
	$6AX$	93312		$12Y$	11664
$4E$	$4E$	207360	$4F$	$4F$	24192
$4H$	$4H$	6912	$4I$	$4I$	3456
	$12AZ$	1728		$12AB$	1728
	$12AA$	1728		$12AC$	1728
				$12AD$	864
$6M$	$6AY$	1889568	$6N$	$6BF$	629856
	$6AZ$	944784		$6BG$	52488
	$6BA$	944784		$18O$	11664
	$6BB$	26244		$6BH$	104976
	$6BC$	1889568		$6BI$	157464
	$6BD$	1889568		$6BJ$	157464
	$6BE$	944784			
$6O$	$6BK$	629856	$6P$	$6BO$	58320
	$6BL$	104976		$6BP$	23328
	$6BM$	78732		$6BQ$	5832
	$6BN$	52488			
	$18P$	11664			
$6Q$	$6BR$	23328	$6R$	$6BX$	7776
	$6BS$	23328		$6BY$	3888
	$6BT$	23328		$6BZ$	3888
	$6BU$	11664,		$6BCA$	1944
	$6BV$	11664			
	$6BW$	11664			
$6T$	$6CB$	2592	$6U$	$6CC$	7776
	$18Q$	1296		$6CD$	3888
				$18R$	1296
$6V$	$6CE$	3888	$6W$	$18S$	2916
	$6CF$	1944		$18T$	2916
	$6CG$	1944		$6CI$	2916
	$6CH$	972		$18U$	1458
				$18V$	1458
				$18W$	1458

Table 9.7: The conjugacy classes of $3^7{\cdot}(O_7(3){:}2)$ (continued)

$[g]_{O_7(3):2}$	$[x]_{3^7\cdot O_7(3):2}$	$\lvert C_{3^7\cdot O_7(3):2}(x)\rvert$	$[g]_{O_7(3):2}$	$[x]_{3^7\cdot O_7(3):2}$	$\lvert C_{3^7\cdot O_7(3):2}(x)\rvert$
$6X$	$6CJ$	324	$6Y$	$18Y$	972
	$18X$	162		$18Z$	486
				$18AA$	324
				$6CK$	324
$8C$	$8C$	192	$10C$	$10C$	240
	$8D$	576			
	$24C$	144			
	$24D$	144			
$10D$	$10D$	720	$10E$	$10E$	360
	$30C$	180		$30E$	180
	$30D$	180		$30F$	180
				$30G$	90
$12B$	$12AE$	2592	$12C$	$12AF$	864
$12D$	$12AG$	432	$12E$	$12AH$	432
$12F$	$12AI$	2592	$12G$	$12AK$	1296
	$12AJ$	324		$12AL$	648
				$36E$	216
$12H$	$12AM$	1296	$12I$	$12AO$	864
	$12AN$	648		$12AP$	216
	$36F$	216		$12AQ$	216
$12J$	$12AR$	432	$12K$	$12AX$	36
	$12AS$	432			
	$12AT$	432			
	$12AU$	216			
	$12AV$	216			
	$12AW$	216			
$18D$	$18AB$	972	$18E$	$18AF$	972
	$18AC$	486		$18AG$	972
	$18AD$	324		$18AH$	972
	$18AE$	324		$18AI$	162
$18F$	$18AJ$	324	$20B$	$20B$	40
	$18AK$	324			
	$18AL$	324			
	$18AM$	162			
	$18AN$	162			
	$18AO$	162			
$24A$	$24E$	24	$26A$	$26A$	26
$26B$	$26B$	26	$28A$	$28A$	28
$28B$	$28B$	28	$30A$	$30H$	30
$36A$	$36G$	36			

We used the Fischer-Clifford matrices given in Table 9.6, the projective characters of $H_2 = 2U_4(3).2_2$ (Table 9.2) corresponding to the factor set α^{-1} and the ordinary characters of H_1, H_2 (Table 9.1), H_3 (Table 1, Appendix B) and H_4 (Table 2, Appendix B) together with the fusions of the inertia factors H_2, H_3 and H_4 (Tables 9.3, 9.4 and 9.5) into $O_7(3){:}2$. The set of irreducible characters $3^7{\cdot}(O_7(3){:}2)$ will be partioned into four blocks B_1, B_2, B_3 and B_4 corresponding to the inertia factors H_1, H_2, H_3 and H_4 respectively. In fact

$$\begin{aligned} B_1 &= \{\chi_i \mid 1 \leq i \leq 98\}, \qquad B_2 = \{\chi_i \mid 99 \leq i \leq 151\}\ , \\ B_3 &= \{\chi_i \mid 152 \leq i \leq 242\}, \quad B_4 = \{\chi_i \mid 243 \leq i \leq 291\}, \end{aligned}$$

where $Irr(3^7{\cdot}(O_7(3){:}2)) = \cup_{i=1}^{4} B_i$. The complete character table of $3^7{\cdot}(O_7(3){:}2)$ is given in Table 9.8. Please note that the centralizers of the elements of $3^7{\cdot}(O_7(3){:}2)$ are listed in Table 9.7. The character table of $3^7{\cdot}(O_7(3){:}2)$ has been accepted for incorporation into GAP [104] and will be available in the latest version.

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$

	$1A$				$2A$		$2B$				$2C$			
	$1A$	$3A$	$3B$	$3C$	$2A$	$6A$	$2B$	$6B$	$6C$	$6D$	$2C$	$6E$	$6F$	$6G$
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{3}	78	78	78	78	-34	-34	14	14	14	14	-2	-2	-2	-2
χ_{4}	78	78	78	78	-34	-34	14	14	14	14	-2	-2	-2	-2
χ_{5}	91	91	91	91	-21	-21	11	11	11	11	-5	-5	-5	-5
χ_{6}	91	91	91	91	-21	-21	11	11	11	11	-5	-5	-5	-5
χ_{7}	105	105	105	105	-35	-35	5	5	5	5	1	1	1	1
χ_{8}	105	105	105	105	-35	-35	5	5	5	5	1	1	1	1
χ_{9}	168	168	168	168	56	56	24	24	24	24	8	8	8	8
χ_{10}	168	168	168	168	56	56	24	24	24	24	8	8	8	8
χ_{11}	182	182	182	182	70	70	22	22	22	22	6	6	6	6
χ_{12}	182	182	182	182	70	70	22	22	22	22	6	6	6	6
χ_{13}	195	195	195	195	55	55	15	15	15	15	11	11	11	11
χ_{14}	195	195	195	195	55	55	15	15	15	15	11	11	11	11
χ_{15}	520	520	520	520	40	40	40	40	40	40	8	8	8	8
χ_{16}	273	273	273	273	-91	-91	29	29	29	29	-7	-7	-7	-7
χ_{17}	273	273	273	273	-91	-91	29	29	29	29	-7	-7	-7	-7
χ_{18}	546	546	546	546	154	154	26	26	26	26	2	2	2	2
χ_{19}	546	546	546	546	154	154	26	26	26	26	2	2	2	2
χ_{20}	819	819	819	819	-21	-21	-21	-21	-21	-21	19	19	19	19
χ_{21}	819	819	819	819	-21	-21	-21	-21	-21	-21	19	19	19	19
χ_{22}	1820	1820	1820	1820	-420	-420	60	60	60	60	-4	-4	-4	-4
χ_{23}	1092	1092	1092	1092	-140	-140	52	52	52	52	4	4	4	4
χ_{24}	1092	1092	1092	1092	-140	-140	52	52	52	52	4	4	4	4
χ_{25}	1365	1365	1365	1365	245	245	5	5	5	5	-27	-27	-27	-27
χ_{26}	1365	1365	1365	1365	245	245	5	5	5	5	-27	-27	-27	-27
χ_{27}	1365	1365	1365	1365	-35	-35	45	45	45	45	5	5	5	5
χ_{28}	1365	1365	1365	1365	-35	-35	45	45	45	45	5	5	5	5
χ_{29}	3120	3120	3120	3120	240	240	-80	-80	-80	-80	-16	-16	-16	-16
χ_{30}	1638	1638	1638	1638	294	294	54	54	54	54	-10	-10	-10	-10
χ_{31}	1638	1638	1638	1638	294	294	54	54	54	54	-10	-10	-10	-10
χ_{32}	1820	1820	1820	1820	140	140	-20	-20	-20	-20	-4	-4	-4	-4
χ_{33}	1820	1820	1820	1820	140	140	-20	-20	-20	-20	-4	-4	-4	-4
χ_{34}	2106	2106	2106	2106	-414	-414	66	66	66	66	-6	-6	-6	-6
χ_{35}	2106	2106	2106	2106	-414	-414	66	66	66	66	-6	-6	-6	-6
χ_{36}	2184	2184	2184	2184	56	56	24	24	24	24	-24	-24	-24	-24
χ_{37}	2184	2184	2184	2184	56	56	24	24	24	24	-24	-24	-24	-24
χ_{38}	2457	2457	2457	2457	189	189	21	21	21	21	33	33	33	33
χ_{39}	2457	2457	2457	2457	189	189	21	21	21	21	33	33	33	33
χ_{40}	2730	2730	2730	2730	490	490	90	90	90	90	26	26	26	26
χ_{41}	2730	2730	2730	2730	490	490	90	90	90	90	26	26	26	26
χ_{42}	2730	2730	2730	2730	-70	-70	10	10	10	10	-6	-6	-6	-6
χ_{43}	2730	2730	2730	2730	-70	-70	10	10	10	10	-6	-6	-6	-6
χ_{44}	2835	2835	2835	2835	315	315	75	75	75	75	3	3	3	3
χ_{45}	2835	2835	2835	2835	315	315	75	75	75	75	3	3	3	3
χ_{46}	4095	4095	4095	4095	315	315	-45	-45	-45	-45	-25	-25	-25	-25
χ_{47}	4095	4095	4095	4095	315	315	-45	-45	-45	-45	-25	-25	-25	-25
χ_{48}	4095	4095	4095	4095	-525	-525	75	75	75	75	7	7	7	7
χ_{49}	4095	4095	4095	4095	-525	-525	75	75	75	75	7	7	7	7
χ_{50}	4368	4368	4368	4368	560	560	48	48	48	48	16	16	16	16
χ_{51}	4368	4368	4368	4368	560	560	48	48	48	48	16	16	16	16
χ_{52}	4536	4536	4536	4536	-504	-504	-24	-24	-24	-24	24	24	24	24
χ_{53}	4536	4536	4536	4536	-504	-504	-24	-24	-24	-24	24	24	24	24
χ_{54}	5265	5265	5265	5265	225	225	-15	-15	-15	-15	33	33	33	33
χ_{55}	5265	5265	5265	5265	225	225	-15	-15	-15	-15	33	33	33	33
χ_{56}	5460	5460	5460	5460	420	420	100	100	100	100	20	20	20	20
χ_{57}	5460	5460	5460	5460	420	420	100	100	100	100	20	20	20	20
χ_{58}	5460	5460	5460	5460	-700	-700	100	100	100	100	-12	-12	-12	-12
χ_{59}	5460	5460	5460	5460	-700	-700	100	100	100	100	-12	-12	-12	-12
χ_{60}	5460	5460	5460	5460	-140	-140	-140	-140	-140	-140	20	20	20	20

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	3A						3B				3C				
	$3D$	$3E$	$3F$	$3G$	$3H$	$3I$	$3J$	$3K$	$3L$	$9A$	$3M$	$3N$	$9B$	$3O$	$3P$
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{3}	-3	-3	-3	-3	-3	-3	15	15	15	15	6	6	6	6	6
χ_{4}	-3	-3	-3	-3	-3	-3	15	15	15	15	6	6	6	6	6
χ_{5}	10	10	10	10	10	10	1	1	1	1	19	19	19	19	19
χ_{6}	10	10	10	10	10	10	1	1	1	1	19	19	19	19	19
χ_{7}	24	24	24	24	24	24	15	15	15	15	6	6	6	6	6
χ_{8}	24	24	24	24	24	24	15	15	15	15	6	6	6	6	6
χ_{9}	6	6	6	6	6	6	15	15	15	15	24	24	24	24	24
χ_{10}	6	6	6	6	6	6	15	15	15	15	24	24	24	24	24
χ_{11}	20	20	20	20	20	20	29	29	29	29	11	11	11	11	11
χ_{12}	20	20	20	20	20	20	29	29	29	29	11	11	11	11	11
χ_{13}	33	33	33	33	33	33	15	15	15	15	24	24	24	24	24
χ_{14}	33	33	33	33	33	33	15	15	15	15	24	24	24	24	24
χ_{15}	34	34	34	34	34	34	-20	-20	-20	-20	-20	-20	-20	-20	-20
χ_{16}	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
χ_{17}	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
χ_{18}	-21	-21	-21	-21	-21	-21	51	51	51	51	-12	-12	-12	-12	-12
χ_{19}	-21	-21	-21	-21	-21	-21	51	51	51	51	-12	-12	-12	-12	-12
χ_{20}	90	90	90	90	90	90	9	9	9	9	9	9	9	9	9
χ_{21}	90	90	90	90	90	90	9	9	9	9	9	9	9	9	9
χ_{22}	38	38	38	38	38	38	110	110	110	110	-34	-34	-34	-34	-34
χ_{23}	-42	-42	-42	-42	-42	-42	-6	-6	-6	-6	30	30	30	30	30
χ_{24}	-42	-42	-42	-42	-42	-42	-6	-6	-6	-6	30	30	30	30	30
χ_{25}	69	69	69	69	69	69	60	60	60	60	-3	-3	-3	-3	-3
χ_{26}	69	69	69	69	69	69	60	60	60	60	-3	-3	-3	-3	-3
χ_{27}	-12	-12	-12	-12	-12	-12	-30	-30	-30	-30	87	87	87	87	87
χ_{28}	-12	-12	-12	-12	-12	-12	-30	-30	-30	-30	87	87	87	87	87
χ_{29}	-120	-120	-120	-120	-120	-120	60	60	60	60	24	24	24	24	24
χ_{30}	-63	-63	-63	-63	-63	-63	45	45	45	45	18	18	18	18	18
χ_{31}	-63	-63	-63	-63	-63	-63	45	45	45	45	18	18	18	18	18
χ_{32}	-43	-43	-43	-43	-43	-43	20	20	20	20	56	56	56	56	56
χ_{33}	-43	-43	-43	-43	-43	-43	20	20	20	20	56	56	56	56	56
χ_{34}	-81	-81	-81	-81	-81	-81	81	81	81	81	0	0	0	0	0
χ_{35}	-81	-81	-81	-81	-81	-81	81	81	81	81	0	0	0	0	0
χ_{36}	78	78	78	78	78	78	-21	-21	-21	-21	96	96	96	96	96
χ_{37}	78	78	78	78	78	78	-21	-21	-21	-21	96	96	96	96	96
χ_{38}	27	27	27	27	27	27	0	0	0	0	54	54	54	54	54
χ_{39}	27	27	27	27	27	27	0	0	0	0	54	54	54	54	54
χ_{40}	-24	-24	-24	-24	-24	-24	75	75	75	75	-15	-15	-15	-15	-15
χ_{41}	-24	-24	-24	-24	-24	-24	75	75	75	75	-15	-15	-15	-15	-15
χ_{42}	138	138	138	138	138	138	-15	-15	-15	-15	21	21	21	21	21
χ_{43}	138	138	138	138	138	138	-15	-15	-15	-15	21	21	21	21	21
χ_{44}	-81	-81	-81	-81	-81	-81	0	0	0	0	81	81	81	81	81
χ_{45}	-81	-81	-81	-81	-81	-81	0	0	0	0	81	81	81	81	81
χ_{46}	207	207	207	207	207	207	45	45	45	45	18	18	18	18	18
χ_{47}	207	207	207	207	207	207	45	45	45	45	18	18	18	18	18
χ_{48}	-36	-36	-36	-36	-36	-36	45	45	45	45	72	72	72	72	72
χ_{49}	-36	-36	-36	-36	-36	-36	45	45	45	45	72	72	72	72	72
χ_{50}	156	156	156	156	156	156	66	66	66	66	-24	-24	-24	-24	-24
χ_{51}	156	156	156	156	156	156	66	66	66	66	-24	-24	-24	-24	-24
χ_{52}	162	162	162	162	162	162	81	81	81	81	0	0	0	0	0
χ_{53}	162	162	162	162	162	162	81	81	81	81	0	0	0	0	0
χ_{54}	162	162	162	162	162	162	0	0	0	0	81	81	81	81	81
χ_{55}	162	162	162	162	162	162	0	0	0	0	81	81	81	81	81
χ_{56}	33	33	33	33	33	33	-30	-30	-30	-30	96	96	96	96	96
χ_{57}	33	33	33	33	33	33	-30	-30	-30	-30	96	96	96	96	96
χ_{58}	114	114	114	114	114	114	60	60	60	60	6	6	6	6	6
χ_{59}	114	114	114	114	114	114	60	60	60	60	6	6	6	6	6
χ_{60}	-129	-129	-129	-129	-129	-129	60	60	60	60	60	60	60	60	60

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$3D$				$3E$			$3F$							$4A$	
	$9C$	$9D$	$9E$	$3Q$	$3R$	$9F$	$9G$	$9H$	$9I$	$9J$	$9K$	$3S$	$9L$	$9M$	$4A$	$12A$
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{3}	-3	-3	-3	-3	6	6	6	-3	-3	-3	-3	-3	-3	-3	-6	-6
χ_{4}	-3	-3	-3	-3	6	6	6	-3	-3	-3	-3	-3	-3	-3	-6	-6
χ_{5}	10	10	10	10	1	1	1	1	1	1	1	1	1	1	-1	-1
χ_{6}	10	10	10	10	1	1	1	1	1	1	1	1	1	1	-1	-1
χ_{7}	-3	-3	-3	-3	-3	-3	-3	6	6	6	6	6	6	6	-5	-5
χ_{8}	-3	-3	-3	-3	-3	-3	-3	6	6	6	6	6	6	6	-5	-5
χ_{9}	6	6	6	6	6	6	6	-3	-3	-3	-3	-3	-3	-3	4	4
χ_{10}	6	6	6	6	6	6	6	-3	-3	-3	-3	-3	-3	-3	4	4
χ_{11}	-7	-7	-7	-7	2	2	2	2	2	2	2	2	2	2	10	10
χ_{12}	-7	-7	-7	-7	2	2	2	2	2	2	2	2	2	2	10	10
χ_{13}	6	6	6	6	-3	-3	-3	6	6	6	6	6	6	6	5	5
χ_{14}	6	6	6	6	-3	-3	-3	6	6	6	6	6	6	6	5	5
χ_{15}	7	7	7	7	16	16	16	-2	-2	-2	-2	-2	-2	-2	0	0
χ_{16}	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-9	-9
χ_{17}	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-9	-9
χ_{18}	6	6	6	6	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	14	14
χ_{19}	6	6	6	6	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	14	14
χ_{20}	9	9	9	9	9	9	9	9	9	9	9	9	9	9	-1	-1
χ_{21}	9	9	9	9	9	9	9	9	9	9	9	9	9	9	-1	-1
χ_{22}	11	11	11	11	2	2	2	2	2	2	2	2	2	2	-20	-20
χ_{23}	-15	-15	-15	-15	12	12	12	3	3	3	3	3	3	3	0	0
χ_{24}	-15	-15	-15	-15	12	12	12	3	3	3	3	3	3	3	0	0
χ_{25}	15	15	15	15	6	6	6	6	6	6	6	6	6	6	5	5
χ_{26}	15	15	15	15	6	6	6	6	6	6	6	6	6	6	5	5
χ_{27}	15	15	15	15	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	5	5
χ_{28}	15	15	15	15	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	5	5
χ_{29}	-12	-12	-12	-12	6	6	6	6	6	6	6	6	6	6	0	0
χ_{30}	-9	-9	-9	-9	9	9	9	0	0	0	0	0	0	0	6	6
χ_{31}	-9	-9	-9	-9	9	9	9	0	0	0	0	0	0	0	6	6
χ_{32}	11	11	11	11	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	0	0
χ_{33}	11	11	11	11	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	0	0
χ_{34}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-14
χ_{35}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14	-14
χ_{36}	24	24	24	24	6	6	6	6	6	6	6	6	6	6	-4	-4
χ_{37}	24	24	24	24	6	6	6	6	6	6	6	6	6	6	-4	-4
χ_{38}	27	27	27	27	0	0	0	0	0	0	0	0	0	0	-9	-9
χ_{39}	27	27	27	27	0	0	0	0	0	0	0	0	0	0	-9	-9
χ_{40}	3	3	3	3	12	12	12	3	3	3	3	3	3	3	10	10
χ_{41}	3	3	3	3	12	12	12	3	3	3	3	3	3	3	10	10
χ_{42}	-24	-24	-24	-24	-6	-6	-6	3	3	3	3	3	3	3	-10	-10
χ_{43}	-24	-24	-24	-24	-6	-6	-6	3	3	3	3	3	3	3	-10	-10
χ_{44}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5	-5
χ_{45}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5	-5
χ_{46}	-9	-9	-9	-9	0	0	0	9	9	9	9	9	9	9	5	5
χ_{47}	-9	-9	-9	-9	0	0	0	9	9	9	9	9	9	9	5	5
χ_{48}	18	18	18	18	9	9	9	0	0	0	0	0	0	0	5	5
χ_{49}	18	18	18	18	9	9	9	0	0	0	0	0	0	0	5	5
χ_{50}	-6	-6	-6	-6	-6	-6	-6	3	3	3	3	3	3	3	0	0
χ_{51}	-6	-6	-6	-6	-6	-6	-6	3	3	3	3	3	3	3	0	0
χ_{52}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	-4
χ_{53}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	-4
χ_{54}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
χ_{55}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
χ_{56}	-21	-21	-21	-21	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	0	0
χ_{57}	-21	-21	-21	-21	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	0	0
χ_{58}	-21	-21	-21	-21	6	6	6	6	6	6	6	6	6	6	0	0
χ_{59}	-21	-21	-21	-21	6	6	6	6	6	6	6	6	6	6	0	0
χ_{60}	6	6	6	6	15	15	15	-3	-3	-3	-3	-3	-3	-3	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$4B$				$4C$		$4D$				$5A$				$6A$		$6B$
	$4B$	$12B$	$12C$	$12D$	$4C$	$12E$	$4D$	$12F$	$12G$	$12H$	$5A$	$15A$	$15B$	$15C$	$6H$	$6I$	$6J$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_3	2	2	2	2	2	2	2	2	2	2	3	3	3	3	-7	-7	-7
χ_4	2	2	2	2	2	2	2	2	2	2	3	3	3	3	-7	-7	-7
χ_5	3	3	3	3	3	3	-1	-1	-1	-1	1	1	1	1	6	6	-3
χ_6	3	3	3	3	3	3	-1	-1	-1	-1	1	1	1	1	6	6	-3
χ_7	5	5	5	5	1	1	-1	-1	-1	-1	0	0	0	0	-8	-8	1
χ_8	5	5	5	5	1	1	-1	-1	-1	-1	0	0	0	0	-8	-8	1
χ_9	0	0	0	0	0	0	4	4	4	4	3	3	3	3	2	2	11
χ_{10}	0	0	0	0	0	0	4	4	4	4	3	3	3	3	2	2	11
χ_{11}	2	2	2	2	2	2	2	2	2	2	2	2	2	2	16	16	7
χ_{12}	2	2	2	2	2	2	2	2	2	2	2	2	2	2	16	16	7
χ_{13}	3	3	3	3	-1	-1	1	1	1	1	0	0	0	0	1	1	1
χ_{14}	3	3	3	3	-1	-1	1	1	1	1	0	0	0	0	1	1	1
χ_{15}	8	8	8	8	8	8	0	0	0	0	0	0	0	0	-14	-14	4
χ_{16}	1	1	1	1	-3	-3	3	3	3	3	3	3	3	3	-10	-10	-10
χ_{17}	1	1	1	1	-3	-3	3	3	3	3	3	3	3	3	-10	-10	-10
χ_{18}	6	6	6	6	-2	-2	-2	-2	-2	-2	1	1	1	1	19	19	1
χ_{19}	6	6	6	6	-2	-2	-2	-2	-2	-2	1	1	1	1	19	19	1
χ_{20}	7	7	7	7	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	6	6	-3
χ_{21}	7	7	7	7	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	6	6	-3
χ_{22}	4	4	4	4	4	4	-4	-4	-4	-4	0	0	0	0	-42	-42	-6
χ_{23}	4	4	4	4	4	4	0	0	0	0	2	2	2	2	22	22	-14
χ_{24}	4	4	4	4	4	4	0	0	0	0	2	2	2	2	22	22	-14
χ_{25}	1	1	1	1	1	1	-3	-3	-3	-3	0	0	0	0	29	29	2
χ_{26}	1	1	1	1	1	1	-3	-3	-3	-3	0	0	0	0	29	29	2
χ_{27}	5	5	5	5	-3	-3	-3	-3	-3	-3	0	0	0	0	-8	-8	-8
χ_{28}	5	5	5	5	-3	-3	-3	-3	-3	-3	0	0	0	0	-8	-8	-8
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	24	-12
χ_{30}	2	2	2	2	2	2	-2	-2	-2	-2	3	3	3	3	-3	-3	15
χ_{31}	2	2	2	2	2	2	-2	-2	-2	-2	3	3	3	3	-3	-3	15
χ_{32}	4	4	4	4	4	4	0	0	0	0	0	0	0	0	5	5	-4
χ_{33}	4	4	4	4	4	4	0	0	0	0	0	0	0	0	5	5	-4
χ_{34}	6	6	6	6	-2	-2	2	2	2	2	1	1	1	1	-9	-9	-9
χ_{35}	6	6	6	6	-2	-2	2	2	2	2	1	1	1	1	-9	-9	-9
χ_{36}	0	0	0	0	0	0	-4	-4	-4	-4	-1	-1	-1	-1	2	2	11
χ_{37}	0	0	0	0	0	0	-4	-4	-4	-4	-1	-1	-1	-1	2	2	11
χ_{38}	-7	-7	-7	-7	5	5	3	3	3	3	-3	-3	-3	-3	27	27	0
χ_{39}	-7	-7	-7	-7	5	5	3	3	3	3	-3	-3	-3	-3	27	27	0
χ_{40}	-2	-2	-2	-2	-2	-2	2	2	2	2	0	0	0	0	4	4	13
χ_{41}	-2	-2	-2	-2	-2	-2	2	2	2	2	0	0	0	0	4	4	13
χ_{42}	6	6	6	6	6	6	-2	-2	-2	-2	0	0	0	0	38	38	11
χ_{43}	6	6	6	6	6	6	-2	-2	-2	-2	0	0	0	0	38	38	11
χ_{44}	3	3	3	3	-5	-5	3	3	3	3	0	0	0	0	-9	-9	18
χ_{45}	3	3	3	3	-5	-5	3	3	3	3	0	0	0	0	-9	-9	18
χ_{46}	11	11	11	11	-1	-1	1	1	1	1	0	0	0	0	-9	-9	-9
χ_{47}	11	11	11	11	-1	-1	1	1	1	1	0	0	0	0	-9	-9	-9
χ_{48}	-9	-9	-9	-9	3	3	1	1	1	1	0	0	0	0	-12	-12	-21
χ_{49}	-9	-9	-9	-9	3	3	1	1	1	1	0	0	0	0	-12	-12	-21
χ_{50}	0	0	0	0	0	0	0	0	0	0	-2	-2	-2	-2	20	20	2
χ_{51}	0	0	0	0	0	0	0	0	0	0	-2	-2	-2	-2	20	20	2
χ_{52}	0	0	0	0	0	0	-4	-4	-4	-4	1	1	1	1	-18	-18	9
χ_{53}	0	0	0	0	0	0	-4	-4	-4	-4	1	1	1	1	-18	-18	9
χ_{54}	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	-18	-18	-18
χ_{55}	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	-18	-18	-18
χ_{56}	4	4	4	4	4	4	0	0	0	0	0	0	0	0	-39	-39	6
χ_{57}	4	4	4	4	4	4	0	0	0	0	0	0	0	0	-39	-39	6
χ_{58}	-4	-4	-4	-4	-4	-4	0	0	0	0	0	0	0	0	2	2	-16
χ_{59}	-4	-4	-4	-4	-4	-4	0	0	0	0	0	0	0	0	2	2	-16
χ_{60}	12	12	12	12	-4	-4	0	0	0	0	0	0	0	0	-5	-5	4

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6C$		$6D$			$6E$		$6F$				$6G$				
	$6K$	$6L$	$6M$	$6N$	$6O$	$6P$	$18A$	$6Q$	$6R$	$6S$	$18B$	$6T$	$6U$	$6V$	$6W$	$6X$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_3	2	2	5	5	5	-2	-2	2	2	2	2	1	1	1	1	1
χ_4	2	2	5	5	5	-2	-2	2	2	2	2	1	1	1	1	1
χ_5	-3	-3	2	2	2	-5	-5	-1	-1	-1	-1	-2	-2	-2	-2	-2
χ_6	-3	-3	2	2	2	-5	-5	-1	-1	-1	-1	-2	-2	-2	-2	-2
χ_7	-8	-8	-4	-4	-4	-2	-2	2	2	2	2	4	4	4	4	4
χ_8	-8	-8	-4	-4	-4	-2	-2	2	2	2	2	4	4	4	4	4
χ_9	2	2	6	6	6	8	8	0	0	0	0	2	2	2	2	2
χ_{10}	2	2	6	6	6	8	8	0	0	0	0	2	2	2	2	2
χ_{11}	7	7	4	4	4	3	3	7	7	7	7	0	0	0	0	0
χ_{12}	7	7	4	4	4	3	3	7	7	7	7	0	0	0	0	0
χ_{13}	10	10	-3	-3	-3	8	8	0	0	0	0	5	5	5	5	5
χ_{14}	10	10	-3	-3	-3	8	8	0	0	0	0	5	5	5	5	5
χ_{15}	4	4	-14	-14	-14	-4	-4	4	4	4	4	2	2	2	2	2
χ_{16}	-10	-10	2	2	2	-10	-10	2	2	2	2	2	2	2	2	2
χ_{17}	-10	-10	2	2	2	-10	-10	2	2	2	2	2	2	2	2	2
χ_{18}	-8	-8	-1	-1	-1	-4	-4	8	8	8	8	-1	-1	-1	-1	-1
χ_{19}	-8	-8	-1	-1	-1	-4	-4	8	8	8	8	-1	-1	-1	-1	-1
χ_{20}	-3	-3	6	6	6	1	1	-3	-3	-3	-3	10	10	10	10	10
χ_{21}	-3	-3	6	6	6	1	1	-3	-3	-3	-3	10	10	10	10	10
χ_{22}	-6	-6	6	6	6	14	14	6	6	6	6	-10	-10	-10	-10	-10
χ_{23}	4	4	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
χ_{24}	4	4	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
χ_{25}	11	11	5	5	5	-3	-3	5	5	5	5	-3	-3	-3	-3	-3
χ_{26}	11	11	5	5	5	-3	-3	5	5	5	5	-3	-3	-3	-3	-3
χ_{27}	1	1	0	0	0	-1	-1	3	3	3	3	-4	-4	-4	-4	-4
χ_{28}	1	1	0	0	0	-1	-1	3	3	3	3	-4	-4	-4	-4	-4
χ_{29}	-12	-12	-8	-8	-8	8	8	16	16	16	16	8	8	8	8	8
χ_{30}	-12	-12	9	9	9	2	2	-6	-6	-6	-6	5	5	5	5	5
χ_{31}	-12	-12	9	9	9	2	2	-6	-6	-6	-6	5	5	5	5	5
χ_{32}	-4	-4	-11	-11	-11	8	8	-8	-8	-8	-8	5	5	5	5	5
χ_{33}	-4	-4	-11	-11	-11	8	8	-8	-8	-8	-8	5	5	5	5	5
χ_{34}	18	18	3	3	3	0	0	0	0	0	0	3	3	3	3	3
χ_{35}	18	18	3	3	3	0	0	0	0	0	0	3	3	3	3	3
χ_{36}	2	2	6	6	6	0	0	0	0	0	0	-6	-6	-6	-6	-6
χ_{37}	2	2	6	6	6	0	0	0	0	0	0	-6	-6	-6	-6	-6
χ_{38}	0	0	3	3	3	6	6	6	6	6	6	3	3	3	3	3
χ_{39}	0	0	3	3	3	6	6	6	6	6	6	3	3	3	3	3
χ_{40}	-5	-5	0	0	0	-7	-7	-3	-3	-3	-3	-4	-4	-4	-4	-4
χ_{41}	-5	-5	0	0	0	-7	-7	-3	-3	-3	-3	-4	-4	-4	-4	-4
χ_{42}	-7	-7	10	10	10	-3	-3	1	1	1	1	6	6	6	6	6
χ_{43}	-7	-7	10	10	10	-3	-3	1	1	1	1	6	6	6	6	6
χ_{44}	-9	-9	3	3	3	9	9	-3	-3	-3	-3	3	3	3	3	3
χ_{45}	-9	-9	3	3	3	9	9	-3	-3	-3	-3	3	3	3	3	3
χ_{46}	18	18	-9	-9	-9	2	2	-6	-6	-6	-6	-1	-1	-1	-1	-1
χ_{47}	18	18	-9	-9	-9	2	2	-6	-6	-6	-6	-1	-1	-1	-1	-1
χ_{48}	6	6	12	12	12	-8	-8	0	0	0	0	4	4	4	4	4
χ_{49}	6	6	12	12	12	-8	-8	0	0	0	0	4	4	4	4	4
χ_{50}	20	20	12	12	12	-8	-8	0	0	0	0	4	4	4	4	4
χ_{51}	20	20	12	12	12	-8	-8	0	0	0	0	4	4	4	4	4
χ_{52}	-18	-18	-6	-6	-6	0	0	0	0	0	0	6	6	6	6	6
χ_{53}	-18	-18	-6	-6	-6	0	0	0	0	0	0	6	6	6	6	6
χ_{54}	9	9	-6	-6	-6	9	9	-3	-3	-3	-3	6	6	6	6	6
χ_{55}	9	9	-6	-6	-6	9	9	-3	-3	-3	-3	6	6	6	6	6
χ_{56}	6	6	1	1	1	8	8	4	4	4	4	-7	-7	-7	-7	-7
χ_{57}	6	6	1	1	1	8	8	4	4	4	4	-7	-7	-7	-7	-7
χ_{58}	-16	-16	10	10	10	6	6	-2	-2	-2	-2	-6	-6	-6	-6	-6
χ_{59}	-16	-16	10	10	10	6	6	-2	-2	-2	-2	-6	-6	-6	-6	-6
χ_{60}	4	4	-5	-5	-5	-4	-4	4	4	4	4	-1	-1	-1	-1	-1

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	6H					6I					6J				6K
	$6Y$	$6Z$	$6AA$	$6AB$	$18C$	$6AC$	$6AD$	$6AE$	$6AF$	$6AG$	$6AH$	$6AI$	$6AJ$	$6AK$	$6AL$
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{3}	-1	-1	-1	-1	-1	1	1	1	1	1	-2	-2	-2	-2	2
χ_{4}	-1	-1	-1	-1	-1	1	1	1	1	1	-2	-2	-2	-2	2
χ_{5}	5	5	5	5	5	1	1	1	1	1	1	1	1	1	-3
χ_{6}	5	5	5	5	5	1	1	1	1	1	1	1	1	1	-3
χ_{7}	-1	-1	-1	-1	-1	1	1	1	1	1	4	4	4	4	1
χ_{8}	-1	-1	-1	-1	-1	1	1	1	1	1	4	4	4	4	1
χ_{9}	3	3	3	3	3	-1	-1	-1	-1	-1	2	2	2	2	2
χ_{10}	3	3	3	3	3	-1	-1	-1	-1	-1	2	2	2	2	2
χ_{11}	1	1	1	1	1	3	3	3	3	3	3	3	3	3	-2
χ_{12}	1	1	1	1	1	3	3	3	3	3	3	3	3	3	-2
χ_{13}	3	3	3	3	3	5	5	5	5	5	2	2	2	2	1
χ_{14}	3	3	3	3	3	5	5	5	5	5	2	2	2	2	1
χ_{15}	4	4	4	4	4	-4	-4	-4	-4	-4	-4	-4	-4	-4	4
χ_{16}	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-1
χ_{17}	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-1
χ_{18}	-1	-1	-1	-1	-1	5	5	5	5	5	-4	-4	-4	-4	1
χ_{19}	-1	-1	-1	-1	-1	5	5	5	5	5	-4	-4	-4	-4	1
χ_{20}	-3	-3	-3	-3	-3	1	1	1	1	1	1	1	1	1	-3
χ_{21}	-3	-3	-3	-3	-3	1	1	1	1	1	1	1	1	1	-3
χ_{22}	6	6	6	6	6	2	2	2	2	2	2	2	2	2	-6
χ_{23}	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	4	4	4	4	4
χ_{24}	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	4	4	4	4	4
χ_{25}	-4	-4	-4	-4	-4	-6	-6	-6	-6	-6	3	3	3	3	2
χ_{26}	-4	-4	-4	-4	-4	-6	-6	-6	-6	-6	3	3	3	3	2
χ_{27}	6	6	6	6	6	-4	-4	-4	-4	-4	5	5	5	5	1
χ_{28}	6	6	6	6	6	-4	-4	-4	-4	-4	5	5	5	5	1
χ_{29}	4	4	4	4	4	-4	-4	-4	-4	-4	-4	-4	-4	-4	6
χ_{30}	-3	-3	-3	-3	-3	-1	-1	-1	-1	-1	-4	-4	-4	-4	-3
χ_{31}	-3	-3	-3	-3	-3	-1	-1	-1	-1	-1	-4	-4	-4	-4	-3
χ_{32}	4	4	4	4	4	-4	-4	-4	-4	-4	-4	-4	-4	-4	5
χ_{33}	4	4	4	4	4	-4	-4	-4	-4	-4	-4	-4	-4	-4	5
χ_{34}	-3	-3	-3	-3	-3	3	3	3	3	3	-6	-6	-6	-6	0
χ_{35}	-3	-3	-3	-3	-3	3	3	3	3	3	-6	-6	-6	-6	0
χ_{36}	3	3	3	3	3	3	3	3	3	3	-6	-6	-6	-6	2
χ_{37}	3	3	3	3	3	3	3	3	3	3	-6	-6	-6	-6	2
χ_{38}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{39}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{40}	3	3	3	3	3	5	5	5	5	5	-1	-1	-1	-1	4
χ_{41}	3	3	3	3	3	5	5	5	5	5	-1	-1	-1	-1	4
χ_{42}	1	1	1	1	1	3	3	3	3	3	-3	-3	-3	-3	2
χ_{43}	1	1	1	1	1	3	3	3	3	3	-3	-3	-3	-3	2
χ_{44}	0	0	0	0	0	-6	-6	-6	-6	-6	3	3	3	3	0
χ_{45}	0	0	0	0	0	-6	-6	-6	-6	-6	3	3	3	3	0
χ_{46}	-3	-3	-3	-3	-3	-1	-1	-1	-1	-1	2	2	2	2	0
χ_{47}	-3	-3	-3	-3	-3	-1	-1	-1	-1	-1	2	2	2	2	0
χ_{48}	-3	-3	-3	-3	-3	-5	-5	-5	-5	-5	-2	-2	-2	-2	-3
χ_{49}	-3	-3	-3	-3	-3	-5	-5	-5	-5	-5	-2	-2	-2	-2	-3
χ_{50}	6	6	6	6	6	-2	-2	-2	-2	-2	4	4	4	4	2
χ_{51}	6	6	6	6	6	-2	-2	-2	-2	-2	4	4	4	4	2
χ_{52}	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	6	6	6	6	0
χ_{53}	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	6	6	6	6	0
χ_{54}	0	0	0	0	0	6	6	6	6	6	-3	-3	-3	-3	0
χ_{55}	0	0	0	0	0	6	6	6	6	6	-3	-3	-3	-3	0
χ_{56}	-2	-2	-2	-2	-2	2	2	2	2	2	2	2	2	2	-3
χ_{57}	-2	-2	-2	-2	-2	2	2	2	2	2	2	2	2	2	-3
χ_{58}	4	4	4	4	4	0	0	0	0	0	0	0	0	0	2
χ_{59}	4	4	4	4	4	0	0	0	0	0	0	0	0	0	2
χ_{60}	4	4	4	4	4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-5

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6L$			$6M$		$6N$			$7A$		$8A$		$8B$		$9A$		
	$18D$	$6AM$	$18E$	$6AN$	$18F$	$18G$	$6AO$	$18H$	$7A$	$21A$	$8A$	$24A$	$8B$	$24B$	$9N$	$9O$	$9P$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_3	1	1	1	-2	-2	1	1	1	1	1	0	0	0	0	3	3	3
χ_4	1	1	1	-2	-2	1	1	1	1	1	0	0	0	0	3	3	3
χ_5	-2	-2	-2	1	1	1	1	1	0	0	-1	-1	-1	-1	-2	-2	-2
χ_6	-2	-2	-2	1	1	1	1	1	0	0	-1	-1	-1	-1	-2	-2	-2
χ_7	1	1	1	1	1	-2	-2	-2	0	0	1	1	-1	-1	3	3	3
χ_8	1	1	1	1	1	-2	-2	-2	0	0	1	1	-1	-1	3	3	3
χ_9	2	2	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0	0
χ_{10}	2	2	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0	0
χ_{11}	-3	-3	-3	0	0	0	0	0	0	0	0	0	0	0	5	5	5
χ_{12}	-3	-3	-3	0	0	0	0	0	0	0	0	0	0	0	5	5	5
χ_{13}	2	2	2	-1	-1	2	2	2	-1	-1	1	1	-1	-1	0	0	0
χ_{14}	2	2	2	-1	-1	2	2	2	-1	-1	1	1	-1	-1	0	0	0
χ_{15}	-1	-1	-1	2	2	2	2	2	2	2	0	0	0	0	-2	-2	-2
χ_{16}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	-1	-1	1	1	3	3	3
χ_{17}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	-1	-1	1	1	3	3	3
χ_{18}	2	2	2	-1	-1	-1	-1	-1	0	0	0	0	0	0	3	3	3
χ_{19}	2	2	2	-1	-1	-1	-1	-1	0	0	0	0	0	0	3	3	3
χ_{20}	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	0
χ_{21}	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	0
χ_{22}	-1	-1	-1	2	2	2	2	2	0	0	0	0	0	0	8	8	8
χ_{23}	1	1	1	-2	-2	1	1	1	0	0	0	0	0	0	-3	-3	-3
χ_{24}	1	1	1	-2	-2	1	1	1	0	0	0	0	0	0	-3	-3	-3
χ_{25}	3	3	3	0	0	0	0	0	0	0	-1	-1	-1	-1	3	3	3
χ_{26}	3	3	3	0	0	0	0	0	0	0	-1	-1	-1	-1	3	3	3
χ_{27}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	1	1	1	1	0	0	0
χ_{28}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	1	1	1	1	0	0	0
χ_{29}	-4	-4	-4	2	2	2	2	2	-2	-2	0	0	0	0	-6	-6	-6
χ_{30}	-1	-1	-1	-1	-1	2	2	2	0	0	0	0	0	0	0	0	0
χ_{31}	-1	-1	-1	-1	-1	2	2	2	0	0	0	0	0	0	0	0	0
χ_{32}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	5	5	5
χ_{33}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	5	5	5
χ_{34}	0	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0
χ_{35}	0	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0
χ_{36}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{37}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{38}	3	3	3	0	0	0	0	0	0	0	-1	-1	1	1	0	0	0
χ_{39}	3	3	3	0	0	0	0	0	0	0	-1	-1	1	1	0	0	0
χ_{40}	-1	-1	-1	2	2	-1	-1	-1	0	0	0	0	0	0	0	0	0
χ_{41}	-1	-1	-1	2	2	-1	-1	-1	0	0	0	0	0	0	0	0	0
χ_{42}	0	0	0	0	0	-3	-3	-3	0	0	0	0	0	0	-3	-3	-3
χ_{43}	0	0	0	0	0	-3	-3	-3	0	0	0	0	0	0	-3	-3	-3
χ_{44}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0	0
χ_{45}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0	0
χ_{46}	-1	-1	-1	2	2	-1	-1	-1	0	0	-1	-1	1	1	0	0	0
χ_{47}	-1	-1	-1	2	2	-1	-1	-1	0	0	-1	-1	1	1	0	0	0
χ_{48}	-2	-2	-2	1	1	-2	-2	-2	0	0	1	1	-1	-1	0	0	0
χ_{49}	-2	-2	-2	1	1	-2	-2	-2	0	0	1	1	-1	-1	0	0	0
χ_{50}	-2	-2	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0	0
χ_{51}	-2	-2	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0	0
χ_{52}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{53}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{54}	0	0	0	0	0	0	0	0	1	1	-1	-1	-1	-1	0	0	0
χ_{55}	0	0	0	0	0	0	0	0	1	1	-1	-1	-1	-1	0	0	0
χ_{56}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	-6	-6	-6
χ_{57}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	-6	-6	-6
χ_{58}	3	3	3	0	0	0	0	0	0	0	0	0	0	0	-3	-3	-3
χ_{59}	3	3	3	0	0	0	0	0	0	0	0	0	0	0	-3	-3	-3
χ_{60}	2	2	2	-1	-1	-1	-1	-1	0	0	0	0	0	0	-3	-3	-3

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	9B							9C			10A		10B		12A	
	9Q	9R	9S	9T	9U	9V	9W	27A	27B	27C	10A	30A	10B	30B	12I	36A
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{3}	0	0	0	0	0	0	0	0	0	0	-1	-1	1	1	2	2
χ_{4}	0	0	0	0	0	0	0	0	0	0	-1	-1	1	1	2	2
χ_{5}	4	4	4	4	4	4	4	1	1	1	1	1	-1	-1	3	3
χ_{6}	4	4	4	4	4	4	4	1	1	1	1	1	-1	-1	3	3
χ_{7}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
χ_{8}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
χ_{9}	3	3	3	3	3	3	3	0	0	0	-1	-1	1	1	0	0
χ_{10}	3	3	3	3	3	3	3	0	0	0	-1	-1	1	1	0	0
χ_{11}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	2	2	0	0	-1	-1
χ_{12}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	2	2	0	0	-1	-1
χ_{13}	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0
χ_{14}	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0
χ_{15}	-2	-2	-2	-2	-2	-2	-2	1	1	1	0	0	0	0	-4	-4
χ_{16}	3	3	3	3	3	3	3	0	0	0	-1	-1	-1	-1	-2	-2
χ_{17}	3	3	3	3	3	3	3	0	0	0	-1	-1	-1	-1	-2	-2
χ_{18}	0	0	0	0	0	0	0	0	0	0	1	1	-1	-1	0	0
χ_{19}	0	0	0	0	0	0	0	0	0	0	1	1	-1	-1	0	0
χ_{20}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1
χ_{21}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1
χ_{22}	-4	-4	-4	-4	-4	-4	-4	-1	-1	-1	0	0	0	0	-2	-2
χ_{23}	0	0	0	0	0	0	0	0	0	0	2	2	0	0	-2	-2
χ_{24}	0	0	0	0	0	0	0	0	0	0	2	2	0	0	-2	-2
χ_{25}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{26}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{27}	3	3	3	3	3	3	3	0	0	0	0	0	0	0	-1	-1
χ_{28}	3	3	3	3	3	3	3	0	0	0	0	0	0	0	-1	-1
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	2	2
χ_{31}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	2	2
χ_{32}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	4	4
χ_{33}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	4	4
χ_{34}	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0
χ_{35}	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0
χ_{36}	3	3	3	3	3	3	3	0	0	0	-1	-1	1	1	0	0
χ_{37}	3	3	3	3	3	3	3	0	0	0	-1	-1	1	1	0	0
χ_{38}	0	0	0	0	0	0	0	0	0	0	1	1	-1	-1	2	2
χ_{39}	0	0	0	0	0	0	0	0	0	0	1	1	-1	-1	2	2
χ_{40}	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	1	1
χ_{41}	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	1	1
χ_{42}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	-3
χ_{43}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	-3
χ_{44}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	-3
χ_{45}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	-3
χ_{46}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
χ_{47}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
χ_{48}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{49}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{50}	-3	-3	-3	-3	-3	-3	-3	0	0	0	-2	-2	0	0	0	0
χ_{51}	-3	-3	-3	-3	-3	-3	-3	0	0	0	-2	-2	0	0	0	0
χ_{52}	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0
χ_{53}	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0
χ_{54}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	-3
χ_{55}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	-3
χ_{56}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
χ_{57}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
χ_{58}	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	2	2
χ_{59}	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	2	2
χ_{60}	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$12B$					$12C$		$12D$		$12E$		$12F$			$12G$	
	$12J$	$12K$	$12L$	$12M$	$12N$	$12O$	$12P$	$12Q$	$12R$	$12S$	$12T$	$36B$	$12U$	$36C$	$12V$	$36D$
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{3}	-1	-1	-1	-1	-1	0	0	-3	-3	-1	-1	-1	-1	-1	-1	-1
χ_{4}	-1	-1	-1	-1	-1	0	0	-3	-3	-1	-1	-1	-1	-1	-1	-1
χ_{5}	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	-1	-1
χ_{6}	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	-1	-1
χ_{7}	2	2	2	2	2	-2	-2	1	1	-2	-2	-1	-1	-1	-1	-1
χ_{8}	2	2	2	2	2	-2	-2	1	1	-2	-2	-1	-1	-1	-1	-1
χ_{9}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	1	1
χ_{10}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	1	1
χ_{11}	2	2	2	2	2	1	1	1	1	2	2	-1	-1	-1	-1	-1
χ_{12}	2	2	2	2	2	1	1	1	1	2	2	-1	-1	-1	-1	-1
χ_{13}	3	3	3	3	3	2	2	-1	-1	-1	-1	0	0	0	1	1
χ_{14}	3	3	3	3	3	2	2	-1	-1	-1	-1	0	0	0	1	1
χ_{15}	2	2	2	2	2	0	0	0	0	2	2	-1	-1	-1	0	0
χ_{16}	4	4	4	4	4	0	0	0	0	0	0	1	1	1	0	0
χ_{17}	4	4	4	4	4	0	0	0	0	0	0	1	1	1	0	0
χ_{18}	-3	-3	-3	-3	-3	2	2	-1	-1	1	1	0	0	0	1	1
χ_{19}	-3	-3	-3	-3	-3	2	2	-1	-1	1	1	0	0	0	1	1
χ_{20}	-2	-2	-2	-2	-2	-1	-1	-1	-1	2	2	1	1	1	-1	-1
χ_{21}	-2	-2	-2	-2	-2	-1	-1	-1	-1	2	2	1	1	1	-1	-1
χ_{22}	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	1	1	1	2	2
χ_{23}	-2	-2	-2	-2	-2	0	0	0	0	-2	-2	1	1	1	0	0
χ_{24}	-2	-2	-2	-2	-2	0	0	0	0	-2	-2	1	1	1	0	0
χ_{25}	1	1	1	1	1	-1	-1	2	2	1	1	1	1	1	0	0
χ_{26}	1	1	1	1	1	-1	-1	2	2	1	1	1	1	1	0	0
χ_{27}	-4	-4	-4	-4	-4	-1	-1	2	2	0	0	-1	-1	-1	0	0
χ_{28}	-4	-4	-4	-4	-4	-1	-1	2	2	0	0	-1	-1	-1	0	0
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	-1	-1	-1	-1	-1	0	0	3	3	-1	-1	-1	-1	-1	1	1
χ_{31}	-1	-1	-1	-1	-1	0	0	3	3	-1	-1	-1	-1	-1	1	1
χ_{32}	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0
χ_{33}	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0
χ_{34}	-3	-3	-3	-3	-3	-2	-2	1	1	1	1	0	0	0	-1	-1
χ_{35}	-3	-3	-3	-3	-3	-2	-2	1	1	1	1	0	0	0	-1	-1
χ_{36}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	-1	-1
χ_{37}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	-1	-1
χ_{38}	-1	-1	-1	-1	-1	0	0	0	0	-1	-1	-1	-1	-1	0	0
χ_{39}	-1	-1	-1	-1	-1	0	0	0	0	-1	-1	-1	-1	-1	0	0
χ_{40}	-2	-2	-2	-2	-2	1	1	1	1	-2	-2	1	1	1	-1	-1
χ_{41}	-2	-2	-2	-2	-2	1	1	1	1	-2	-2	1	1	1	-1	-1
χ_{42}	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	1	1
χ_{43}	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	1	1
χ_{44}	-3	-3	-3	-3	-3	1	1	-2	-2	1	1	0	0	0	0	0
χ_{45}	-3	-3	-3	-3	-3	1	1	-2	-2	1	1	0	0	0	0	0
χ_{46}	-1	-1	-1	-1	-1	2	2	-1	-1	-1	-1	-1	-1	-1	1	1
χ_{47}	-1	-1	-1	-1	-1	2	2	-1	-1	-1	-1	-1	-1	-1	1	1
χ_{48}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	1	1
χ_{49}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	1	1
χ_{50}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{51}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{52}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	-1	-1
χ_{53}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	-1	-1
χ_{54}	0	0	0	0	0	-1	-1	2	2	0	0	0	0	0	0	0
χ_{55}	0	0	0	0	0	-1	-1	2	2	0	0	0	0	0	0	0
χ_{56}	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0
χ_{57}	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0
χ_{58}	2	2	2	2	2	0	0	0	0	2	2	-1	-1	-1	0	0
χ_{59}	2	2	2	2	2	0	0	0	0	2	2	-1	-1	-1	0	0
χ_{60}	3	3	3	3	3	0	0	0	0	-1	-1	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	13*A*		13*B*		14*A*		15*A*		18*A*	18*B*			18*C*		20*A*	
	13*A*	39*A*	13*B*	39*B*	14*A*	42*A*	15*D*	45*A*	18*I*	18*J*	18*K*	18*L*	18*M*	18*N*	20*A*	60*A*
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{3}	0	0	0	0	1	1	0	0	-1	2	2	2	-1	-1	-1	-1
χ_{4}	0	0	0	0	1	1	0	0	-1	2	2	2	-1	-1	-1	-1
χ_{5}	0	0	0	0	0	0	1	1	0	0	0	0	2	2	-1	-1
χ_{6}	0	0	0	0	0	0	1	1	0	0	0	0	2	2	-1	-1
χ_{7}	1	1	1	1	0	0	0	0	1	-2	-2	-2	-1	-1	0	0
χ_{8}	1	1	1	1	0	0	0	0	1	-2	-2	-2	-1	-1	0	0
χ_{9}	-1	-1	-1	-1	0	0	0	0	2	-1	-1	-1	0	0	-1	-1
χ_{10}	-1	-1	-1	-1	0	0	0	0	2	-1	-1	-1	0	0	-1	-1
χ_{11}	0	0	0	0	0	0	-1	-1	1	1	1	1	1	1	0	0
χ_{12}	0	0	0	0	0	0	-1	-1	1	1	1	1	1	1	0	0
χ_{13}	0	0	0	0	-1	-1	0	0	-2	1	1	1	0	0	0	0
χ_{14}	0	0	0	0	-1	-1	0	0	-2	1	1	1	0	0	0	0
χ_{15}	0	0	0	0	-2	-2	0	0	-2	-2	-2	-2	-2	-2	0	0
χ_{16}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	1	1
χ_{17}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	1	1
χ_{18}	0	0	0	0	0	0	1	1	1	-2	-2	-2	-1	-1	-1	-1
χ_{19}	0	0	0	0	0	0	1	1	1	-2	-2	-2	-1	-1	-1	-1
χ_{20}	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	-1	-1
χ_{21}	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	-1	-1
χ_{22}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{23}	0	0	0	0	0	0	-1	-1	1	-2	-2	-2	1	1	0	0
χ_{24}	0	0	0	0	0	0	-1	-1	1	-2	-2	-2	1	1	0	0
χ_{25}	0	0	0	0	0	0	0	0	-1	2	2	2	-1	-1	0	0
χ_{26}	0	0	0	0	0	0	0	0	-1	2	2	2	-1	-1	0	0
χ_{27}	0	0	0	0	0	0	0	0	-2	1	1	1	0	0	0	0
χ_{28}	0	0	0	0	0	0	0	0	-2	1	1	1	0	0	0	0
χ_{29}	0	0	0	0	2	2	0	0	0	0	0	0	-2	-2	0	0
χ_{30}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{31}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{32}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1	0	0
χ_{33}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1	0	0
χ_{34}	0	0	0	0	-1	-1	1	1	0	0	0	0	0	0	1	1
χ_{35}	0	0	0	0	-1	-1	1	1	0	0	0	0	0	0	1	1
χ_{36}	0	0	0	0	0	0	-1	-1	2	-1	-1	-1	0	0	1	1
χ_{37}	0	0	0	0	0	0	-1	-1	2	-1	-1	-1	0	0	1	1
χ_{38}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{39}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{40}	0	0	0	0	0	0	0	0	-2	1	1	1	0	0	0	0
χ_{41}	0	0	0	0	0	0	0	0	-2	1	1	1	0	0	0	0
χ_{42}	0	0	0	0	0	0	0	0	-1	2	2	2	1	1	0	0
χ_{43}	0	0	0	0	0	0	0	0	-1	2	2	2	1	1	0	0
χ_{44}	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
χ_{45}	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
χ_{46}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{47}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{48}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{49}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{50}	0	0	0	0	0	0	1	1	2	-1	-1	-1	0	0	0	0
χ_{51}	0	0	0	0	0	0	1	1	2	-1	-1	-1	0	0	0	0
χ_{52}	-1	-1	-1	-1	0	0	1	1	0	0	0	0	0	0	1	1
χ_{53}	-1	-1	-1	-1	0	0	1	1	0	0	0	0	0	0	1	1
χ_{54}	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
χ_{55}	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
χ_{56}	0	0	0	0	0	0	0	0	0	0	0	0	-2	-2	0	0
χ_{57}	0	0	0	0	0	0	0	0	0	0	0	0	-2	-2	0	0
χ_{58}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1	0	0
χ_{59}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1	0	0
χ_{60}	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$2D$				$2E$				$2F$			
	$2D$	$6AP$	$6AQ$	$6AR$	$2E$	$6AS$	$6AT$	$6AU$	$2F$	$6AV$	$6AW$	$6AX$
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{3}	26	26	26	26	-6	-6	-6	-6	2	2	2	2
χ_{4}	-26	-26	-26	-26	6	6	6	6	-2	-2	-2	-2
χ_{5}	39	39	39	39	-9	-9	-9	-9	-1	-1	-1	-1
χ_{6}	-39	-39	-39	-39	9	9	9	9	1	1	1	1
χ_{7}	25	25	25	25	-15	-15	-15	-15	5	5	5	5
χ_{8}	-25	-25	-25	-25	15	15	15	15	-5	-5	-5	-5
χ_{9}	64	64	64	64	16	16	16	16	8	8	8	8
χ_{10}	-64	-64	-64	-64	-16	-16	-16	-16	-8	-8	-8	-8
χ_{11}	52	52	52	52	20	20	20	20	12	12	12	12
χ_{12}	-52	-52	-52	-52	-20	-20	-20	-20	-12	-12	-12	-12
χ_{13}	65	65	65	65	25	25	25	25	5	5	5	5
χ_{14}	-65	-65	-65	-65	-25	-25	-25	-25	-5	-5	-5	-5
χ_{15}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{16}	91	91	91	91	-29	-29	-29	-29	7	7	7	7
χ_{17}	-91	-91	-91	-91	29	29	29	29	-7	-7	-7	-7
χ_{18}	26	26	26	26	-6	-6	-6	-6	-14	-14	-14	-14
χ_{19}	-26	-26	-26	-26	6	6	6	6	14	14	14	14
χ_{20}	39	39	39	39	39	39	39	39	-1	-1	-1	-1
χ_{21}	-39	-39	-39	-39	-39	-39	-39	-39	1	1	1	1
χ_{22}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{23}	208	208	208	208	0	0	0	0	8	8	8	8
χ_{24}	-208	-208	-208	-208	0	0	0	0	-8	-8	-8	-8
χ_{25}	65	65	65	65	-15	-15	-15	-15	-15	-15	-15	-15
χ_{26}	-65	-65	-65	-65	15	15	15	15	15	15	15	15
χ_{27}	325	325	325	325	5	5	5	5	5	5	5	5
χ_{28}	-325	-325	-325	-325	-5	-5	-5	-5	-5	-5	-5	-5
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	234	234	234	234	-6	-6	-6	-6	-22	-22	-22	-22
χ_{31}	-234	-234	-234	-234	6	6	6	6	22	22	22	22
χ_{32}	260	260	260	260	20	20	20	20	-20	-20	-20	-20
χ_{33}	-260	-260	-260	-260	-20	-20	-20	-20	20	20	20	20
χ_{34}	234	234	234	234	-6	-6	-6	-6	-6	-6	-6	-6
χ_{35}	-234	-234	-234	-234	6	6	6	6	6	6	6	6
χ_{36}	416	416	416	416	-16	-16	-16	-16	-24	-24	-24	-24
χ_{37}	-416	-416	-416	-416	16	16	16	16	24	24	24	24
χ_{38}	351	351	351	351	39	39	39	39	27	27	27	27
χ_{39}	-351	-351	-351	-351	-39	-39	-39	-39	-27	-27	-27	-27
χ_{40}	260	260	260	260	20	20	20	20	20	20	20	20
χ_{41}	-260	-260	-260	-260	-20	-20	-20	-20	-20	-20	-20	-20
χ_{42}	260	260	260	260	-60	-60	-60	-60	-20	-20	-20	-20
χ_{43}	-260	-260	-260	-260	60	60	60	60	20	20	20	20
χ_{44}	495	495	495	495	15	15	15	15	15	15	15	15
χ_{45}	-495	-495	-495	-495	-15	-15	-15	-15	-15	-15	-15	-15
χ_{46}	195	195	195	195	75	75	75	75	-25	-25	-25	-25
χ_{47}	-195	-195	-195	-195	-75	-75	-75	-75	25	25	25	25
χ_{48}	585	585	585	585	-15	-15	-15	-15	5	5	5	5
χ_{49}	-585	-585	-585	-585	15	15	15	15	-5	-5	-5	-5
χ_{50}	208	208	208	208	80	80	80	80	48	48	48	48
χ_{51}	-208	-208	-208	-208	-80	-80	-80	-80	-48	-48	-48	-48
χ_{52}	144	144	144	144	-96	-96	-96	-96	24	24	24	24
χ_{53}	-144	-144	-144	-144	96	96	96	96	-24	-24	-24	-24
χ_{54}	585	585	585	585	105	105	105	105	-15	-15	-15	-15
χ_{55}	-585	-585	-585	-585	-105	-105	-105	-105	15	15	15	15
χ_{56}	780	780	780	780	60	60	60	60	20	20	20	20
χ_{57}	-780	-780	-780	-780	-60	-60	-60	-60	-20	-20	-20	-20
χ_{58}	520	520	520	520	-40	-40	-40	-40	0	0	0	0
χ_{59}	-520	-520	-520	-520	40	40	40	40	0	0	0	0
χ_{60}	260	260	260	260	20	20	20	20	-20	-20	-20	-20

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$4E$	$4F$	$4G$				$4H$			$4I$			
	$4E$	$4F$	$4G$	$12W$	$12X$	$12Y$	$4H$	$12Z$	$12AA$	$4I$	$12AB$	$12AC$	$12AD$
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{3}	-14	6	2	2	2	2	2	2	2	-2	-2	-2	-2
χ_{4}	14	-6	-2	-2	-2	-2	-2	-2	-2	2	2	2	2
χ_{5}	-9	7	7	7	7	7	-1	-1	-1	-1	-1	-1	-1
χ_{6}	9	-7	-7	-7	-7	-7	1	1	1	1	1	1	1
χ_{7}	-5	7	3	3	3	3	-1	-1	-1	-3	-3	-3	-3
χ_{8}	5	-7	-3	-3	-3	-3	1	1	1	3	3	3	3
χ_{9}	24	0	8	8	8	8	0	0	0	0	0	0	0
χ_{10}	-24	0	-8	-8	-8	-8	0	0	0	0	0	0	0
χ_{11}	20	0	4	4	4	4	4	4	4	0	0	0	0
χ_{12}	-20	0	-4	-4	-4	-4	-4	-4	-4	0	0	0	0
χ_{13}	15	-1	7	7	7	7	3	3	3	1	1	1	1
χ_{14}	-15	1	-7	-7	-7	-7	-3	-3	-3	-1	-1	-1	-1
χ_{15}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{16}	-31	-7	9	9	9	9	-3	-3	-3	3	3	3	3
χ_{17}	31	7	-9	-9	-9	-9	3	3	3	-3	-3	-3	-3
χ_{18}	14	-14	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
χ_{19}	-14	14	2	2	2	2	2	2	2	2	2	2	2
χ_{20}	-21	7	-5	-5	-5	-5	-5	-5	-5	3	3	3	3
χ_{21}	21	-7	5	5	5	5	5	5	5	-3	-3	-3	-3
χ_{22}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{23}	-40	0	8	8	8	8	0	0	0	0	0	0	0
χ_{24}	40	0	-8	-8	-8	-8	0	0	0	0	0	0	0
χ_{25}	25	21	-7	-7	-7	-7	1	1	1	5	5	5	5
χ_{26}	-25	-21	7	7	7	7	-1	-1	-1	-5	-5	-5	-5
χ_{27}	-15	-7	17	17	17	17	1	1	1	-3	-3	-3	-3
χ_{28}	15	7	-17	-17	-17	-17	-1	-1	-1	3	3	3	3
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	66	14	2	2	2	2	-6	-6	-6	-2	-2	-2	-2
χ_{31}	-66	-14	-2	-2	-2	-2	6	6	6	2	2	2	2
χ_{32}	20	28	4	4	4	4	-4	-4	-4	4	4	4	4
χ_{33}	-20	-28	-4	-4	-4	-4	4	4	4	-4	-4	-4	-4
χ_{34}	-66	-6	-2	-2	-2	-2	6	6	6	-2	-2	-2	-2
χ_{35}	66	6	2	2	2	2	-6	-6	-6	2	2	2	2
χ_{36}	24	0	8	8	8	8	0	0	0	0	0	0	0
χ_{37}	-24	0	-8	-8	-8	-8	0	0	0	0	0	0	0
χ_{38}	21	21	-3	-3	-3	-3	1	1	1	-1	-1	-1	-1
χ_{39}	-21	-21	3	3	3	3	-1	-1	-1	1	1	1	1
χ_{40}	60	0	-4	-4	-4	-4	4	4	4	0	0	0	0
χ_{41}	-60	0	4	4	4	4	-4	-4	-4	0	0	0	0
χ_{42}	20	0	4	4	4	4	4	4	4	0	0	0	0
χ_{43}	-20	0	-4	-4	-4	-4	-4	-4	-4	0	0	0	0
χ_{44}	75	-21	11	11	11	11	-5	-5	-5	-1	-1	-1	-1
χ_{45}	-75	21	-11	-11	-11	-11	5	5	5	1	1	1	1
χ_{46}	-15	21	9	9	9	9	-3	-3	-3	-1	-1	-1	-1
χ_{47}	15	-21	-9	-9	-9	-9	3	3	3	1	1	1	1
χ_{48}	-105	7	-1	-1	-1	-1	3	3	3	1	1	1	1
χ_{49}	105	-7	1	1	1	1	-3	-3	-3	-1	-1	-1	-1
χ_{50}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{51}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{52}	24	0	8	8	8	8	0	0	0	0	0	0	0
χ_{53}	-24	0	-8	-8	-8	-8	0	0	0	0	0	0	0
χ_{54}	-15	-27	1	1	1	1	1	1	1	-3	-3	-3	-3
χ_{55}	15	27	-1	-1	-1	-1	-1	-1	-1	3	3	3	3
χ_{56}	60	28	12	12	12	12	4	4	4	4	4	4	4
χ_{57}	-60	-28	-12	-12	-12	-12	-4	-4	-4	-4	-4	-4	-4
χ_{58}	-80	0	0	0	0	0	-8	-8	-8	0	0	0	0
χ_{59}	80	0	0	0	0	0	8	8	8	0	0	0	0
χ_{60}	-20	-28	-4	-4	-4	-4	4	4	4	4	4	4	4

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	6O							6P						6Q	
	6AY	6AZ	6BA	6BB	6BC	6BD	6BE	6BF	6BG	18O	6BH	6BI	6BJ	6BK	6BL
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	8	8
χ_4	1	1	1	1	1	1	1	1	1	1	1	1	1	-8	-8
χ_5	12	12	12	12	12	12	12	3	3	3	3	3	3	3	3
χ_6	-12	-12	-12	-12	-12	-12	-12	-3	-3	-3	-3	-3	-3	-3	-3
χ_7	-2	-2	-2	-2	-2	-2	-2	7	7	7	7	7	7	-2	-2
χ_8	2	2	2	2	2	2	2	-7	-7	-7	-7	-7	-7	2	2
χ_9	10	10	10	10	10	10	10	1	1	1	1	1	1	10	10
χ_{10}	-10	-10	-10	-10	-10	-10	-10	-1	-1	-1	-1	-1	-1	-10	-10
χ_{11}	-2	-2	-2	-2	-2	-2	-2	7	7	7	7	7	7	7	7
χ_{12}	2	2	2	2	2	2	2	-7	-7	-7	-7	-7	-7	-7	-7
χ_{13}	11	11	11	11	11	11	11	11	11	11	11	11	11	2	2
χ_{14}	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-2	-2
χ_{15}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{16}	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
χ_{17}	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
χ_{18}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	8	8
χ_{19}	1	1	1	1	1	1	1	1	1	1	1	1	1	-8	-8
χ_{20}	12	12	12	12	12	12	12	3	3	3	3	3	3	3	3
χ_{21}	-12	-12	-12	-12	-12	-12	-12	-3	-3	-3	-3	-3	-3	-3	-3
χ_{22}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{23}	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	10	10
χ_{24}	8	8	8	8	8	8	8	8	8	8	8	8	8	-10	-10
χ_{25}	11	11	11	11	11	11	11	2	2	2	2	2	2	11	11
χ_{26}	-11	-11	-11	-11	-11	-11	-11	-2	-2	-2	-2	-2	-2	-11	-11
χ_{27}	28	28	28	28	28	28	28	-8	-8	-8	-8	-8	-8	1	1
χ_{28}	-28	-28	-28	-28	-28	-28	-28	8	8	8	8	8	8	-1	-1
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	18	18
χ_{31}	9	9	9	9	9	9	9	9	9	9	9	9	9	-18	-18
χ_{32}	17	17	17	17	17	17	17	-10	-10	-10	-10	-10	-10	-10	-10
χ_{33}	-17	-17	-17	-17	-17	-17	-17	10	10	10	10	10	10	10	10
χ_{34}	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	18	18
χ_{35}	9	9	9	9	9	9	9	9	9	9	9	9	9	-18	-18
χ_{36}	38	38	38	38	38	38	38	11	11	11	11	11	11	2	2
χ_{37}	-38	-38	-38	-38	-38	-38	-38	-11	-11	-11	-11	-11	-11	-2	-2
χ_{38}	27	27	27	27	27	27	27	0	0	0	0	0	0	0	0
χ_{39}	-27	-27	-27	-27	-27	-27	-27	0	0	0	0	0	0	0	0
χ_{40}	-10	-10	-10	-10	-10	-10	-10	-1	-1	-1	-1	-1	-1	17	17
χ_{41}	10	10	10	10	10	10	10	1	1	1	1	1	1	-17	-17
χ_{42}	-10	-10	-10	-10	-10	-10	-10	17	17	17	17	17	17	-1	-1
χ_{43}	10	10	10	10	10	10	10	-17	-17	-17	-17	-17	-17	1	1
χ_{44}	9	9	9	9	9	9	9	-18	-18	-18	-18	-18	-18	9	9
χ_{45}	-9	-9	-9	-9	-9	-9	-9	18	18	18	18	18	18	-9	-9
χ_{46}	-21	-21	-21	-21	-21	-21	-21	15	15	15	15	15	15	-12	-12
χ_{47}	21	21	21	21	21	21	21	-15	-15	-15	-15	-15	-15	12	12
χ_{48}	18	18	18	18	18	18	18	-9	-9	-9	-9	-9	-9	18	18
χ_{49}	-18	-18	-18	-18	-18	-18	-18	9	9	9	9	9	9	-18	-18
χ_{50}	-8	-8	-8	-8	-8	-8	-8	10	10	10	10	10	10	-8	-8
χ_{51}	8	8	8	8	8	8	8	-10	-10	-10	-10	-10	-10	8	8
χ_{52}	-18	-18	-18	-18	-18	-18	-18	9	9	9	9	9	9	-18	-18
χ_{53}	18	18	18	18	18	18	18	-9	-9	-9	-9	-9	-9	18	18
χ_{54}	18	18	18	18	18	18	18	18	18	18	18	18	18	-9	-9
χ_{55}	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	9	9
χ_{56}	-3	-3	-3	-3	-3	-3	-3	6	6	6	6	6	6	6	6
χ_{57}	3	3	3	3	3	3	3	-6	-6	-6	-6	-6	-6	-6	-6
χ_{58}	-20	-20	-20	-20	-20	-20	-20	16	16	16	16	16	16	16	16
χ_{59}	20	20	20	20	20	20	20	-16	-16	-16	-16	-16	-16	-16	-16
χ_{60}	17	17	17	17	17	17	17	-10	-10	-10	-10	-10	-10	-10	-10

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	6Q			6R			6S						6T			
	6BM	6BN	18P	6BO	6BP	6BQ	6BR	6BS	6BT	6BU	6BV	6BW	6BX	6BY	6BZ	6CA
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{3}	8	8	8	5	5	5	3	3	3	3	3	3	-3	-3	-3	-3
χ_{4}	-8	-8	-8	-5	-5	-5	-3	-3	-3	-3	-3	-3	3	3	3	3
χ_{5}	3	3	3	-1	-1	-1	0	0	0	0	0	0	3	3	3	3
χ_{6}	-3	-3	-3	1	1	1	0	0	0	0	0	0	-3	-3	-3	-3
χ_{7}	-2	-2	-2	5	5	5	-6	-6	-6	-6	-6	-6	-3	-3	-3	-3
χ_{8}	2	2	2	-5	-5	-5	6	6	6	6	6	6	3	3	3	3
χ_{9}	10	10	10	5	5	5	-2	-2	-2	-2	-2	-2	1	1	1	1
χ_{10}	-10	-10	-10	-5	-5	-5	2	2	2	2	2	2	-1	-1	-1	-1
χ_{11}	7	7	7	9	9	9	2	2	2	2	2	2	5	5	5	5
χ_{12}	-7	-7	-7	-9	-9	-9	-2	-2	-2	-2	-2	-2	-5	-5	-5	-5
χ_{13}	2	2	2	5	5	5	7	7	7	7	7	7	1	1	1	1
χ_{14}	-2	-2	-2	-5	-5	-5	-7	-7	-7	-7	-7	-7	-1	-1	-1	-1
χ_{15}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{16}	10	10	10	10	10	10	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
χ_{17}	-10	-10	-10	-10	-10	-10	2	2	2	2	2	2	2	2	2	2
χ_{18}	8	8	8	1	1	1	3	3	3	3	3	3	-3	-3	-3	-3
χ_{19}	-8	-8	-8	-1	-1	-1	-3	-3	-3	-3	-3	-3	3	3	3	3
χ_{20}	3	3	3	-1	-1	-1	12	12	12	12	12	12	3	3	3	3
χ_{21}	-3	-3	-3	1	1	1	-12	-12	-12	-12	-12	-12	-3	-3	-3	-3
χ_{22}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{23}	10	10	10	-4	-4	-4	0	0	0	0	0	0	0	0	0	0
χ_{24}	-10	-10	-10	4	4	4	0	0	0	0	0	0	0	0	0	0
χ_{25}	11	11	11	0	0	0	3	3	3	3	3	3	0	0	0	0
χ_{26}	-11	-11	-11	0	0	0	-3	-3	-3	-3	-3	-3	0	0	0	0
χ_{27}	1	1	1	-10	-10	-10	-4	-4	-4	-4	-4	-4	2	2	2	2
χ_{28}	-1	-1	-1	10	10	10	4	4	4	4	4	4	-2	-2	-2	-2
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	18	18	18	5	5	5	3	3	3	3	3	3	-3	-3	-3	-3
χ_{31}	-18	-18	-18	-5	-5	-5	-3	-3	-3	-3	-3	-3	3	3	3	3
χ_{32}	-10	-10	-10	10	10	10	-7	-7	-7	-7	-7	-7	2	2	2	2
χ_{33}	10	10	10	-10	-10	-10	7	7	7	7	7	7	-2	-2	-2	-2
χ_{34}	18	18	18	9	9	9	3	3	3	3	3	3	-3	-3	-3	-3
χ_{35}	-18	-18	-18	-9	-9	-9	-3	-3	-3	-3	-3	-3	3	3	3	3
χ_{36}	2	2	2	-9	-9	-9	2	2	2	2	2	2	-1	-1	-1	-1
χ_{37}	-2	-2	-2	9	9	9	-2	-2	-2	-2	-2	-2	1	1	1	1
χ_{38}	0	0	0	0	0	0	3	3	3	3	3	3	0	0	0	0
χ_{39}	0	0	0	0	0	0	-3	-3	-3	-3	-3	-3	0	0	0	0
χ_{40}	17	17	17	5	5	5	2	2	2	2	2	2	5	5	5	5
χ_{41}	-17	-17	-17	-5	-5	-5	-2	-2	-2	-2	-2	-2	-5	-5	-5	-5
χ_{42}	-1	-1	-1	-5	-5	-5	-6	-6	-6	-6	-6	-6	3	3	3	3
χ_{43}	1	1	1	5	5	5	6	6	6	6	6	6	-3	-3	-3	-3
χ_{44}	9	9	9	0	0	0	-3	-3	-3	-3	-3	-3	0	0	0	0
χ_{45}	-9	-9	-9	0	0	0	3	3	3	3	3	3	0	0	0	0
χ_{46}	-12	-12	-12	5	5	5	3	3	3	3	3	3	-3	-3	-3	-3
χ_{47}	12	12	12	-5	-5	-5	-3	-3	-3	-3	-3	-3	3	3	3	3
χ_{48}	18	18	18	5	5	5	-6	-6	-6	-6	-6	-6	-3	-3	-3	-3
χ_{49}	-18	-18	-18	-5	-5	-5	6	6	6	6	6	6	3	3	3	3
χ_{50}	-8	-8	-8	6	6	6	8	8	8	8	8	8	2	2	2	2
χ_{51}	8	8	8	-6	-6	-6	-8	-8	-8	-8	-8	-8	-2	-2	-2	-2
χ_{52}	-18	-18	-18	9	9	9	-6	-6	-6	-6	-6	-6	-3	-3	-3	-3
χ_{53}	18	18	18	-9	-9	-9	6	6	6	6	6	6	3	3	3	3
χ_{54}	-9	-9	-9	0	0	0	6	6	6	6	6	6	0	0	0	0
χ_{55}	9	9	9	0	0	0	-6	-6	-6	-6	-6	-6	0	0	0	0
χ_{56}	6	6	6	-10	-10	-10	-3	-3	-3	-3	-3	-3	-6	-6	-6	-6
χ_{57}	-6	-6	-6	10	10	10	3	3	3	3	3	3	6	6	6	6
χ_{58}	16	16	16	0	0	0	-4	-4	-4	-4	-4	-4	8	8	8	8
χ_{59}	-16	-16	-16	0	0	0	4	4	4	4	4	4	-8	-8	-8	-8
χ_{60}	-10	-10	-10	10	10	10	-7	-7	-7	-7	-7	-7	2	2	2	2

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6U$		$6V$			$6W$				$6X$						$6Y$	
	$6CB$	$18Q$	$6CC$	$6CD$	$18R$	$6CE$	$6CF$	$6CG$	$6CH$	$18S$	$18T$	$6CI$	$18U$	$18V$	$18W$	$6CJ$	$18X$
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{3}	-1	-1	-4	-4	-4	0	0	0	0	-1	-1	-1	-1	-1	-1	2	2
χ_{4}	1	1	4	4	4	0	0	0	0	1	1	1	1	1	1	-2	-2
χ_{5}	-1	-1	-1	-1	-1	-3	-3	-3	-3	3	3	3	3	3	3	-1	-1
χ_{6}	1	1	1	1	1	3	3	3	3	-3	-3	-3	-3	-3	-3	1	1
χ_{7}	-1	-1	2	2	2	0	0	0	0	-2	-2	-2	-2	-2	-2	-1	-1
χ_{8}	1	1	-2	-2	-2	0	0	0	0	2	2	2	2	2	2	1	1
χ_{9}	5	5	2	2	2	4	4	4	4	1	1	1	1	1	1	2	2
χ_{10}	-5	-5	-2	-2	-2	-4	-4	-4	-4	-1	-1	-1	-1	-1	-1	-2	-2
χ_{11}	3	3	3	3	3	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	0	0
χ_{12}	-3	-3	-3	-3	-3	1	1	1	1	2	2	2	2	2	2	0	0
χ_{13}	-1	-1	2	2	2	4	4	4	4	2	2	2	2	2	2	-1	-1
χ_{14}	1	1	-2	-2	-2	-4	-4	-4	-4	-2	-2	-2	-2	-2	-2	1	1
χ_{15}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{16}	-2	-2	-2	-2	-2	-2	-2	-2	-2	1	1	1	1	1	1	1	1
χ_{17}	2	2	2	2	2	2	2	2	2	-1	-1	-1	-1	-1	-1	-1	-1
χ_{18}	-5	-5	4	4	4	0	0	0	0	-1	-1	-1	-1	-1	-1	1	1
χ_{19}	5	5	-4	-4	-4	0	0	0	0	1	1	1	1	1	1	-1	-1
χ_{20}	-1	-1	-1	-1	-1	3	3	3	3	3	3	3	3	3	3	-1	-1
χ_{21}	1	1	1	1	1	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	1	1
χ_{22}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{23}	-4	-4	2	2	2	0	0	0	0	1	1	1	1	1	1	2	2
χ_{24}	4	4	-2	-2	-2	0	0	0	0	-1	-1	-1	-1	-1	-1	-2	-2
χ_{25}	-6	-6	3	3	3	-3	-3	-3	-3	2	2	2	2	2	2	0	0
χ_{26}	6	6	-3	-3	-3	3	3	3	3	-2	-2	-2	-2	-2	-2	0	0
χ_{27}	-4	-4	5	5	5	-1	-1	-1	-1	1	1	1	1	1	1	-1	-1
χ_{28}	4	4	-5	-5	-5	1	1	1	1	-1	-1	-1	-1	-1	-1	1	1
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	-1	-1	2	2	2	0	0	0	0	0	0	0	0	0	0	-1	-1
χ_{31}	1	1	-2	-2	-2	0	0	0	0	0	0	0	0	0	0	1	1
χ_{32}	-2	-2	-2	-2	-2	2	2	2	2	-1	-1	-1	-1	-1	-1	1	1
χ_{33}	2	2	2	2	2	-2	-2	-2	-2	1	1	1	1	1	1	-1	-1
χ_{34}	3	3	-6	-6	-6	0	0	0	0	0	0	0	0	0	0	0	0
χ_{35}	-3	-3	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0
χ_{36}	3	3	-6	-6	-6	-4	-4	-4	-4	2	2	2	2	2	2	0	0
χ_{37}	-3	-3	6	6	6	4	4	4	4	-2	-2	-2	-2	-2	-2	0	0
χ_{38}	0	0	0	0	0	6	6	6	6	0	0	0	0	0	0	0	0
χ_{39}	0	0	0	0	0	-6	-6	-6	-6	0	0	0	0	0	0	0	0
χ_{40}	-1	-1	5	5	5	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	2	2
χ_{41}	1	1	-5	-5	-5	1	1	1	1	1	1	1	1	1	1	-2	-2
χ_{42}	1	1	-5	-5	-5	3	3	3	3	-1	-1	-1	-1	-1	-1	-2	-2
χ_{43}	-1	-1	5	5	5	-3	-3	-3	-3	1	1	1	1	1	1	2	2
χ_{44}	6	6	-3	-3	-3	3	3	3	3	0	0	0	0	0	0	0	0
χ_{45}	-6	-6	3	3	3	-3	-3	-3	-3	0	0	0	0	0	0	0	0
χ_{46}	-1	-1	-4	-4	-4	0	0	0	0	-3	-3	-3	-3	-3	-3	2	2
χ_{47}	1	1	4	4	4	0	0	0	0	3	3	3	3	3	3	-2	-2
χ_{48}	-1	-1	2	2	2	0	0	0	0	0	0	0	0	0	0	-1	-1
χ_{49}	1	1	-2	-2	-2	0	0	0	0	0	0	0	0	0	0	1	1
χ_{50}	6	6	0	0	0	-4	-4	-4	-4	1	1	1	1	1	1	0	0
χ_{51}	-6	-6	0	0	0	4	4	4	4	-1	-1	-1	-1	-1	-1	0	0
χ_{52}	-3	-3	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0
χ_{53}	3	3	-6	-6	-6	0	0	0	0	0	0	0	0	0	0	0	0
χ_{54}	-6	-6	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0
χ_{55}	6	6	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	0
χ_{56}	2	2	2	2	2	0	0	0	0	-3	-3	-3	-3	-3	-3	-1	-1
χ_{57}	-2	-2	-2	-2	-2	0	0	0	0	3	3	3	3	3	3	1	1
χ_{58}	0	0	0	0	0	2	2	2	2	-2	-2	-2	-2	-2	-2	0	0
χ_{59}	0	0	0	0	0	-2	-2	-2	-2	2	2	2	2	2	2	0	0
χ_{60}	-2	-2	-2	-2	-2	2	2	2	2	-1	-1	-1	-1	-1	-1	1	1

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6Z$				$8C$				$10C$	$10D$			$10E$				$12H$
	$18Y$	$18Z$	$18AA$	$6CK$	$8C$	$8D$	$24C$	$24D$	$10C$	$10D$	$30C$	$30D$	$10E$	$30E$	$30F$	$30G$	$12AE$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_3	-1	-1	-1	-1	0	0	0	0	-3	1	1	1	-1	-1	-1	-1	-5
χ_4	1	1	1	1	0	0	0	0	3	-1	-1	-1	1	1	1	1	5
χ_5	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	1	1	1	0
χ_6	1	1	1	1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	0
χ_7	2	2	2	2	-3	1	1	1	0	0	0	0	0	0	0	0	4
χ_8	-2	-2	-2	-2	3	-1	-1	-1	0	0	0	0	0	0	0	0	-4
χ_9	-1	-1	-1	-1	0	0	0	0	3	-1	-1	-1	1	1	1	1	6
χ_{10}	1	1	1	1	0	0	0	0	-3	1	1	1	-1	-1	-1	-1	-6
χ_{11}	0	0	0	0	2	2	2	2	2	2	2	2	0	0	0	0	2
χ_{12}	0	0	0	0	-2	-2	-2	-2	-2	-2	-2	-2	0	0	0	0	-2
χ_{13}	2	2	2	2	3	-1	-1	-1	0	0	0	0	0	0	0	0	-3
χ_{14}	-2	-2	-2	-2	-3	1	1	1	0	0	0	0	0	0	0	0	3
χ_{15}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{16}	1	1	1	1	-3	1	1	1	-3	1	1	1	1	1	1	1	-4
χ_{17}	-1	-1	-1	-1	3	-1	-1	-1	3	-1	-1	-1	-1	-1	-1	-1	4
χ_{18}	1	1	1	1	0	0	0	0	1	1	1	1	-1	-1	-1	-1	5
χ_{19}	-1	-1	-1	-1	0	0	0	0	-1	-1	-1	-1	1	1	1	1	-5
χ_{20}	-1	-1	-1	-1	1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	6
χ_{21}	1	1	1	1	-1	-1	-1	-1	1	1	1	1	1	1	1	1	-6
χ_{22}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{23}	-1	-1	-1	-1	0	0	0	0	-2	-2	-2	-2	0	0	0	0	-4
χ_{24}	1	1	1	1	0	0	0	0	2	2	2	2	0	0	0	0	4
χ_{25}	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	0	0	0	7
χ_{26}	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	-7
χ_{27}	-1	-1	-1	-1	1	1	1	1	0	0	0	0	0	0	0	0	-6
χ_{28}	1	1	1	1	-1	-1	-1	-1	0	0	0	0	0	0	0	0	6
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	2	2	2	2	0	0	0	0	3	-1	-1	-1	-1	-1	-1	-1	3
χ_{31}	-2	-2	-2	-2	0	0	0	0	-3	1	1	1	1	1	1	1	-3
χ_{32}	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-7
χ_{33}	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	7
χ_{34}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-3
χ_{35}	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	3
χ_{36}	0	0	0	0	0	0	0	0	1	1	1	1	-1	-1	-1	-1	6
χ_{37}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1	1	1	-6
χ_{38}	0	0	0	0	-3	1	1	1	-3	1	1	1	-1	-1	-1	-1	3
χ_{39}	0	0	0	0	3	-1	-1	-1	3	-1	-1	-1	1	1	1	1	-3
χ_{40}	-1	-1	-1	-1	-2	-2	-2	-2	0	0	0	0	0	0	0	0	6
χ_{41}	1	1	1	1	2	2	2	2	0	0	0	0	0	0	0	0	-6
χ_{42}	1	1	1	1	-2	-2	-2	-2	0	0	0	0	0	0	0	0	2
χ_{43}	-1	-1	-1	-1	2	2	2	2	0	0	0	0	0	0	0	0	-2
χ_{44}	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	0	0	0	3
χ_{45}	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	-3
χ_{46}	-1	-1	-1	-1	3	-1	-1	-1	0	0	0	0	0	0	0	0	3
χ_{47}	1	1	1	1	-3	1	1	1	0	0	0	0	0	0	0	0	-3
χ_{48}	2	2	2	2	3	-1	-1	-1	0	0	0	0	0	0	0	0	-6
χ_{49}	-2	-2	-2	-2	-3	1	1	1	0	0	0	0	0	0	0	0	6
χ_{50}	3	3	3	3	0	0	0	0	-2	-2	-2	-2	0	0	0	0	0
χ_{51}	-3	-3	-3	-3	0	0	0	0	2	2	2	2	0	0	0	0	0
χ_{52}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	6
χ_{53}	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	-6
χ_{54}	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	0	0	0	-6
χ_{55}	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	6
χ_{56}	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-3
χ_{57}	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3
χ_{58}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8
χ_{59}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
χ_{60}	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	7

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$12I$	$12J$	$12K$	$12L$		$12M$			$12N$			$12O$		
	$12AF$	$12AG$	$12AH$	$12AI$	$12AJ$	$12AK$	$12AL$	$36E$	$12AM$	$12AN$	$36F$	$12AO$	$12AP$	$12AQ$
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{3}	-2	-3	1	-1	-1	2	2	2	-1	-1	-1	2	2	2
χ_{4}	2	3	-1	1	1	-2	-2	-2	1	1	1	-2	-2	-2
χ_{5}	3	-2	-3	4	4	1	1	1	1	1	1	-1	-1	-1
χ_{6}	-3	2	3	-4	-4	-1	-1	-1	-1	-1	-1	1	1	1
χ_{7}	-2	-2	1	0	0	0	0	0	3	3	3	2	2	2
χ_{8}	2	2	-1	0	0	0	0	0	-3	-3	-3	-2	-2	-2
χ_{9}	0	0	3	2	2	2	2	2	-1	-1	-1	0	0	0
χ_{10}	0	0	-3	-2	-2	-2	-2	-2	1	1	1	0	0	0
χ_{11}	5	0	-1	-2	-2	1	1	1	1	1	1	1	1	1
χ_{12}	-5	0	1	2	2	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{13}	0	-1	3	1	1	-2	-2	-2	1	1	1	0	0	0
χ_{14}	0	1	-3	-1	-1	2	2	2	-1	-1	-1	0	0	0
χ_{15}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{16}	-4	2	-4	0	0	0	0	0	0	0	0	0	0	0
χ_{17}	4	-2	4	0	0	0	0	0	0	0	0	0	0	0
χ_{18}	2	-5	-1	1	1	-2	-2	-2	1	1	1	-2	-2	-2
χ_{19}	-2	5	1	-1	-1	2	2	2	-1	-1	-1	2	2	2
χ_{20}	-3	-2	-3	-2	-2	1	1	1	1	1	1	1	1	1
χ_{21}	3	2	3	2	2	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{22}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{23}	8	0	2	-4	-4	2	2	2	2	2	2	0	0	0
χ_{24}	-8	0	-2	4	4	-2	-2	-2	-2	-2	-2	0	0	0
χ_{25}	1	3	4	-1	-1	-1	-1	-1	2	2	2	1	1	1
χ_{26}	-1	-3	-4	1	1	1	1	1	-2	-2	-2	-1	-1	-1
χ_{27}	-3	2	0	2	2	-1	-1	-1	2	2	2	1	1	1
χ_{28}	3	-2	0	-2	-2	1	1	1	-2	-2	-2	-1	-1	-1
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	0	5	-3	-1	-1	2	2	2	-1	-1	-1	0	0	0
χ_{31}	0	-5	3	1	1	-2	-2	-2	1	1	1	0	0	0
χ_{32}	2	1	2	1	1	-2	-2	-2	-2	-2	-2	2	2	2
χ_{33}	-2	-1	-2	-1	-1	2	2	2	2	2	2	-2	-2	-2
χ_{34}	0	3	3	1	1	-2	-2	-2	1	1	1	0	0	0
χ_{35}	0	-3	-3	-1	-1	2	2	2	-1	-1	-1	0	0	0
χ_{36}	0	0	3	2	2	2	2	2	-1	-1	-1	0	0	0
χ_{37}	0	0	-3	-2	-2	-2	-2	-2	1	1	1	0	0	0
χ_{38}	6	3	0	3	3	0	0	0	0	0	0	-2	-2	-2
χ_{39}	-6	-3	0	-3	-3	0	0	0	0	0	0	2	2	2
χ_{40}	-3	0	-3	2	2	-1	-1	-1	-1	-1	-1	1	1	1
χ_{41}	3	0	3	-2	-2	1	1	1	1	1	1	-1	-1	-1
χ_{42}	5	0	-1	-2	-2	1	1	1	1	1	1	1	1	1
χ_{43}	-5	0	1	2	2	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{44}	-3	-3	0	-1	-1	-1	-1	-1	2	2	2	1	1	1
χ_{45}	3	3	0	1	1	1	1	1	-2	-2	-2	-1	-1	-1
χ_{46}	0	3	-3	3	3	0	0	0	3	3	3	0	0	0
χ_{47}	0	-3	3	-3	-3	0	0	0	-3	-3	-3	0	0	0
χ_{48}	0	-2	-3	2	2	2	2	2	-1	-1	-1	0	0	0
χ_{49}	0	2	3	-2	-2	-2	-2	-2	1	1	1	0	0	0
χ_{50}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{51}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{52}	0	0	3	2	2	2	2	2	-1	-1	-1	0	0	0
χ_{53}	0	0	-3	-2	-2	-2	-2	-2	1	1	1	0	0	0
χ_{54}	-3	0	0	-2	-2	1	1	1	-2	-2	-2	1	1	1
χ_{55}	3	0	0	2	2	-1	-1	-1	2	2	2	-1	-1	-1
χ_{56}	-6	1	0	-3	-3	0	0	0	0	0	0	-2	-2	-2
χ_{57}	6	-1	0	3	3	0	0	0	0	0	0	2	2	2
χ_{58}	-2	0	4	0	0	0	0	0	0	0	0	-2	-2	-2
χ_{59}	2	0	-4	0	0	0	0	0	0	0	0	2	2	2
χ_{60}	-2	-1	-2	-1	-1	2	2	2	2	2	2	-2	-2	-2

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$12P$						$12Q$	$18D$				$18E$		
	$12AR$	$12AS$	$12AT$	$12AU$	$12AV$	$12AW$	$12AX$	$18AB$	$18AC$	$18AD$	$18AE$	$18AF$	$18AG$	$18AH$
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{3}	1	1	1	1	1	1	0	-1	-1	-1	-1	2	2	2
χ_{4}	-1	-1	-1	-1	-1	-1	0	1	1	1	1	-2	-2	-2
χ_{5}	2	2	2	2	2	2	1	0	0	0	0	0	0	0
χ_{6}	-2	-2	-2	-2	-2	-2	-1	0	0	0	0	0	0	0
χ_{7}	0	0	0	0	0	0	1	1	1	1	1	-2	-2	-2
χ_{8}	0	0	0	0	0	0	-1	-1	-1	-1	-1	2	2	2
χ_{9}	0	0	0	0	0	0	0	-2	-2	-2	-2	1	1	1
χ_{10}	0	0	0	0	0	0	0	2	2	2	2	-1	-1	-1
χ_{11}	0	0	0	0	0	0	0	1	1	1	1	1	1	1
χ_{12}	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1
χ_{13}	1	1	1	1	1	1	-1	2	2	2	2	-1	-1	-1
χ_{14}	-1	-1	-1	-1	-1	-1	1	-2	-2	-2	-2	1	1	1
χ_{15}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{16}	0	0	0	0	0	0	-1	1	1	1	1	1	1	1
χ_{17}	0	0	0	0	0	0	1	-1	-1	-1	-1	-1	-1	-1
χ_{18}	1	1	1	1	1	1	1	-1	-1	-1	-1	2	2	2
χ_{19}	-1	-1	-1	-1	-1	-1	-1	1	1	1	1	-2	-2	-2
χ_{20}	0	0	0	0	0	0	1	0	0	0	0	0	0	0
χ_{21}	0	0	0	0	0	0	-1	0	0	0	0	0	0	0
χ_{22}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{23}	0	0	0	0	0	0	0	1	1	1	1	-2	-2	-2
χ_{24}	0	0	0	0	0	0	0	-1	-1	-1	-1	2	2	2
χ_{25}	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	2	2	2
χ_{26}	1	1	1	1	1	1	0	1	1	1	1	-2	-2	-2
χ_{27}	0	0	0	0	0	0	-1	-2	-2	-2	-2	1	1	1
χ_{28}	0	0	0	0	0	0	1	2	2	2	2	-1	-1	-1
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	1	1	1	1	1	1	-1	0	0	0	0	0	0	0
χ_{31}	-1	-1	-1	-1	-1	-1	1	0	0	0	0	0	0	0
χ_{32}	1	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	-1
χ_{33}	-1	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1
χ_{34}	1	1	1	1	1	1	0	0	0	0	0	0	0	0
χ_{35}	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{36}	0	0	0	0	0	0	0	2	2	2	2	-1	-1	-1
χ_{37}	0	0	0	0	0	0	0	-2	-2	-2	-2	1	1	1
χ_{38}	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{39}	1	1	1	1	1	1	0	0	0	0	0	0	0	0
χ_{40}	0	0	0	0	0	0	0	2	2	2	2	-1	-1	-1
χ_{41}	0	0	0	0	0	0	0	-2	-2	-2	-2	1	1	1
χ_{42}	0	0	0	0	0	0	0	-1	-1	-1	-1	2	2	2
χ_{43}	0	0	0	0	0	0	0	1	1	1	1	-2	-2	-2
χ_{44}	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{45}	1	1	1	1	1	1	0	0	0	0	0	0	0	0
χ_{46}	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{47}	1	1	1	1	1	1	0	0	0	0	0	0	0	0
χ_{48}	-2	-2	-2	-2	-2	-2	1	0	0	0	0	0	0	0
χ_{49}	2	2	2	2	2	2	-1	0	0	0	0	0	0	0
χ_{50}	0	0	0	0	0	0	0	-2	-2	-2	-2	1	1	1
χ_{51}	0	0	0	0	0	0	0	2	2	2	2	-1	-1	-1
χ_{52}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{53}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{54}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{55}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{56}	1	1	1	1	1	1	1	0	0	0	0	0	0	0
χ_{57}	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0
χ_{58}	0	0	0	0	0	0	0	1	1	1	1	1	1	1
χ_{59}	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1
χ_{60}	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

		18F						20B	24A	26A		28A		30A	26A
	18AI	18AJ	18AK	18AL	18AM	18AN	18AO	20B	24E	26A	26B	28A	28B	30H	36G
χ_{1}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_{2}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{3}	2	0	0	0	0	0	0	1	0	0	0	-1	-1	0	1
χ_{4}	-2	0	0	0	0	0	0	-1	0	0	0	1	1	0	-1
χ_{5}	0	0	0	0	0	0	0	1	-1	0	0	0	0	-1	0
χ_{6}	0	0	0	0	0	0	0	-1	1	0	0	0	0	1	0
χ_{7}	-2	0	0	0	0	0	0	0	0	-1	-1	0	0	0	1
χ_{8}	2	0	0	0	0	0	0	0	0	1	1	0	0	0	-1
χ_{9}	1	1	1	1	1	1	1	-1	0	-1	-1	0	0	0	0
χ_{10}	-1	-1	-1	-1	-1	-1	-1	1	0	1	1	0	0	0	0
χ_{11}	1	-1	-1	-1	-1	-1	-1	0	-1	0	0	0	0	-1	-1
χ_{12}	-1	1	1	1	1	1	1	0	1	0	0	0	0	1	1
χ_{13}	-1	1	1	1	1	1	1	0	0	0	0	-1	-1	0	0
χ_{14}	1	-1	-1	-1	-1	-1	-1	0	0	0	0	1	1	0	0
χ_{15}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{16}	1	1	1	1	1	1	1	-1	0	0	0	0	0	0	-1
χ_{17}	-1	-1	-1	-1	-1	-1	-1	1	0	0	0	0	0	0	1
χ_{18}	2	0	0	0	0	0	0	-1	0	0	0	0	0	1	-1
χ_{19}	-2	0	0	0	0	0	0	1	0	0	0	0	0	-1	1
χ_{20}	0	0	0	0	0	0	0	-1	1	0	0	0	0	-1	0
χ_{21}	0	0	0	0	0	0	0	1	-1	0	0	0	0	1	0
χ_{22}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{23}	-2	0	0	0	0	0	0	0	0	0	0	0	0	1	-1
χ_{24}	2	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
χ_{25}	2	0	0	0	0	0	0	0	-1	0	0	0	0	0	1
χ_{26}	-2	0	0	0	0	0	0	0	1	0	0	0	0	0	-1
χ_{27}	1	-1	-1	-1	-1	-1	-1	0	1	0	0	0	0	0	0
χ_{28}	-1	1	1	1	1	1	1	0	-1	0	0	0	0	0	0
χ_{29}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
χ_{31}	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0
χ_{32}	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	-1
χ_{33}	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1
χ_{34}	0	0	0	0	0	0	0	-1	0	0	0	1	1	-1	0
χ_{35}	0	0	0	0	0	0	0	1	0	0	0	-1	-1	1	0
χ_{36}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	1	0
χ_{37}	1	1	1	1	1	1	1	1	0	0	0	0	0	-1	0
χ_{38}	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
χ_{39}	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0
χ_{40}	-1	-1	-1	-1	-1	-1	-1	0	1	0	0	0	0	0	0
χ_{41}	1	1	1	1	1	1	1	0	-1	0	0	0	0	0	0
χ_{42}	2	0	0	0	0	0	0	0	1	0	0	0	0	0	-1
χ_{43}	-2	0	0	0	0	0	0	0	-1	0	0	0	0	0	1
χ_{44}	0	0	0	0	0	0	0	0	-1	1	1	0	0	0	0
χ_{45}	0	0	0	0	0	0	0	0	1	-1	-1	0	0	0	0
χ_{46}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{47}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{48}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{49}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{50}	1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	1	0
χ_{51}	-1	1	1	1	1	1	1	0	0	0	0	0	0	-1	0
χ_{52}	0	0	0	0	0	0	0	-1	0	1	1	0	0	-1	0
χ_{53}	0	0	0	0	0	0	0	1	0	-1	-1	0	0	1	0
χ_{54}	0	0	0	0	0	0	0	0	-1	0	0	1	1	0	0
χ_{55}	0	0	0	0	0	0	0	0	1	0	0	-1	-1	0	0
χ_{56}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{57}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{58}	1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	1
χ_{59}	-1	1	1	1	1	1	1	0	0	0	0	0	0	0	-1
χ_{60}	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	1

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$1A$				$2A$		$2B$				$2C$			
	$1A$	$3A$	$3B$	$3C$	$2A$	$6A$	$2B$	$6B$	$6C$	$6D$	$2C$	$6E$	$6F$	$6G$
χ_{61}	5460	5460	5460	5460	-140	-140	-140	-140	-140	-140	20	20	20	20
χ_{62}	5824	5824	5824	5824	896	896	64	64	64	64	0	0	0	0
χ_{63}	5824	5824	5824	5824	896	896	64	64	64	64	0	0	0	0
χ_{64}	5824	5824	5824	5824	-896	-896	64	64	64	64	0	0	0	0
χ_{65}	5824	5824	5824	5824	-896	-896	64	64	64	64	0	0	0	0
χ_{66}	6552	6552	6552	6552	-504	-504	-24	-24	-24	-24	-8	-8	-8	-8
χ_{67}	6552	6552	6552	6552	-504	-504	-24	-24	-24	-24	-8	-8	-8	-8
χ_{68}	14040	14040	14040	14040	1080	1080	120	120	120	120	24	24	24	24
χ_{69}	7280	7280	7280	7280	-560	-560	80	80	80	80	-16	-16	-16	-16
χ_{70}	7280	7280	7280	7280	-560	-560	80	80	80	80	-16	-16	-16	-16
χ_{71}	14560	14560	14560	14560	-1120	-1120	160	160	160	160	-32	-32	-32	-32
χ_{72}	7371	7371	7371	7371	819	819	51	51	51	51	-21	-21	-21	-21
χ_{73}	7371	7371	7371	7371	819	819	51	51	51	51	-21	-21	-21	-21
χ_{74}	16380	16380	16380	16380	-420	-420	60	60	60	60	-36	-36	-36	-36
χ_{75}	11648	11648	11648	11648	0	0	128	128	128	128	0	0	0	0
χ_{76}	11648	11648	11648	11648	0	0	128	128	128	128	0	0	0	0
χ_{77}	14742	14742	14742	14742	630	630	102	102	102	102	6	6	6	6
χ_{78}	14742	14742	14742	14742	630	630	102	102	102	102	6	6	6	6
χ_{79}	16380	16380	16380	16380	-420	-420	60	60	60	60	28	28	28	28
χ_{80}	16380	16380	16380	16380	-420	-420	60	60	60	60	28	28	28	28
χ_{81}	16640	16640	16640	16640	1280	1280	0	0	0	0	0	0	0	0
χ_{82}	16640	16640	16640	16640	1280	1280	0	0	0	0	0	0	0	0
χ_{83}	16640	16640	16640	16640	-1280	-1280	0	0	0	0	0	0	0	0
χ_{84}	16640	16640	16640	16640	-1280	-1280	0	0	0	0	0	0	0	0
χ_{85}	17472	17472	17472	17472	-896	-896	-64	-64	-64	-64	0	0	0	0
χ_{86}	17472	17472	17472	17472	-896	-896	-64	-64	-64	-64	0	0	0	0
χ_{87}	17472	17472	17472	17472	896	896	-64	-64	-64	-64	0	0	0	0
χ_{88}	17472	17472	17472	17472	896	896	-64	-64	-64	-64	0	0	0	0
χ_{89}	17920	17920	17920	17920	0	0	0	0	0	0	0	0	0	0
χ_{90}	17920	17920	17920	17920	0	0	0	0	0	0	0	0	0	0
χ_{91}	17920	17920	17920	17920	0	0	0	0	0	0	0	0	0	0
χ_{92}	17920	17920	17920	17920	0	0	0	0	0	0	0	0	0	0
χ_{93}	19683	19683	19683	19683	-729	-729	-81	-81	-81	-81	27	27	27	27
χ_{94}	19683	19683	19683	19683	-729	-729	-81	-81	-81	-81	27	27	27	27
χ_{95}	21840	21840	21840	21840	560	560	-80	-80	-80	-80	-48	-48	-48	-48
χ_{96}	21840	21840	21840	21840	560	560	-80	-80	-80	-80	-48	-48	-48	-48
χ_{97}	22113	22113	22113	22113	189	189	-171	-171	-171	-171	9	9	9	9
χ_{98}	22113	22113	22113	22113	189	189	-171	-171	-171	-171	9	9	9	9
χ_{99}	10530	0	-405	405	30	-15	-90	9	0	-9	-6	-3	3	0
χ_{100}	10530	0	-405	405	30	-15	-90	9	0	-9	-6	-3	3	0
χ_{101}	14742	0	-567	567	42	-21	450	-45	0	45	30	15	-15	0
χ_{102}	14742	0	-567	567	42	-21	450	-45	0	45	30	15	-15	0
χ_{103}	73710	0	-2835	2835	210	-105	810	-81	0	81	54	27	-27	0
χ_{104}	73710	0	-2835	2835	210	-105	810	-81	0	81	54	27	-27	0
χ_{105}	73710	0	-2835	2835	210	-105	-630	63	0	-63	-42	-21	21	0
χ_{106}	73710	0	-2835	2835	210	-105	-630	63	0	-63	-42	-21	21	0
χ_{107}	73710	0	-2835	2835	210	-105	810	-81	0	81	54	27	-27	0
χ_{108}	73710	0	-2835	2835	210	-105	810	-81	0	81	54	27	-27	0
χ_{109}	147420	0	-5670	5670	420	-210	180	-18	0	18	12	6	-6	0
χ_{110}	147420	0	-5670	5670	420	-210	180	-18	0	18	12	6	-6	0
χ_{111}	221130	0	-8505	8505	630	-315	-450	45	0	-45	-30	-15	15	0
χ_{112}	221130	0	-8505	8505	630	-315	-450	45	0	-45	-30	-15	15	0
χ_{113}	235872	0	-9072	9072	672	-336	1440	-144	0	144	96	48	-48	0
χ_{114}	235872	0	-9072	9072	672	-336	1440	-144	0	144	96	48	-48	0
χ_{115}	505440	0	-19440	19440	1440	-720	1440	-144	0	144	96	48	-48	0
χ_{116}	269568	0	-10368	10368	768	-384	0	0	0	0	0	0	0	0
χ_{117}	269568	0	-10368	10368	768	-384	0	0	0	0	0	0	0	0
χ_{118}	294840	0	-11340	11340	840	-420	360	-36	0	36	24	12	-12	0
χ_{119}	294840	0	-11340	11340	840	-420	360	-36	0	36	24	12	-12	0
χ_{120}	442260	0	-17010	17010	1260	-630	540	-54	0	54	36	18	-18	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	3A						3B				3C				
	$3D$	$3E$	$3F$	$3G$	$3H$	$3I$	$3J$	$3K$	$3L$	$9A$	$3M$	$3N$	$9B$	$3O$	$3P$
χ_{61}	-129	-129	-129	-129	-129	-129	60	60	60	60	60	60	60	60	60
χ_{62}	-8	-8	-8	-8	-8	-8	154	154	154	154	-8	-8	-8	-8	-8
χ_{63}	-8	-8	-8	-8	-8	-8	154	154	154	154	-8	-8	-8	-8	-8
χ_{64}	-8	-8	-8	-8	-8	-8	154	154	154	154	-8	-8	-8	-8	-8
χ_{65}	-8	-8	-8	-8	-8	-8	154	154	154	154	-8	-8	-8	-8	-8
χ_{66}	234	234	234	234	234	234	45	45	45	45	72	72	72	72	72
χ_{67}	234	234	234	234	234	234	45	45	45	45	72	72	72	72	72
χ_{68}	-54	-54	-54	-54	-54	-54	0	0	0	0	-108	-108	-108	-108	-108
χ_{69}	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	152	152	152	152	152
χ_{70}	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	152	152	152	152	152
χ_{71}	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-128	-128	-128	-128	-128
χ_{72}	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
χ_{73}	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
χ_{74}	342	342	342	342	342	342	-90	-90	-90	-90	-90	-90	-90	-90	-90
χ_{75}	-16	-16	-16	-16	-16	-16	-124	-124	-124	-124	-16	-16	-16	-16	-16
χ_{76}	-16	-16	-16	-16	-16	-16	-124	-124	-124	-124	-16	-16	-16	-16	-16
χ_{77}	162	162	162	162	162	162	-81	-81	-81	-81	-81	-81	-81	-81	-81
χ_{78}	162	162	162	162	162	162	-81	-81	-81	-81	-81	-81	-81	-81	-81
χ_{79}	99	99	99	99	99	99	-90	-90	-90	-90	-36	-36	-36	-36	-36
χ_{80}	99	99	99	99	99	99	-90	-90	-90	-90	-36	-36	-36	-36	-36
χ_{81}	-208	-208	-208	-208	-208	-208	80	80	80	80	-64	-64	-64	-64	-64
χ_{82}	-208	-208	-208	-208	-208	-208	80	80	80	80	-64	-64	-64	-64	-64
χ_{83}	-208	-208	-208	-208	-208	-208	80	80	80	80	-64	-64	-64	-64	-64
χ_{84}	-208	-208	-208	-208	-208	-208	80	80	80	80	-64	-64	-64	-64	-64
χ_{85}	-24	-24	-24	-24	-24	-24	30	30	30	30	-24	-24	-24	-24	-24
χ_{86}	-24	-24	-24	-24	-24	-24	30	30	30	30	-24	-24	-24	-24	-24
χ_{87}	-24	-24	-24	-24	-24	-24	30	30	30	30	-24	-24	-24	-24	-24
χ_{88}	-24	-24	-24	-24	-24	-24	30	30	30	30	-24	-24	-24	-24	-24
χ_{89}	-224	-224	-224	-224	-224	-224	-80	-80	-80	-80	64	64	64	64	64
χ_{90}	-224	-224	-224	-224	-224	-224	-80	-80	-80	-80	64	64	64	64	64
χ_{91}	-224	-224	-224	-224	-224	-224	-80	-80	-80	-80	64	64	64	64	64
χ_{92}	-224	-224	-224	-224	-224	-224	-80	-80	-80	-80	64	64	64	64	64
χ_{93}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{94}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{95}	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	24	24	24	24	24
χ_{96}	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	24	24	24	24	24
χ_{97}	243	243	243	243	243	243	0	0	0	0	0	0	0	0	0
χ_{98}	243	243	243	243	243	243	0	0	0	0	0	0	0	0	0
χ_{99}	324	0	0	162	-162	-162	0	0	0	0	216	-27	0	54	-27
χ_{100}	324	0	0	162	-162	-162	0	0	0	0	216	-27	0	54	-27
χ_{101}	162	0	0	81	-81	-81	0	0	0	0	432	-54	0	108	-54
χ_{102}	162	0	0	81	-81	-81	0	0	0	0	432	-54	0	108	-54
χ_{103}	810	0	0	405	-405	-405	0	0	0	0	216	-27	0	54	-27
χ_{104}	810	0	0	405	-405	-405	0	0	0	0	216	-27	0	54	-27
χ_{105}	810	0	0	405	-405	-405	0	0	0	0	216	-27	0	54	-27
χ_{106}	810	0	0	405	-405	-405	0	0	0	0	216	-27	0	54	-27
χ_{107}	-648	0	0	-324	324	324	0	0	0	0	864	-108	0	216	-108
χ_{108}	-648	0	0	-324	324	324	0	0	0	0	864	-108	0	216	-108
χ_{109}	162	0	0	81	-81	-81	0	0	0	0	1080	-135	0	270	-135
χ_{110}	162	0	0	81	-81	-81	0	0	0	0	1080	-135	0	270	-135
χ_{111}	-1944	0	0	-972	972	972	0	0	0	0	648	-81	0	162	-81
χ_{112}	-1944	0	0	-972	972	972	0	0	0	0	648	-81	0	162	-81
χ_{113}	-324	0	0	-162	162	162	0	0	0	0	432	-54	0	108	-54
χ_{114}	-324	0	0	-162	162	162	0	0	0	0	432	-54	0	108	-54
χ_{115}	-1944	0	0	-972	972	972	0	0	0	0	-1296	162	0	-324	162
χ_{116}	1296	0	0	648	-648	-648	0	0	0	0	864	-108	0	216	-108
χ_{117}	1296	0	0	648	-648	-648	0	0	0	0	864	-108	0	216	-108
χ_{118}	1782	0	0	891	-891	-891	0	0	0	0	-432	54	0	-108	54
χ_{119}	1782	0	0	891	-891	-891	0	0	0	0	-432	54	0	-108	54
χ_{120}	486	0	0	243	-243	-243	0	0	0	0	-648	81	0	-162	81

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$3D$				$3E$			$3F$							$4A$	
	$9C$	$9D$	$9E$	$3Q$	$3R$	$9F$	$9G$	$9H$	$9I$	$9J$	$9K$	$3S$	$9L$	$9M$	$4A$	$12A$
χ_{61}	6	6	6	6	15	15	15	-3	-3	-3	-3	-3	-3	-3	0	0
χ_{62}	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	16	16
χ_{63}	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	16	16
χ_{64}	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-16	-16
χ_{65}	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-16	-16
χ_{66}	18	18	18	18	0	0	0	9	9	9	9	9	9	9	4	4
χ_{67}	18	18	18	18	0	0	0	9	9	9	9	9	9	9	4	4
χ_{68}	27	27	27	27	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	0	0
χ_{70}	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	0	0
χ_{71}	34	34	34	34	16	16	16	-2	-2	-2	-2	-2	-2	-2	0	0
χ_{72}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1
χ_{73}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1
χ_{74}	-9	-9	-9	-9	-18	-18	-18	0	0	0	0	0	0	0	20	20
χ_{75}	-16	-16	-16	-16	20	20	20	2	2	2	2	2	2	2	0	0
χ_{76}	-16	-16	-16	-16	20	20	20	2	2	2	2	2	2	2	0	0
χ_{77}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	-10
χ_{78}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	-10
χ_{79}	18	18	18	18	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	0	0
χ_{80}	18	18	18	18	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	0	0
χ_{81}	8	8	8	8	-10	-10	-10	8	8	8	8	8	8	8	0	0
χ_{82}	8	8	8	8	-10	-10	-10	8	8	8	8	8	8	8	0	0
χ_{83}	8	8	8	8	-10	-10	-10	8	8	8	8	8	8	8	0	0
χ_{84}	8	8	8	8	-10	-10	-10	8	8	8	8	8	8	8	0	0
χ_{85}	-24	-24	-24	-24	12	12	12	-6	-6	-6	-6	-6	-6	-6	16	16
χ_{86}	-24	-24	-24	-24	12	12	12	-6	-6	-6	-6	-6	-6	-6	16	16
χ_{87}	-24	-24	-24	-24	12	12	12	-6	-6	-6	-6	-6	-6	-6	-16	-16
χ_{88}	-24	-24	-24	-24	12	12	12	-6	-6	-6	-6	-6	-6	-6	-16	-16
χ_{89}	-8	-8	-8	-8	-8	-8	-8	10	10	10	10	10	10	10	0	0
χ_{90}	-8	-8	-8	-8	-8	-8	-8	10	10	10	10	10	10	10	0	0
χ_{91}	-8	-8	-8	-8	-8	-8	-8	10	10	10	10	10	10	10	0	0
χ_{92}	-8	-8	-8	-8	-8	-8	-8	10	10	10	10	10	10	10	0	0
χ_{93}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9
χ_{94}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9
χ_{95}	24	24	24	24	6	6	6	-12	-12	-12	-12	-12	-12	-12	0	0
χ_{96}	24	24	24	24	6	6	6	-12	-12	-12	-12	-12	-12	-12	0	0
χ_{97}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-9	-9
χ_{98}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-9	-9
χ_{99}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{100}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{101}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{102}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{103}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{104}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{105}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{106}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{107}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{108}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{109}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{110}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{111}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{112}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{113}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{114}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{117}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{118}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{119}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{120}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	4B				4C		4D				5A				6A		6B
	4B	12B	12C	12D	4C	12E	4D	12F	12G	12H	5A	15A	15B	15C	6H	6I	6J
χ_{61}	12	12	12	12	-4	-4	0	0	0	0	0	0	0	0	-5	-5	4
χ_{62}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	32	32	-4
χ_{63}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	32	32	-4
χ_{64}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-32	-32	4
χ_{65}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-32	-32	4
χ_{66}	0	0	0	0	0	0	4	4	4	4	-3	-3	-3	-3	-18	-18	9
χ_{67}	0	0	0	0	0	0	4	4	4	4	-3	-3	-3	-3	-18	-18	9
χ_{68}	8	8	8	8	8	8	0	0	0	0	0	0	0	0	-54	-54	0
χ_{69}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	34	-2
χ_{70}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	34	-2
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	68	-4
χ_{72}	-9	-9	-9	-9	-1	-1	-1	-1	-1	-1	1	1	1	1	9	9	9
χ_{73}	-9	-9	-9	-9	-1	-1	-1	-1	-1	-1	1	1	1	1	9	9	9
χ_{74}	4	4	4	4	4	4	4	4	4	4	0	0	0	0	-42	-42	-6
χ_{75}	0	0	0	0	0	0	0	0	0	0	-2	-2	-2	-2	0	0	0
χ_{76}	0	0	0	0	0	0	0	0	0	0	-2	-2	-2	-2	0	0	0
χ_{77}	-6	-6	-6	-6	-6	-6	-2	-2	-2	-2	2	2	2	2	-18	-18	9
χ_{78}	-6	-6	-6	-6	-6	-6	-2	-2	-2	-2	2	2	2	2	-18	-18	9
χ_{79}	12	12	12	12	-4	-4	0	0	0	0	0	0	0	0	39	39	-6
χ_{80}	12	12	12	12	-4	-4	0	0	0	0	0	0	0	0	39	39	-6
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16	-16	-16
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-16	-16	-16
χ_{83}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16	16
χ_{84}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16	16
χ_{85}	0	0	0	0	0	0	0	0	0	0	-3	-3	-3	-3	-32	-32	4
χ_{86}	0	0	0	0	0	0	0	0	0	0	-3	-3	-3	-3	-32	-32	4
χ_{87}	0	0	0	0	0	0	0	0	0	0	-3	-3	-3	-3	32	32	-4
χ_{88}	0	0	0	0	0	0	0	0	0	0	-3	-3	-3	-3	32	32	-4
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{91}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{92}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{93}	-9	-9	-9	-9	3	3	-3	-3	-3	-3	3	3	3	3	0	0	0
χ_{94}	-9	-9	-9	-9	3	3	-3	-3	-3	-3	3	3	3	3	0	0	0
χ_{95}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-34	2
χ_{96}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-34	-34	2
χ_{97}	-3	-3	-3	-3	1	1	3	3	3	3	3	3	3	3	27	27	0
χ_{98}	-3	-3	-3	-3	1	1	3	3	3	3	3	3	3	3	27	27	0
χ_{99}	18	9	-9	0	6	-3	-12	0	-3	3	0	0	0	0	12	-6	0
χ_{100}	18	9	-9	0	6	-3	-12	0	-3	3	0	0	0	0	12	-6	0
χ_{101}	6	3	-3	0	2	-1	12	0	3	-3	12	0	3	-3	6	-3	0
χ_{102}	6	3	-3	0	2	-1	12	0	3	-3	12	0	3	-3	6	-3	0
χ_{103}	6	3	-3	0	2	-1	12	0	3	-3	0	0	0	0	30	-15	0
χ_{104}	6	3	-3	0	2	-1	12	0	3	-3	0	0	0	0	30	-15	0
χ_{105}	30	15	-15	0	10	-5	12	0	3	-3	0	0	0	0	30	-15	0
χ_{106}	30	15	-15	0	10	-5	12	0	3	-3	0	0	0	0	30	-15	0
χ_{107}	6	3	-3	0	2	-1	12	0	3	-3	0	0	0	0	-24	12	0
χ_{108}	6	3	-3	0	2	-1	12	0	3	-3	0	0	0	0	-24	12	0
χ_{109}	-12	-6	6	0	-4	2	-24	0	-6	6	0	0	0	0	6	-3	0
χ_{110}	-12	-6	6	0	-4	2	-24	0	-6	6	0	0	0	0	6	-3	0
χ_{111}	18	9	-9	0	6	-3	-12	0	-3	3	0	0	0	0	-72	36	0
χ_{112}	18	9	-9	0	6	-3	-12	0	-3	3	0	0	0	0	-72	36	0
χ_{113}	0	0	0	0	0	0	0	0	0	0	12	0	3	-3	-12	6	0
χ_{114}	0	0	0	0	0	0	0	0	0	0	12	0	3	-3	-12	6	0
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-72	36	0
χ_{116}	0	0	0	0	0	0	0	0	0	0	-12	0	-3	3	48	-24	0
χ_{117}	0	0	0	0	0	0	0	0	0	0	-12	0	-3	3	48	-24	0
χ_{118}	24	12	-12	0	8	-4	0	0	0	0	0	0	0	0	66	-33	0
χ_{119}	24	12	-12	0	8	-4	0	0	0	0	0	0	0	0	66	-33	0
χ_{120}	12	6	-6	0	4	-2	-24	0	-6	6	0	0	0	0	18	-9	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6C$		$6D$			$6E$		$6F$				$6G$				
	$6K$	$6L$	$6M$	$6N$	$6O$	$6P$	$18A$	$6Q$	$6R$	$6S$	$18B$	$6T$	$6U$	$6V$	$6W$	$6X$
χ_{61}	4	4	-5	-5	-5	-4	-4	4	4	4	4	-1	-1	-1	-1	-1
χ_{62}	-4	-4	-8	-8	-8	0	0	4	4	4	4	0	0	0	0	0
χ_{63}	-4	-4	-8	-8	-8	0	0	4	4	4	4	0	0	0	0	0
χ_{64}	4	4	-8	-8	-8	0	0	4	4	4	4	0	0	0	0	0
χ_{65}	4	4	-8	-8	-8	0	0	4	4	4	4	0	0	0	0	0
χ_{66}	-18	-18	-6	-6	-6	-8	-8	0	0	0	0	-2	-2	-2	-2	-2
χ_{67}	-18	-18	-6	-6	-6	-8	-8	0	0	0	0	-2	-2	-2	-2	-2
χ_{68}	0	0	-6	-6	-6	-12	-12	-12	-12	-12	-12	-6	-6	-6	-6	-6
χ_{69}	-2	-2	-10	-10	-10	-16	-16	-4	-4	-4	-4	2	2	2	2	2
χ_{70}	-2	-2	-10	-10	-10	-16	-16	-4	-4	-4	-4	2	2	2	2	2
χ_{71}	-4	-4	-20	-20	-20	16	16	-8	-8	-8	-8	4	4	4	4	4
χ_{72}	9	9	-3	-3	-3	9	9	-3	-3	-3	-3	-3	-3	-3	-3	-3
χ_{73}	9	9	-3	-3	-3	9	9	-3	-3	-3	-3	-3	-3	-3	-3	-3
χ_{74}	-6	-6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
χ_{75}	0	0	-16	-16	-16	0	0	8	8	8	8	0	0	0	0	0
χ_{76}	0	0	-16	-16	-16	0	0	8	8	8	8	0	0	0	0	0
χ_{77}	9	9	-6	-6	-6	-9	-9	3	3	3	3	6	6	6	6	6
χ_{78}	9	9	-6	-6	-6	-9	-9	3	3	3	3	6	6	6	6	6
χ_{79}	-6	-6	15	15	15	4	4	0	0	0	0	-5	-5	-5	-5	-5
χ_{80}	-6	-6	15	15	15	4	4	0	0	0	0	-5	-5	-5	-5	-5
χ_{81}	-16	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	-16	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	4	4	8	8	8	0	0	-4	-4	-4	-4	0	0	0	0	0
χ_{86}	4	4	8	8	8	0	0	-4	-4	-4	-4	0	0	0	0	0
χ_{87}	-4	-4	8	8	8	0	0	-4	-4	-4	-4	0	0	0	0	0
χ_{88}	-4	-4	8	8	8	0	0	-4	-4	-4	-4	0	0	0	0	0
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{91}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{92}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{93}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{94}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{95}	2	2	10	10	10	0	0	4	4	4	4	6	6	6	6	6
χ_{96}	2	2	10	10	10	0	0	4	4	4	4	6	6	6	6	6
χ_{97}	0	0	-9	-9	-9	0	0	0	0	0	0	-9	-9	-9	-9	-9
χ_{98}	0	0	-9	-9	-9	0	0	0	0	0	0	-9	-9	-9	-9	-9
χ_{99}	6	-3	36	-18	0	0	0	-12	6	-3	0	12	-6	-6	6	0
χ_{100}	6	-3	36	-18	0	0	0	-12	6	-3	0	12	-6	-6	6	0
χ_{101}	12	-6	-18	9	0	0	0	24	-12	6	0	-6	3	3	-3	0
χ_{102}	12	-6	-18	9	0	0	0	24	-12	6	0	-6	3	3	-3	0
χ_{103}	6	-3	54	-27	0	0	0	36	-18	9	0	18	-9	-9	9	0
χ_{104}	6	-3	54	-27	0	0	0	36	-18	9	0	18	-9	-9	9	0
χ_{105}	6	-3	-18	9	0	0	0	-12	6	-3	0	-6	3	3	-3	0
χ_{106}	6	-3	-18	9	0	0	0	-12	6	-3	0	-6	3	3	-3	0
χ_{107}	24	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{108}	24	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{109}	30	-15	-18	9	0	0	0	-12	6	-3	0	-6	3	3	-3	0
χ_{110}	30	-15	-18	9	0	0	0	-12	6	-3	0	-6	3	3	-3	0
χ_{111}	18	-9	72	-36	0	0	0	12	-6	3	0	24	-12	-12	12	0
χ_{112}	18	-9	72	-36	0	0	0	12	-6	3	0	24	-12	-12	12	0
χ_{113}	12	-6	-36	18	0	0	0	-24	12	-6	0	-12	6	6	-6	0
χ_{114}	12	-6	-36	18	0	0	0	-24	12	-6	0	-12	6	6	-6	0
χ_{115}	-36	18	72	-36	0	0	0	-24	12	-6	0	24	-12	-12	12	0
χ_{116}	24	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{117}	24	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{118}	-12	6	18	-9	0	0	0	-24	12	-6	0	6	-3	-3	3	0
χ_{119}	-12	6	18	-9	0	0	0	-24	12	-6	0	6	-3	-3	3	0
χ_{120}	-18	9	-54	27	0	0	0	36	-18	9	0	-18	9	9	-9	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6H$					$6I$					$6J$				$6K$
	$6Y$	$6Z$	$6AA$	$6AB$	$18C$	$6AC$	$6AD$	$6AE$	$6AF$	$6AG$	$6AH$	$6AI$	$6AJ$	$6AK$	$6AL$
χ_{61}	4	4	4	4	4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-5
χ_{62}	-2	-2	-2	-2	-2	0	0	0	0	0	0	0	0	0	-4
χ_{63}	-2	-2	-2	-2	-2	0	0	0	0	0	0	0	0	0	-4
χ_{64}	-2	-2	-2	-2	-2	0	0	0	0	0	0	0	0	0	4
χ_{65}	-2	-2	-2	-2	-2	0	0	0	0	0	0	0	0	0	4
χ_{66}	-3	-3	-3	-3	-3	1	1	1	1	1	-2	-2	-2	-2	0
χ_{67}	-3	-3	-3	-3	-3	1	1	1	1	1	-2	-2	-2	-2	0
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-2
χ_{70}	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-2
χ_{71}	4	4	4	4	4	4	4	4	4	4	4	4	4	4	-4
χ_{72}	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	0
χ_{73}	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	0
χ_{74}	6	6	6	6	6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6
χ_{75}	-4	-4	-4	-4	-4	0	0	0	0	0	0	0	0	0	0
χ_{76}	-4	-4	-4	-4	-4	0	0	0	0	0	0	0	0	0	0
χ_{77}	3	3	3	3	3	-3	-3	-3	-3	-3	-3	-3	-3	-3	0
χ_{78}	3	3	3	3	3	-3	-3	-3	-3	-3	-3	-3	-3	-3	0
χ_{79}	-6	-6	-6	-6	-6	-2	-2	-2	-2	-2	-2	-2	-2	-2	3
χ_{80}	-6	-6	-6	-6	-6	-2	-2	-2	-2	-2	-2	-2	-2	-2	3
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
χ_{83}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2
χ_{84}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2
χ_{85}	2	2	2	2	2	0	0	0	0	0	0	0	0	0	4
χ_{86}	2	2	2	2	2	0	0	0	0	0	0	0	0	0	4
χ_{87}	2	2	2	2	2	0	0	0	0	0	0	0	0	0	-4
χ_{88}	2	2	2	2	2	0	0	0	0	0	0	0	0	0	-4
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{91}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{92}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{93}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{94}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{95}	-2	-2	-2	-2	-2	6	6	6	6	6	6	6	6	6	2
χ_{96}	-2	-2	-2	-2	-2	6	6	6	6	6	6	6	6	6	2
χ_{97}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{98}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{99}	12	12	-6	-6	0	12	-6	-6	6	0	-6	-3	3	0	0
χ_{100}	12	12	-6	-6	0	12	-6	-6	6	0	-6	-3	3	0	0
χ_{101}	12	12	-6	-6	0	12	-6	-6	6	0	12	6	-6	0	0
χ_{102}	12	12	-6	-6	0	12	-6	-6	6	0	12	6	-6	0	0
χ_{103}	0	0	0	0	0	0	0	0	0	0	18	9	-9	0	0
χ_{104}	0	0	0	0	0	0	0	0	0	0	18	9	-9	0	0
χ_{105}	12	12	-6	-6	0	12	-6	-6	6	0	-6	-3	3	0	0
χ_{106}	12	12	-6	-6	0	12	-6	-6	6	0	-6	-3	3	0	0
χ_{107}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{108}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{109}	12	12	-6	-6	0	12	-6	-6	6	0	-6	-3	3	0	0
χ_{110}	12	12	-6	-6	0	12	-6	-6	6	0	-6	-3	3	0	0
χ_{111}	-12	-12	6	6	0	-12	6	6	-6	0	6	3	-3	0	0
χ_{112}	-12	-12	6	6	0	-12	6	6	-6	0	6	3	-3	0	0
χ_{113}	-12	-12	6	6	0	-12	6	6	-6	0	-12	-6	6	0	0
χ_{114}	-12	-12	6	6	0	-12	6	6	-6	0	-12	-6	6	0	0
χ_{115}	24	24	-12	-12	0	24	-12	-12	12	0	-12	-6	6	0	0
χ_{116}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{117}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{118}	-12	-12	6	6	0	-12	6	6	-6	0	-12	-6	6	0	0
χ_{119}	-12	-12	6	6	0	-12	6	6	-6	0	-12	-6	6	0	0
χ_{120}	0	0	0	0	0	0	0	0	0	0	18	9	-9	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6L$			$6M$		$6N$			$7A$		$8A$		$8B$		$9A$		
	$18D$	$6AM$	$18E$	$6AN$	$18F$	$18G$	$6AO$	$18H$	$7A$	$21A$	$8A$	$24A$	$8B$	$24B$	$9N$	$9O$	$9P$
χ_{61}	2	2	2	-1	-1	-1	-1	-1	0	0	0	0	0	0	-3	-3	-3
χ_{62}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
χ_{63}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
χ_{64}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
χ_{65}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
χ_{66}	-2	-2	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0	0
χ_{67}	-2	-2	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0	0
χ_{68}	3	3	3	0	0	0	0	0	-2	-2	0	0	0	0	0	0	0
χ_{69}	2	2	2	2	2	2	2	2	0	0	0	0	0	0	-1	-1	-1
χ_{70}	2	2	2	2	2	2	2	2	0	0	0	0	0	0	-1	-1	-1
χ_{71}	-2	-2	-2	-2	-2	-2	-2	-2	0	0	0	0	0	0	-2	-2	-2
χ_{72}	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0
χ_{73}	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0
χ_{74}	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
χ_{76}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
χ_{77}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{78}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{79}	-2	-2	-2	1	1	1	1	1	0	0	0	0	0	0	0	0	0
χ_{80}	-2	-2	-2	1	1	1	1	1	0	0	0	0	0	0	0	0	0
χ_{81}	0	0	0	0	0	0	0	0	1	1	0	0	0	0	-4	-4	-4
χ_{82}	0	0	0	0	0	0	0	0	1	1	0	0	0	0	-4	-4	-4
χ_{83}	0	0	0	0	0	0	0	0	1	1	0	0	0	0	-4	-4	-4
χ_{84}	0	0	0	0	0	0	0	0	1	1	0	0	0	0	-4	-4	-4
χ_{85}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3
χ_{86}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3
χ_{87}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3
χ_{88}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4
χ_{90}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4
χ_{91}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4
χ_{92}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4
χ_{93}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1	0	0	0
χ_{94}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1	0	0	0
χ_{95}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	-3	-3
χ_{96}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	-3	-3
χ_{97}	0	0	0	0	0	0	0	0	0	0	1	1	-1	-1	0	0	0
χ_{98}	0	0	0	0	0	0	0	0	0	0	1	1	-1	-1	0	0	0
χ_{99}	0	0	0	0	0	0	0	0	2	-1	0	0	2	-1	0	0	0
χ_{100}	0	0	0	0	0	0	0	0	2	-1	0	0	2	-1	0	0	0
χ_{101}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0
χ_{102}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0
χ_{103}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0
χ_{104}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0
χ_{105}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0
χ_{106}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0
χ_{107}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0
χ_{108}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0
χ_{109}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{110}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{111}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0
χ_{112}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0
χ_{113}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{114}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{115}	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0
χ_{116}	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0
χ_{117}	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0
χ_{118}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{119}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{120}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	9B							9C			10A		10B		12A	
	9Q	9R	9S	9T	9U	9V	9W	27A	27B	27C	10A	30A	10B	30B	12I	36A
χ_{61}	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	0	0
χ_{62}	1	1	1	1	1	1	1	1	1	1	-1	-1	1	1	0	0
χ_{63}	1	1	1	1	1	1	1	1	1	1	-1	-1	1	1	0	0
χ_{64}	1	1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	0	0
χ_{65}	1	1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	0	0
χ_{66}	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0
χ_{67}	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	-4
χ_{69}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0
χ_{70}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0
χ_{71}	-2	-2	-2	-2	-2	-2	-2	1	1	1	0	0	0	0	0	0
χ_{72}	0	0	0	0	0	0	0	0	0	0	1	1	-1	-1	-3	-3
χ_{73}	0	0	0	0	0	0	0	0	0	0	1	1	-1	-1	-3	-3
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	-2
χ_{75}	2	2	2	2	2	2	2	-1	-1	-1	-2	-2	0	0	0	0
χ_{76}	2	2	2	2	2	2	2	-1	-1	-1	-2	-2	0	0	0	0
χ_{77}	0	0	0	0	0	0	0	0	0	0	2	2	0	0	3	3
χ_{78}	0	0	0	0	0	0	0	0	0	0	2	2	0	0	3	3
χ_{79}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{80}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{81}	2	2	2	2	2	2	2	-1	-1	-1	0	0	0	0	0	0
χ_{82}	2	2	2	2	2	2	2	-1	-1	-1	0	0	0	0	0	0
χ_{83}	2	2	2	2	2	2	2	-1	-1	-1	0	0	0	0	0	0
χ_{84}	2	2	2	2	2	2	2	-1	-1	-1	0	0	0	0	0	0
χ_{85}	3	3	3	3	3	3	3	0	0	0	1	1	-1	-1	0	0
χ_{86}	3	3	3	3	3	3	3	0	0	0	1	1	-1	-1	0	0
χ_{87}	3	3	3	3	3	3	3	0	0	0	1	1	1	1	0	0
χ_{88}	3	3	3	3	3	3	3	0	0	0	1	1	1	1	0	0
χ_{89}	-2	-2	-2	-2	-2	-2	-2	1	1	1	0	0	0	0	0	0
χ_{90}	-2	-2	-2	-2	-2	-2	-2	1	1	1	0	0	0	0	0	0
χ_{91}	-2	-2	-2	-2	-2	-2	-2	1	1	1	0	0	0	0	0	0
χ_{92}	-2	-2	-2	-2	-2	-2	-2	1	1	1	0	0	0	0	0	0
χ_{93}	0	0	0	0	0	0	0	0	0	0	-1	-1	1	1	0	0
χ_{94}	0	0	0	0	0	0	0	0	0	0	-1	-1	1	1	0	0
χ_{95}	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	0	0
χ_{96}	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	0	0
χ_{97}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0
χ_{98}	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0
χ_{99}	9	0	-9	0	0	-9	9	0	0	0	0	0	0	0	0	0
χ_{100}	9	0	-9	0	0	-9	9	0	0	0	0	0	0	0	0	0
χ_{101}	0	9	-9	0	9	-9	0	0	0	0	0	0	2	-1	0	0
χ_{102}	0	9	-9	0	9	-9	0	0	0	0	0	0	2	-1	0	0
χ_{103}	0	-9	9	0	-9	9	0	0	0	0	0	0	0	0	0	0
χ_{104}	0	-9	9	0	-9	9	0	0	0	0	0	0	0	0	0	0
χ_{105}	0	-9	9	0	-9	9	0	0	0	0	0	0	0	0	0	0
χ_{106}	0	-9	9	0	-9	9	0	0	0	0	0	0	0	0	0	0
χ_{107}	-9	9	0	0	9	0	-9	0	0	0	0	0	0	0	0	0
χ_{108}	-9	9	0	0	9	0	-9	0	0	0	0	0	0	0	0	0
χ_{109}	-9	0	9	0	0	9	-9	0	0	0	0	0	0	0	0	0
χ_{110}	-9	0	9	0	0	9	-9	0	0	0	0	0	0	0	0	0
χ_{111}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{112}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{113}	9	-9	0	0	-9	0	9	0	0	0	0	0	2	-1	0	0
χ_{114}	9	-9	0	0	-9	0	9	0	0	0	0	0	2	-1	0	0
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	9	0	-9	0	0	-9	9	0	0	0	0	0	-2	1	0	0
χ_{117}	9	0	-9	0	0	-9	9	0	0	0	0	0	-2	1	0	0
χ_{118}	-9	9	0	0	9	0	-9	0	0	0	0	0	0	0	0	0
χ_{119}	-9	9	0	0	9	0	-9	0	0	0	0	0	0	0	0	0
χ_{120}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$12B$					$12C$		$12D$		$12E$		$12F$			$12G$	
	$12J$	$12K$	$12L$	$12M$	$12N$	$12O$	$12P$	$12Q$	$12R$	$12S$	$12T$	$36B$	$12U$	$36C$	$12V$	$36D$
χ_{61}	3	3	3	3	3	0	0	0	0	-1	-1	0	0	0	0	0
χ_{62}	0	0	0	0	0	-2	-2	-2	-2	0	0	0	0	0	0	0
χ_{63}	0	0	0	0	0	-2	-2	-2	-2	0	0	0	0	0	0	0
χ_{64}	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0
χ_{65}	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0
χ_{66}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	1	1
χ_{67}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	1	1
χ_{68}	2	2	2	2	2	0	0	0	0	2	2	-1	-1	-1	0	0
χ_{69}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{70}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{72}	3	3	3	3	3	-1	-1	-1	-1	-1	-1	0	0	0	-1	-1
χ_{73}	3	3	3	3	3	-1	-1	-1	-1	-1	-1	0	0	0	-1	-1
χ_{74}	-2	-2	-2	-2	-2	2	2	2	2	-2	-2	1	1	1	-2	-2
χ_{75}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{76}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{77}	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	1	1
χ_{78}	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	1	1
χ_{79}	3	3	3	3	3	0	0	0	0	-1	-1	0	0	0	0	0
χ_{80}	3	3	3	3	3	0	0	0	0	-1	-1	0	0	0	0	0
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	0	0	0	0	0	-2	-2	-2	-2	0	0	0	0	0	0	0
χ_{86}	0	0	0	0	0	-2	-2	-2	-2	0	0	0	0	0	0	0
χ_{87}	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0
χ_{88}	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{91}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{92}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{93}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{94}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{95}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{96}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{97}	-3	-3	-3	-3	-3	0	0	0	0	1	1	0	0	0	0	0
χ_{98}	-3	-3	-3	-3	-3	0	0	0	0	1	1	0	0	0	0	0
χ_{99}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{100}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{101}	6	-3	-3	3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{102}	6	-3	-3	3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{103}	6	-3	-3	3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{104}	6	-3	-3	3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{105}	-6	3	3	-3	0	0	0	0	0	-2	1	0	0	0	0	0
χ_{106}	-6	3	3	-3	0	0	0	0	0	-2	1	0	0	0	0	0
χ_{107}	-12	6	6	-6	0	0	0	0	0	-4	2	0	0	0	0	0
χ_{108}	-12	6	6	-6	0	0	0	0	0	-4	2	0	0	0	0	0
χ_{109}	6	-3	-3	3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{110}	6	-3	-3	3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{111}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{112}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{113}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{114}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{117}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{118}	6	-3	-3	3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{119}	6	-3	-3	3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{120}	-6	3	3	-3	0	0	0	0	0	-2	1	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$13A$		$13B$		$14A$		$15A$		$18A$	$18B$			$18C$		$20A$	
	$13A$	$39A$	$13B$	$39B$	$14A$	$42A$	$15D$	$45A$	$18I$	$18J$	$18K$	$18L$	$18M$	$18N$	$20A$	$60A$
χ_{61}	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0
χ_{62}	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	1	1	1	1
χ_{63}	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	1	1	1	1
χ_{64}	0	0	0	0	0	0	-1	-1	1	1	1	1	1	1	-1	-1
χ_{65}	0	0	0	0	0	0	-1	-1	1	1	1	1	1	1	-1	-1
χ_{66}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1
χ_{67}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1
χ_{68}	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
χ_{69}	0	0	0	0	0	0	0	0	1	1	1	1	-1	-1	0	0
χ_{70}	0	0	0	0	0	0	0	0	1	1	1	1	-1	-1	0	0
χ_{71}	0	0	0	0	0	0	0	0	2	2	2	2	-2	-2	0	0
χ_{72}	0	0	0	0	0	0	1	1	0	0	0	0	0	0	-1	-1
χ_{73}	0	0	0	0	0	0	1	1	0	0	0	0	0	0	-1	-1
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	0	0	0	0	0	0	1	1	0	0	0	0	2	2	0	0
χ_{76}	0	0	0	0	0	0	1	1	0	0	0	0	2	2	0	0
χ_{77}	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0
χ_{78}	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0
χ_{79}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{80}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{81}	0	0	0	0	-1	-1	0	0	2	2	2	2	0	0	0	0
χ_{82}	0	0	0	0	-1	-1	0	0	2	2	2	2	0	0	0	0
χ_{83}	0	0	0	0	1	1	0	0	-2	-2	-2	-2	0	0	0	0
χ_{84}	0	0	0	0	1	1	0	0	-2	-2	-2	-2	0	0	0	0
χ_{85}	0	0	0	0	0	0	0	0	1	1	1	1	-1	-1	1	1
χ_{86}	0	0	0	0	0	0	0	0	1	1	1	1	-1	-1	1	1
χ_{87}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1
χ_{88}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1
χ_{89}	A	A	$\bar{A}$	$\bar{A}$	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	A	A	$\bar{A}$	$\bar{A}$	0	0	0	0	0	0	0	0	0	0	0	0
χ_{91}	$\bar{A}$	$\bar{A}$	A	A	0	0	0	0	0	0	0	0	0	0	0	0
χ_{92}	$\bar{A}$	$\bar{A}$	A	A	0	0	0	0	0	0	0	0	0	0	0	0
χ_{93}	1	1	1	1	-1	-1	0	0	0	0	0	0	0	0	-1	-1
χ_{94}	1	1	1	1	-1	-1	0	0	0	0	0	0	0	0	-1	-1
χ_{95}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1	0	0
χ_{96}	0	0	0	0	0	0	0	0	-1	-1	-1	-1	1	1	0	0
χ_{97}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{98}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{99}	0	0	0	0	2	-1	0	0	0	-3	3	0	0	0	0	0
χ_{100}	0	0	0	0	2	-1	0	0	0	-3	3	0	0	0	0	0
χ_{101}	0	0	0	0	0	0	0	0	0	-3	0	3	0	0	0	0
χ_{102}	0	0	0	0	0	0	0	0	0	-3	0	3	0	0	0	0
χ_{103}	0	0	0	0	0	0	0	0	0	3	0	-3	0	0	0	0
χ_{104}	0	0	0	0	0	0	0	0	0	3	0	-3	0	0	0	0
χ_{105}	0	0	0	0	0	0	0	0	0	3	0	-3	0	0	0	0
χ_{106}	0	0	0	0	0	0	0	0	0	3	0	-3	0	0	0	0
χ_{107}	0	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0
χ_{108}	0	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0
χ_{109}	0	0	0	0	0	0	0	0	0	3	-3	0	0	0	0	0
χ_{110}	0	0	0	0	0	0	0	0	0	3	-3	0	0	0	0	0
χ_{111}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{112}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{113}	0	0	0	0	0	0	0	0	0	0	3	-3	0	0	0	0
χ_{114}	0	0	0	0	0	0	0	0	0	0	3	-3	0	0	0	0
χ_{115}	0	0	0	0	-2	1	0	0	0	0	0	0	0	0	0	0
χ_{116}	0	0	0	0	-2	1	0	0	0	-3	3	0	0	0	0	0
χ_{117}	0	0	0	0	-2	1	0	0	0	-3	3	0	0	0	0	0
χ_{118}	0	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0
χ_{119}	0	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0
χ_{120}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	2D				2E				2F			
	$2D$	$6AP$	$6AQ$	$6AR$	$2E$	$6AS$	$6AT$	$6AU$	$2F$	$6AV$	$6AW$	$6AX$
χ_{61}	-260	-260	-260	-260	-20	-20	-20	-20	20	20	20	20
χ_{62}	416	416	416	416	64	64	64	64	16	16	16	16
χ_{63}	-416	-416	-416	-416	-64	-64	-64	-64	-16	-16	-16	-16
χ_{64}	416	416	416	416	-64	-64	-64	-64	16	16	16	16
χ_{65}	-416	-416	-416	-416	64	64	64	64	-16	-16	-16	-16
χ_{66}	624	624	624	624	-96	-96	-96	-96	8	8	8	8
χ_{67}	-624	-624	-624	-624	96	96	96	96	-8	-8	-8	-8
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	1040	1040	1040	1040	-80	-80	-80	-80	0	0	0	0
χ_{70}	-1040	-1040	-1040	-1040	80	80	80	80	0	0	0	0
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{72}	819	819	819	819	51	51	51	51	-21	-21	-21	-21
χ_{73}	-819	-819	-819	-819	-51	-51	-51	-51	21	21	21	21
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	832	832	832	832	0	0	0	0	32	32	32	32
χ_{76}	-832	-832	-832	-832	0	0	0	0	-32	-32	-32	-32
χ_{77}	468	468	468	468	-60	-60	-60	-60	-12	-12	-12	-12
χ_{78}	-468	-468	-468	-468	60	60	60	60	12	12	12	12
χ_{79}	780	780	780	780	60	60	60	60	20	20	20	20
χ_{80}	-780	-780	-780	-780	-60	-60	-60	-60	-20	-20	-20	-20
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	416	416	416	416	64	64	64	64	-48	-48	-48	-48
χ_{86}	-416	-416	-416	-416	-64	-64	-64	-64	48	48	48	48
χ_{87}	416	416	416	416	-64	-64	-64	-64	-48	-48	-48	-48
χ_{88}	-416	-416	-416	-416	64	64	64	64	48	48	48	48
χ_{89}	1280	1280	1280	1280	0	0	0	0	0	0	0	0
χ_{90}	-1280	-1280	-1280	-1280	0	0	0	0	0	0	0	0
χ_{91}	1280	1280	1280	1280	0	0	0	0	0	0	0	0
χ_{92}	-1280	-1280	-1280	-1280	0	0	0	0	0	0	0	0
χ_{93}	729	729	729	729	81	81	81	81	-27	-27	-27	-27
χ_{94}	-729	-729	-729	-729	-81	-81	-81	-81	27	27	27	27
χ_{95}	1040	1040	1040	1040	-80	-80	-80	-80	0	0	0	0
χ_{96}	-1040	-1040	-1040	-1040	80	80	80	80	0	0	0	0
χ_{97}	351	351	351	351	-9	-9	-9	-9	27	27	27	27
χ_{98}	-351	-351	-351	-351	9	9	9	9	-27	-27	-27	-27
χ_{99}	1170	90	-45	-45	10	10	-5	-5	-90	-9	18	-9
χ_{100}	-1170	-90	45	45	-10	-10	5	5	90	9	-18	9
χ_{101}	2574	198	-99	-99	22	22	-11	-11	90	9	-18	9
χ_{102}	-2574	-198	99	99	-22	-22	11	11	-90	-9	18	-9
χ_{103}	5850	450	-225	-225	50	50	-25	-25	270	27	-54	27
χ_{104}	-5850	-450	225	225	-50	-50	25	25	-270	-27	54	-27
χ_{105}	1170	90	-45	-45	10	10	-5	-5	-90	-9	18	-9
χ_{106}	-1170	-90	45	45	-10	-10	5	5	90	9	-18	9
χ_{107}	8190	630	-315	-315	70	70	-35	-35	90	9	-18	9
χ_{108}	-8190	-630	315	315	-70	-70	35	35	-90	-9	18	-9
χ_{109}	11700	900	-450	-450	100	100	-50	-50	-180	-18	36	-18
χ_{110}	-11700	-900	450	450	-100	-100	50	50	180	18	-36	18
χ_{111}	10530	810	-405	-405	90	90	-45	-45	-90	-9	18	-9
χ_{112}	-10530	-810	405	405	-90	-90	45	45	90	9	-18	9
χ_{113}	14976	1152	-576	-576	128	128	-64	-64	0	0	0	0
χ_{114}	-14976	-1152	576	576	-128	-128	64	64	0	0	0	0
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	14976	1152	-576	-576	128	128	-64	-64	0	0	0	0
χ_{117}	-14976	-1152	576	576	-128	-128	64	64	0	0	0	0
χ_{118}	4680	360	-180	-180	40	40	-20	-20	-360	-36	72	-36
χ_{119}	-4680	-360	180	180	-40	-40	20	20	360	36	-72	36
χ_{120}	7020	540	-270	-270	60	60	-30	-30	180	18	-36	18

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$4E$	$4F$	$4G$				$4H$			$4I$			
	$4E$	$4F$	$4G$	$12W$	$12X$	$12Y$	$4H$	$12Z$	$12AA$	$4I$	$12AB$	$12AC$	$12AD$
χ_{61}	20	28	4	4	4	4	-4	-4	-4	-4	-4	-4	-4
χ_{62}	64	0	0	0	0	0	0	0	0	0	0	0	0
χ_{63}	-64	0	0	0	0	0	0	0	0	0	0	0	0
χ_{64}	-64	0	0	0	0	0	0	0	0	0	0	0	0
χ_{65}	64	0	0	0	0	0	0	0	0	0	0	0	0
χ_{66}	-24	0	-8	-8	-8	-8	0	0	0	0	0	0	0
χ_{67}	24	0	8	8	8	8	0	0	0	0	0	0	0
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	-80	0	16	16	16	16	0	0	0	0	0	0	0
χ_{70}	80	0	-16	-16	-16	-16	0	0	0	0	0	0	0
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{72}	111	-21	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{73}	-111	21	1	1	1	1	1	1	1	1	1	1	1
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{76}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{77}	60	0	-4	-4	-4	-4	4	4	4	0	0	0	0
χ_{78}	-60	0	4	4	4	4	-4	-4	-4	0	0	0	0
χ_{79}	-60	-28	-12	-12	-12	-12	-4	-4	-4	4	4	4	4
χ_{80}	60	28	12	12	12	12	4	4	4	-4	-4	-4	-4
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	0	64	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	0	-64	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	-64	0	0	0	0	0	0	0	0	0	0	0	0
χ_{86}	64	0	0	0	0	0	0	0	0	0	0	0	0
χ_{87}	64	0	0	0	0	0	0	0	0	0	0	0	0
χ_{88}	-64	0	0	0	0	0	0	0	0	0	0	0	0
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{91}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{92}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{93}	-81	27	-9	-9	-9	-9	3	3	3	-3	-3	-3	-3
χ_{94}	81	-27	9	9	9	9	-3	-3	-3	3	3	3	3
χ_{95}	80	0	-16	-16	-16	-16	0	0	0	0	0	0	0
χ_{96}	-80	0	16	16	16	16	0	0	0	0	0	0	0
χ_{97}	9	21	-15	-15	-15	-15	-3	-3	-3	-5	-5	-5	-5
χ_{98}	-9	-21	15	15	15	15	3	3	3	5	5	5	5
χ_{99}	0	0	24	6	-3	-3	4	-2	1	2	2	-1	-1
χ_{100}	0	0	-24	-6	3	3	-4	2	-1	-2	-2	1	1
χ_{101}	0	0	72	18	-9	-9	12	-6	3	-2	-2	1	1
χ_{102}	0	0	-72	-18	9	9	-12	6	-3	2	2	-1	-1
χ_{103}	0	0	24	6	-3	-3	4	-2	1	2	2	-1	-1
χ_{104}	0	0	-24	-6	3	3	-4	2	-1	-2	-2	1	1
χ_{105}	0	0	24	6	-3	-3	4	-2	1	2	2	-1	-1
χ_{106}	0	0	-24	-6	3	3	-4	2	-1	-2	-2	1	1
χ_{107}	0	0	72	18	-9	-9	12	-6	3	6	6	-3	-3
χ_{108}	0	0	-72	-18	9	9	-12	6	-3	-6	-6	3	3
χ_{109}	0	0	48	12	-6	-6	8	-4	2	-4	-4	2	2
χ_{110}	0	0	-48	-12	6	6	-8	4	-2	4	4	-2	-2
χ_{111}	0	0	24	6	-3	-3	4	-2	1	-6	-6	3	3
χ_{112}	0	0	-24	-6	3	3	-4	2	-1	6	6	-3	-3
χ_{113}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{114}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{117}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{118}	0	0	0	0	0	0	0	0	0	-8	-8	4	4
χ_{119}	0	0	0	0	0	0	0	0	0	8	8	-4	-4
χ_{120}	0	0	48	12	-6	-6	8	-4	2	4	4	-2	-2

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	6O							6P						6Q	
	$6AY$	$6AZ$	$6BA$	$6BB$	$6BC$	$6BD$	$6BE$	$6BF$	$6BG$	$18O$	$6BH$	$6BI$	$6BJ$	$6BK$	$6BL$
χ_{61}	-17	-17	-17	-17	-17	-17	-17	10	10	10	10	10	10	10	10
χ_{62}	-16	-16	-16	-16	-16	-16	-16	2	2	2	2	2	2	2	2
χ_{63}	16	16	16	16	16	16	16	-2	-2	-2	-2	-2	-2	-2	-2
χ_{64}	-16	-16	-16	-16	-16	-16	-16	2	2	2	2	2	2	2	2
χ_{65}	16	16	16	16	16	16	16	-2	-2	-2	-2	-2	-2	-2	-2
χ_{66}	30	30	30	30	30	30	30	21	21	21	21	21	21	-6	-6
χ_{67}	-30	-30	-30	-30	-30	-30	-30	-21	-21	-21	-21	-21	-21	6	6
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	14	14	14	14	14	14	14	-4	-4	-4	-4	-4	-4	-4	-4
χ_{70}	-14	-14	-14	-14	-14	-14	-14	4	4	4	4	4	4	4	4
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{72}	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
χ_{73}	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	-32	-32	-32	-32	-32	-32	-32	4	4	4	4	4	4	4	4
χ_{76}	32	32	32	32	32	32	32	-4	-4	-4	-4	-4	-4	-4	-4
χ_{77}	-18	-18	-18	-18	-18	-18	-18	9	9	9	9	9	9	9	9
χ_{78}	18	18	18	18	18	18	18	-9	-9	-9	-9	-9	-9	-9	-9
χ_{79}	-3	-3	-3	-3	-3	-3	-3	6	6	6	6	6	6	6	6
χ_{80}	3	3	3	3	3	3	3	-6	-6	-6	-6	-6	-6	-6	-6
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	-16	-16	-16	-16	-16	-16	-16	2	2	2	2	2	2	2	2
χ_{86}	16	16	16	16	16	16	16	-2	-2	-2	-2	-2	-2	-2	-2
χ_{87}	-16	-16	-16	-16	-16	-16	-16	2	2	2	2	2	2	2	2
χ_{88}	16	16	16	16	16	16	16	-2	-2	-2	-2	-2	-2	-2	-2
χ_{89}	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16
χ_{90}	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
χ_{91}	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16
χ_{92}	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
χ_{93}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{94}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{95}	14	14	14	14	14	14	14	-4	-4	-4	-4	-4	-4	-4	-4
χ_{96}	-14	-14	-14	-14	-14	-14	-14	4	4	4	4	4	4	4	4
χ_{97}	27	27	27	27	27	27	27	0	0	0	0	0	0	0	0
χ_{98}	-27	-27	-27	-27	-27	-27	-27	0	0	0	0	0	0	0	0
χ_{99}	-72	36	36	0	36	36	-72	36	0	0	18	-18	-18	-36	0
χ_{100}	72	-36	-36	0	-36	-36	72	-36	0	0	-18	18	18	36	0
χ_{101}	-45	-18	63	0	-18	63	-45	36	0	0	18	-18	-18	72	0
χ_{102}	45	18	-63	0	18	-63	45	-36	0	0	-18	18	18	-72	0
χ_{103}	45	18	-63	0	18	-63	45	72	0	0	36	-36	-36	36	0
χ_{104}	-45	-18	63	0	-18	63	-45	-72	0	0	-36	36	36	-36	0
χ_{105}	171	-126	-45	0	-126	-45	171	36	0	0	18	-18	-18	-36	0
χ_{106}	-171	126	45	0	126	45	-171	-36	0	0	-18	18	18	36	0
χ_{107}	-18	-72	90	0	-72	90	-18	-72	0	0	-36	36	36	72	0
χ_{108}	18	72	-90	0	72	-90	18	72	0	0	36	-36	-36	-72	0
χ_{109}	9	-126	117	0	-126	117	9	36	0	0	18	-18	-18	-36	0
χ_{110}	-9	126	-117	0	126	-117	-9	-36	0	0	-18	18	18	36	0
χ_{111}	0	0	0	0	0	0	0	-108	0	0	-54	54	54	-108	0
χ_{112}	0	0	0	0	0	0	0	108	0	0	54	-54	-54	108	0
χ_{113}	18	72	-90	0	72	-90	18	-36	0	0	-18	18	18	144	0
χ_{114}	-18	-72	90	0	-72	90	-18	36	0	0	18	-18	-18	-144	0
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	-144	72	72	0	72	72	-144	72	0	0	36	-36	-36	-72	0
χ_{117}	144	-72	-72	0	-72	-72	144	-72	0	0	-36	36	36	72	0
χ_{118}	117	-18	-99	0	-18	-99	117	36	0	0	18	-18	-18	72	0
χ_{119}	-117	18	99	0	18	99	-117	-36	0	0	-18	18	18	-72	0
χ_{120}	135	54	-189	0	54	-189	135	0	0	0	0	0	0	-108	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6Q$			$6R$			$6S$						$6T$			
	$6BM$	$6BN$	$18P$	$6BO$	$6BP$	$6BQ$	$6BR$	$6BS$	$6BT$	$6BU$	$6BV$	$6BW$	$6BX$	$6BY$	$6BZ$	$6CA$
χ_{61}	10	10	10	-10	-10	-10	7	7	7	7	7	7	-2	-2	-2	-2
χ_{62}	2	2	2	16	16	16	-8	-8	-8	-8	-8	-8	4	4	4	4
χ_{63}	-2	-2	-2	-16	-16	-16	8	8	8	8	8	8	-4	-4	-4	-4
χ_{64}	2	2	2	16	16	16	8	8	8	8	8	8	-4	-4	-4	-4
χ_{65}	-2	-2	-2	-16	-16	-16	-8	-8	-8	-8	-8	-8	4	4	4	4
χ_{66}	-6	-6	-6	5	5	5	-6	-6	-6	-6	-6	-6	-3	-3	-3	-3
χ_{67}	6	6	6	-5	-5	-5	6	6	6	6	6	6	3	3	3	3
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	-4	-4	-4	0	0	0	10	10	10	10	10	10	4	4	4	4
χ_{70}	4	4	4	0	0	0	-10	-10	-10	-10	-10	-10	-4	-4	-4	-4
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{72}	9	9	9	9	9	9	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
χ_{73}	-9	-9	-9	-9	-9	-9	3	3	3	3	3	3	3	3	3	3
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	4	4	4	-16	-16	-16	0	0	0	0	0	0	0	0	0	0
χ_{76}	-4	-4	-4	16	16	16	0	0	0	0	0	0	0	0	0	0
χ_{77}	9	9	9	-9	-9	-9	-6	-6	-6	-6	-6	-6	3	3	3	3
χ_{78}	-9	-9	-9	9	9	9	6	6	6	6	6	6	-3	-3	-3	-3
χ_{79}	6	6	6	-10	-10	-10	-3	-3	-3	-3	-3	-3	-6	-6	-6	-6
χ_{80}	-6	-6	-6	10	10	10	3	3	3	3	3	3	6	6	6	6
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	2	2	2	0	0	0	-8	-8	-8	-8	-8	-8	4	4	4	4
χ_{86}	-2	-2	-2	0	0	0	8	8	8	8	8	8	-4	-4	-4	-4
χ_{87}	2	2	2	0	0	0	8	8	8	8	8	8	-4	-4	-4	-4
χ_{88}	-2	-2	-2	0	0	0	-8	-8	-8	-8	-8	-8	4	4	4	4
χ_{89}	-16	-16	-16	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	16	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{91}	-16	-16	-16	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{92}	16	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{93}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{94}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{95}	-4	-4	-4	0	0	0	10	10	10	10	10	10	4	4	4	4
χ_{96}	4	4	4	0	0	0	-10	-10	-10	-10	-10	-10	-4	-4	-4	-4
χ_{97}	0	0	0	0	0	0	-9	-9	-9	-9	-9	-9	0	0	0	0
χ_{98}	0	0	0	0	0	0	9	9	9	9	9	9	0	0	0	0
χ_{99}	-9	9	0	0	0	0	4	4	-8	4	-8	4	4	4	-2	-2
χ_{100}	9	-9	0	0	0	0	-4	-4	8	-4	8	-4	-4	-4	2	2
χ_{101}	18	-18	0	0	0	0	7	-2	-5	7	-5	-2	4	4	-2	-2
χ_{102}	-18	18	0	0	0	0	-7	2	5	-7	5	2	-4	-4	2	2
χ_{103}	9	-9	0	0	0	0	-7	2	5	-7	5	2	8	8	-4	-4
χ_{104}	-9	9	0	0	0	0	7	-2	-5	7	-5	-2	-8	-8	4	4
χ_{105}	-9	9	0	0	0	0	-5	-14	19	-5	19	-14	4	4	-2	-2
χ_{106}	9	-9	0	0	0	0	5	14	-19	5	-19	14	-4	-4	2	2
χ_{107}	18	-18	0	0	0	0	10	-8	-2	10	-2	-8	-8	-8	4	4
χ_{108}	-18	18	0	0	0	0	-10	8	2	-10	2	8	8	8	-4	-4
χ_{109}	-9	9	0	0	0	0	13	-14	1	13	1	-14	4	4	-2	-2
χ_{110}	9	-9	0	0	0	0	-13	14	-1	-13	-1	14	-4	-4	2	2
χ_{111}	-27	27	0	0	0	0	0	0	0	0	0	0	-12	-12	6	6
χ_{112}	27	-27	0	0	0	0	0	0	0	0	0	0	12	12	-6	-6
χ_{113}	36	-36	0	0	0	0	-10	8	2	-10	2	8	-4	-4	2	2
χ_{114}	-36	36	0	0	0	0	10	-8	-2	10	-2	-8	4	4	-2	-2
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	-18	18	0	0	0	0	8	8	-16	8	-16	8	8	8	-4	-4
χ_{117}	18	-18	0	0	0	0	-8	-8	16	-8	16	-8	-8	-8	4	4
χ_{118}	18	-18	0	0	0	0	-11	-2	13	-11	13	-2	4	4	-2	-2
χ_{119}	-18	18	0	0	0	0	11	2	-13	11	-13	2	-4	-4	2	2
χ_{120}	-27	27	0	0	0	0	-21	6	15	-21	15	6	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6U$		$6V$			$6W$				$6X$						$6Y$	
	$6CB$	$18Q$	$6CC$	$6CD$	$18R$	$6CE$	$6CF$	$6CG$	$6CH$	$18S$	$18T$	$6CI$	$18U$	$18V$	$18W$	$6CJ$	$18X$
χ_{61}	2	2	2	2	2	-2	-2	-2	-2	1	1	1	1	1	1	-1	-1
χ_{62}	-2	-2	-2	-2	-2	-2	-2	-2	-2	2	2	2	2	2	2	-2	-2
χ_{63}	2	2	2	2	2	2	2	2	2	-2	-2	-2	-2	-2	-2	2	2
χ_{64}	-2	-2	-2	-2	-2	2	2	2	2	2	2	2	2	2	2	-2	-2
χ_{65}	2	2	2	2	2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	2	2
χ_{66}	5	5	2	2	2	0	0	0	0	3	3	3	3	3	3	2	2
χ_{67}	-5	-5	-2	-2	-2	0	0	0	0	-3	-3	-3	-3	-3	-3	-2	-2
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	0	0	0	0	0	-2	-2	-2	-2	-4	-4	-4	-4	-4	-4	0	0
χ_{70}	0	0	0	0	0	2	2	2	2	4	4	4	4	4	4	0	0
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{72}	-3	-3	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	0
χ_{73}	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	-4	-4	-4	-4	-4	0	0	0	0	4	4	4	4	4	4	2	2
χ_{76}	4	4	4	4	4	0	0	0	0	-4	-4	-4	-4	-4	-4	-2	-2
χ_{77}	-3	-3	-3	-3	-3	3	3	3	3	0	0	0	0	0	0	0	0
χ_{78}	3	3	3	3	3	-3	-3	-3	-3	0	0	0	0	0	0	0	0
χ_{79}	2	2	2	2	2	0	0	0	0	-3	-3	-3	-3	-3	-3	-1	-1
χ_{80}	-2	-2	-2	-2	-2	0	0	0	0	3	3	3	3	3	3	1	1
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	6	6	6	6	6	-2	-2	-2	-2	2	2	2	2	2	2	0	0
χ_{86}	-6	-6	-6	-6	-6	2	2	2	2	-2	-2	-2	-2	-2	-2	0	0
χ_{87}	6	6	6	6	6	2	2	2	2	2	2	2	2	2	2	0	0
χ_{88}	-6	-6	-6	-6	-6	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	0	0
χ_{89}	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	0	0
χ_{90}	0	0	0	0	0	0	0	0	0	-2	-2	-2	-2	-2	-2	0	0
χ_{91}	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	0	0
χ_{92}	0	0	0	0	0	0	0	0	0	-2	-2	-2	-2	-2	-2	0	0
χ_{93}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{94}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{95}	0	0	0	0	0	-2	-2	-2	-2	-4	-4	-4	-4	-4	-4	0	0
χ_{96}	0	0	0	0	0	2	2	2	2	4	4	4	4	4	4	0	0
χ_{97}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{98}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{99}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{100}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{101}	0	0	0	0	0	4	4	-2	-2	0	0	0	0	0	0	0	0
χ_{102}	0	0	0	0	0	-4	-4	2	2	0	0	0	0	0	0	0	0
χ_{103}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{104}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{105}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{106}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{107}	0	0	0	0	0	4	4	-2	-2	0	0	0	0	0	0	0	0
χ_{108}	0	0	0	0	0	-4	-4	2	2	0	0	0	0	0	0	0	0
χ_{109}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{110}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{111}	0	0	0	0	0	-6	-6	3	3	0	0	0	0	0	0	0	0
χ_{112}	0	0	0	0	0	6	6	-3	-3	0	0	0	0	0	0	0	0
χ_{113}	0	0	0	0	0	8	8	-4	-4	0	0	0	0	0	0	0	0
χ_{114}	0	0	0	0	0	-8	-8	4	4	0	0	0	0	0	0	0	0
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	0	0	0	0	0	-4	-4	2	2	0	0	0	0	0	0	0	0
χ_{117}	0	0	0	0	0	4	4	-2	-2	0	0	0	0	0	0	0	0
χ_{118}	0	0	0	0	0	4	4	-2	-2	0	0	0	0	0	0	0	0
χ_{119}	0	0	0	0	0	-4	-4	2	2	0	0	0	0	0	0	0	0
χ_{120}	0	0	0	0	0	-6	-6	3	3	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6Z$				$8C$				$10C$	$10D$			$10E$				$12H$
	$18Y$	$18Z$	$18AA$	$6CK$	$8C$	$8D$	$24C$	$24D$	$10C$	$10D$	$30C$	$30D$	$10E$	$30E$	$30F$	$30G$	$12AE$
χ_{61}	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-7
χ_{62}	-2	-2	-2	-2	0	0	0	0	1	1	1	1	-1	-1	-1	-1	-8
χ_{63}	2	2	2	2	0	0	0	0	-1	-1	-1	-1	1	1	1	1	8
χ_{64}	-2	-2	-2	-2	0	0	0	0	1	1	1	1	1	1	1	1	8
χ_{65}	2	2	2	2	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-8
χ_{66}	-1	-1	-1	-1	0	0	0	0	3	-1	-1	-1	-1	-1	-1	-1	-6
χ_{67}	1	1	1	1	0	0	0	0	-3	1	1	1	1	1	1	1	6
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
χ_{70}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{72}	0	0	0	0	1	1	1	1	-1	-1	-1	-1	1	1	1	1	3
χ_{73}	0	0	0	0	-1	-1	-1	-1	1	1	1	1	-1	-1	-1	-1	-3
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	2	2	2	2	0	0	0	0	2	2	2	2	0	0	0	0	0
χ_{76}	-2	-2	-2	-2	0	0	0	0	-2	-2	-2	-2	0	0	0	0	0
χ_{77}	0	0	0	0	2	2	2	2	-2	-2	-2	-2	0	0	0	0	6
χ_{78}	0	0	0	0	-2	-2	-2	-2	2	2	2	2	0	0	0	0	-6
χ_{79}	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	3
χ_{80}	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-3
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	0	0	0	0	0	0	0	0	-3	1	1	1	-1	-1	-1	-1	8
χ_{86}	0	0	0	0	0	0	0	0	3	-1	-1	-1	1	1	1	1	-8
χ_{87}	0	0	0	0	0	0	0	0	-3	1	1	1	1	1	1	1	-8
χ_{88}	0	0	0	0	0	0	0	0	3	-1	-1	-1	-1	-1	-1	-1	8
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{91}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{92}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{93}	0	0	0	0	-3	1	1	1	3	-1	-1	-1	1	1	1	1	0
χ_{94}	0	0	0	0	3	-1	-1	-1	-3	1	1	1	-1	-1	-1	-1	0
χ_{95}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10
χ_{96}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
χ_{97}	0	0	0	0	3	-1	-1	-1	-3	1	1	1	1	1	1	1	9
χ_{98}	0	0	0	0	-3	1	1	1	3	-1	-1	-1	-1	-1	-1	-1	-9
χ_{99}	0	0	0	0	0	-4	2	-1	0	0	0	0	0	0	0	0	0
χ_{100}	0	0	0	0	0	4	-2	1	0	0	0	0	0	0	0	0	0
χ_{101}	0	0	0	0	0	4	-2	1	0	4	-2	1	2	2	-1	-1	0
χ_{102}	0	0	0	0	0	-4	2	-1	0	-4	2	-1	-2	-2	1	1	0
χ_{103}	0	0	0	0	0	4	-2	1	0	0	0	0	0	0	0	0	0
χ_{104}	0	0	0	0	0	-4	2	-1	0	0	0	0	0	0	0	0	0
χ_{105}	0	0	0	0	0	-4	2	-1	0	0	0	0	0	0	0	0	0
χ_{106}	0	0	0	0	0	4	-2	1	0	0	0	0	0	0	0	0	0
χ_{107}	0	0	0	0	0	-4	2	-1	0	0	0	0	0	0	0	0	0
χ_{108}	0	0	0	0	0	4	-2	1	0	0	0	0	0	0	0	0	0
χ_{109}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{110}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{111}	0	0	0	0	0	4	-2	1	0	0	0	0	0	0	0	0	0
χ_{112}	0	0	0	0	0	-4	2	-1	0	0	0	0	0	0	0	0	0
χ_{113}	0	0	0	0	0	0	0	0	0	-4	2	-1	-2	-2	1	1	0
χ_{114}	0	0	0	0	0	0	0	0	0	4	-2	1	2	2	-1	-1	0
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	0	0	0	0	0	0	0	0	0	-4	2	-1	-2	-2	1	1	0
χ_{117}	0	0	0	0	0	0	0	0	0	4	-2	1	2	2	-1	-1	0
χ_{118}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{119}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{120}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$12I$	$12J$	$12K$	$12L$		$12M$			$12N$			$12O$		
	$12AF$	$12AG$	$12AH$	$12AI$	$12AJ$	$12AK$	$12AL$	$36E$	$12AM$	$12AN$	$36F$	$12AO$	$12AP$	$12AQ$
χ_{61}	2	1	2	1	1	-2	-2	-2	-2	-2	-2	2	2	2
χ_{62}	4	0	-2	0	0	0	0	0	0	0	0	0	0	0
χ_{63}	-4	0	2	0	0	0	0	0	0	0	0	0	0	0
χ_{64}	-4	0	2	0	0	0	0	0	0	0	0	0	0	0
χ_{65}	4	0	-2	0	0	0	0	0	0	0	0	0	0	0
χ_{66}	0	0	-3	-2	-2	-2	-2	-2	1	1	1	0	0	0
χ_{67}	0	0	3	2	2	2	2	2	-1	-1	-1	0	0	0
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	4	0	-2	-2	-2	-2	-2	-2	-2	-2	-2	0	0	0
χ_{70}	-4	0	2	2	2	2	2	2	2	2	2	0	0	0
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{72}	3	-3	3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{73}	-3	3	-3	1	1	1	1	1	1	1	1	1	1	1
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{76}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{77}	-3	0	-3	2	2	-1	-1	-1	-1	-1	-1	1	1	1
χ_{78}	3	0	3	-2	-2	1	1	1	1	1	1	-1	-1	-1
χ_{79}	6	-1	0	3	3	0	0	0	0	0	0	2	2	2
χ_{80}	-6	1	0	-3	-3	0	0	0	0	0	0	-2	-2	-2
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	0	-8	0	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	0	8	0	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	-4	0	2	0	0	0	0	0	0	0	0	0	0	0
χ_{86}	4	0	-2	0	0	0	0	0	0	0	0	0	0	0
χ_{87}	4	0	-2	0	0	0	0	0	0	0	0	0	0	0
χ_{88}	-4	0	2	0	0	0	0	0	0	0	0	0	0	0
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{91}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{92}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{93}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{94}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{95}	-4	0	2	2	2	2	2	2	2	2	2	0	0	0
χ_{96}	4	0	-2	-2	-2	-2	-2	-2	-2	-2	-2	0	0	0
χ_{97}	0	3	0	-3	-3	0	0	0	0	0	0	0	0	0
χ_{98}	0	-3	0	3	3	0	0	0	0	0	0	0	0	0
χ_{99}	0	0	0	0	0	6	-3	0	0	0	0	4	-2	1
χ_{100}	0	0	0	0	0	-6	3	0	0	0	0	-4	2	-1
χ_{101}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{102}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{103}	0	0	0	0	0	6	-3	0	0	0	0	4	-2	1
χ_{104}	0	0	0	0	0	-6	3	0	0	0	0	-4	2	-1
χ_{105}	0	0	0	0	0	6	-3	0	0	0	0	4	-2	1
χ_{106}	0	0	0	0	0	-6	3	0	0	0	0	-4	2	-1
χ_{107}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{108}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{109}	0	0	0	0	0	-6	3	0	0	0	0	-4	2	-1
χ_{110}	0	0	0	0	0	6	-3	0	0	0	0	4	-2	1
χ_{111}	0	0	0	0	0	6	-3	0	0	0	0	4	-2	1
χ_{112}	0	0	0	0	0	-6	3	0	0	0	0	-4	2	-1
χ_{113}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{114}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{117}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{118}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{119}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{120}	0	0	0	0	0	-6	3	0	0	0	0	-4	2	-1

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	12P						12Q	18D				18E		
	12AR	12AS	12AT	12AU	12AV	12AW	12AX	18AB	18AC	18AD	18AE	18AF	18AG	18AH
χ_{61}	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1
χ_{62}	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1
χ_{63}	0	0	0	0	0	0	0	1	1	1	1	1	1	1
χ_{64}	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1
χ_{65}	0	0	0	0	0	0	0	1	1	1	1	1	1	1
χ_{66}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{67}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1
χ_{70}	0	0	0	0	0	0	0	1	1	1	1	1	1	1
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{72}	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{73}	1	1	1	1	1	1	0	0	0	0	0	0	0	0
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	0	0	0	0	0	0	0	-2	-2	-2	-2	-2	-2	-2
χ_{76}	0	0	0	0	0	0	0	2	2	2	2	2	2	2
χ_{77}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{78}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{79}	1	1	1	1	1	1	-1	0	0	0	0	0	0	0
χ_{80}	-1	-1	-1	-1	-1	-1	1	0	0	0	0	0	0	0
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	0	0	0	0	0	0	-2	0	0	0	0	0	0	0
χ_{84}	0	0	0	0	0	0	2	0	0	0	0	0	0	0
χ_{85}	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1
χ_{86}	0	0	0	0	0	0	0	1	1	1	1	1	1	1
χ_{87}	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1
χ_{88}	0	0	0	0	0	0	0	1	1	1	1	1	1	1
χ_{89}	0	0	0	0	0	0	0	2	2	2	2	2	2	2
χ_{90}	0	0	0	0	0	0	0	-2	-2	-2	-2	-2	-2	-2
χ_{91}	0	0	0	0	0	0	0	2	2	2	2	2	2	2
χ_{92}	0	0	0	0	0	0	0	-2	-2	-2	-2	-2	-2	-2
χ_{93}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{94}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{95}	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1
χ_{96}	0	0	0	0	0	0	0	1	1	1	1	1	1	1
χ_{97}	1	1	1	1	1	1	0	0	0	0	0	0	0	0
χ_{98}	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{99}	2	-4	2	2	2	-4	0	0	0	0	0	3	-6	3
χ_{100}	-2	4	-2	-2	-2	4	0	0	0	0	0	-3	6	-3
χ_{101}	1	-2	1	1	1	-2	0	0	0	0	0	3	3	-6
χ_{102}	-1	2	-1	-1	-1	2	0	0	0	0	0	-3	-3	6
χ_{103}	-1	2	-1	-1	-1	2	0	0	0	0	0	-3	-3	6
χ_{104}	1	-2	1	1	1	-2	0	0	0	0	0	3	3	-6
χ_{105}	-1	2	-1	-1	-1	2	0	0	0	0	0	3	3	-6
χ_{106}	1	-2	1	1	1	-2	0	0	0	0	0	-3	-3	6
χ_{107}	0	0	0	0	0	0	0	0	0	0	0	-6	3	3
χ_{108}	0	0	0	0	0	0	0	0	0	0	0	6	-3	-3
χ_{109}	-1	2	-1	-1	-1	2	0	0	0	0	0	3	-6	3
χ_{110}	1	-2	1	1	1	-2	0	0	0	0	0	-3	6	-3
χ_{111}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{112}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{113}	0	0	0	0	0	0	0	0	0	0	0	6	-3	-3
χ_{114}	0	0	0	0	0	0	0	0	0	0	0	-6	3	3
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	0	0	0	0	0	0	0	0	0	0	0	-3	6	-3
χ_{117}	0	0	0	0	0	0	0	0	0	0	0	3	-6	3
χ_{118}	1	-2	1	1	1	-2	0	0	0	0	0	-6	3	3
χ_{119}	-1	2	-1	-1	-1	2	0	0	0	0	0	6	-3	-3
χ_{120}	1	-2	1	1	1	-2	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

		18F						20B	24A	26A		28A		30A	26A
	18AI	18AJ	18AK	18AL	18AM	18AN	18AO	20B	24E	26A	26B	28A	28B	30H	36G
χ_{61}	1	1	1	1	1	1	1	0	0	0	0	0	0	0	-1
χ_{62}	-1	1	1	1	1	1	1	-1	0	0	0	0	0	1	1
χ_{63}	1	-1	-1	-1	-1	-1	-1	1	0	0	0	0	0	-1	-1
χ_{64}	-1	-1	-1	-1	-1	-1	-1	1	0	0	0	0	0	1	-1
χ_{65}	1	1	1	1	1	1	1	-1	0	0	0	0	0	-1	1
χ_{66}	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
χ_{67}	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0
χ_{68}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{69}	-1	1	1	1	1	1	1	0	0	0	0	0	0	0	1
χ_{70}	1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	-1
χ_{71}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{72}	0	0	0	0	0	0	0	1	1	0	0	0	0	-1	0
χ_{73}	0	0	0	0	0	0	0	-1	-1	0	0	0	0	1	0
χ_{74}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	-2	0	0	0	0	0	0	0	0	0	0	0	0	-1	0
χ_{76}	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0
χ_{77}	0	0	0	0	0	0	0	0	-1	0	0	0	0	1	0
χ_{78}	0	0	0	0	0	0	0	0	1	0	0	0	0	-1	0
χ_{79}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{80}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	C	$-C$	0	0
χ_{82}	0	0	0	0	0	0	0	0	0	0	0	$-C$	C	0	0
χ_{83}	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
χ_{84}	0	0	0	0	0	0	0	0	0	0	0	-1	-1	0	0
χ_{85}	-1	1	1	1	1	1	1	1	0	0	0	0	0	0	-1
χ_{86}	1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	1
χ_{87}	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	1
χ_{88}	1	1	1	1	1	1	1	1	0	0	0	0	0	0	-1
χ_{89}	2	0	0	0	0	0	0	0	0	A	$\bar{A}$	0	0	0	0
χ_{90}	-2	0	0	0	0	0	0	0	0	$-A$	$-\bar{A}$	0	0	0	0
χ_{91}	2	0	0	0	0	0	0	0	0	$\bar{A}$	A	0	0	0	0
χ_{92}	-2	0	0	0	0	0	0	0	0	$-\bar{A}$	$-A$	0	0	0	0
χ_{93}	0	0	0	0	0	0	0	-1	0	1	1	-1	-1	0	0
χ_{94}	0	0	0	0	0	0	0	1	0	-1	-1	1	1	0	0
χ_{95}	-1	1	1	1	1	1	1	0	0	0	0	0	0	0	-1
χ_{96}	1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	1
χ_{97}	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0
χ_{98}	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
χ_{99}	0	1	1	-2	1	-2	1	0	0	0	0	0	0	0	0
χ_{100}	0	-1	-1	2	-1	2	-1	0	0	0	0	0	0	0	0
χ_{101}	0	-2	1	1	-2	1	1	0	0	0	0	0	0	0	0
χ_{102}	0	2	-1	-1	2	-1	-1	0	0	0	0	0	0	0	0
χ_{103}	0	2	-1	-1	2	-1	-1	0	0	0	0	0	0	0	0
χ_{104}	0	-2	1	1	-2	1	1	0	0	0	0	0	0	0	0
χ_{105}	0	-2	1	1	-2	1	1	0	0	0	0	0	0	0	0
χ_{106}	0	2	-1	-1	2	-1	-1	0	0	0	0	0	0	0	0
χ_{107}	0	1	-2	1	1	1	-2	0	0	0	0	0	0	0	0
χ_{108}	0	-1	2	-1	-1	-1	2	0	0	0	0	0	0	0	0
χ_{109}	0	1	1	-2	1	-2	1	0	0	0	0	0	0	0	0
χ_{110}	0	-1	-1	2	-1	2	-1	0	0	0	0	0	0	0	0
χ_{111}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{112}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{113}	0	-1	2	-1	-1	-1	2	0	0	0	0	0	0	0	0
χ_{114}	0	1	-2	1	1	1	-2	0	0	0	0	0	0	0	0
χ_{115}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{116}	0	-1	-1	2	-1	2	-1	0	0	0	0	0	0	0	0
χ_{117}	0	1	1	-2	1	-2	1	0	0	0	0	0	0	0	0
χ_{118}	0	1	-2	1	1	1	-2	0	0	0	0	0	0	0	0
χ_{119}	0	-1	2	-1	-1	-1	2	0	0	0	0	0	0	0	0
χ_{120}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$1A$				$2A$		$2B$				$2C$			
	$1A$	$3A$	$3B$	$3C$	$2A$	$6A$	$2B$	$6B$	$6C$	$6D$	$2C$	$6E$	$6F$	$6G$
χ_{121}	442260	0	-17010	17010	1260	-630	540	-54	0	54	36	18	-18	0
χ_{122}	511758	0	-19683	19683	1458	-729	810	-81	0	81	54	27	-27	0
χ_{123}	511758	0	-19683	19683	1458	-729	810	-81	0	81	54	27	-27	0
χ_{124}	530712	0	-20412	20412	1512	-756	-1080	108	0	-108	-72	-36	36	0
χ_{125}	530712	0	-20412	20412	1512	-756	-1080	108	0	-108	-72	-36	36	0
χ_{126}	663390	0	-25515	25515	1890	-945	-1350	135	0	-135	-90	-45	45	0
χ_{127}	663390	0	-25515	25515	1890	-945	-1350	135	0	-135	-90	-45	45	0
χ_{128}	4212	0	-162	162	-12	6	180	-18	0	18	-12	-6	6	0
χ_{129}	4212	0	-162	162	-12	6	180	-18	0	18	-12	-6	6	0
χ_{130}	58968	0	-2268	2268	-168	84	-360	36	0	-36	24	12	-12	0
χ_{131}	58968	0	-2268	2268	-168	84	-360	36	0	-36	24	12	-12	0
χ_{132}	84240	0	-3240	3240	-240	120	720	-72	0	72	-48	-24	24	0
χ_{133}	84240	0	-3240	3240	-240	120	720	-72	0	72	-48	-24	24	0
χ_{134}	88452	0	-3402	3402	-252	126	900	-90	0	90	-60	-30	30	0
χ_{135}	88452	0	-3402	3402	-252	126	900	-90	0	90	-60	-30	30	0
χ_{136}	147420	0	-5670	5670	-420	210	540	-54	0	54	-36	-18	18	0
χ_{137}	147420	0	-5670	5670	-420	210	540	-54	0	54	-36	-18	18	0
χ_{138}	379080	0	-14580	14580	-1080	540	-1080	108	0	-108	72	36	-36	0
χ_{139}	235872	0	-9072	9072	-672	336	-1440	144	0	-144	96	48	-48	0
χ_{140}	235872	0	-9072	9072	-672	336	-1440	144	0	-144	96	48	-48	0
χ_{141}	269568	0	-10368	10368	-768	384	0	0	0	0	0	0	0	0
χ_{142}	269568	0	-10368	10368	-768	384	0	0	0	0	0	0	0	0
χ_{143}	294840	0	-11340	11340	-840	420	1080	-108	0	108	-72	-36	36	0
χ_{144}	294840	0	-11340	11340	-840	420	1080	-108	0	108	-72	-36	36	0
χ_{145}	442260	0	-17010	17010	-1260	630	1620	-162	0	162	-108	-54	54	0
χ_{146}	442260	0	-17010	17010	-1260	630	1620	-162	0	162	-108	-54	54	0
χ_{147}	884520	0	-34020	34020	-2520	1260	360	-36	0	36	-24	-12	12	0
χ_{148}	589680	0	-22680	22680	-1680	840	-720	72	0	-72	48	24	-24	0
χ_{149}	589680	0	-22680	22680	-1680	840	-720	72	0	-72	48	24	-24	0
χ_{150}	589680	0	-22680	22680	-1680	840	-720	72	0	-72	48	24	-24	0
χ_{151}	589680	0	-22680	22680	-1680	840	-720	72	0	-72	48	24	-24	0
χ_{152}	728	26	-1	-28	0	0	80	8	-10	-1	8	-4	-1	2
χ_{153}	728	26	-1	-28	0	0	80	8	-10	-1	8	-4	-1	2
χ_{154}	3640	130	-5	-140	0	0	80	8	-10	-1	-24	12	3	-6
χ_{155}	3640	130	-5	-140	0	0	80	8	-10	-1	-24	12	3	-6
χ_{156}	3640	130	-5	-140	0	0	80	8	-10	-1	-24	12	3	-6
χ_{157}	3640	130	-5	-140	0	0	80	8	-10	-1	-24	12	3	-6
χ_{158}	4368	156	-6	-168	0	0	160	16	-20	-2	-16	8	2	-4
χ_{159}	4368	156	-6	-168	0	0	160	16	-20	-2	-16	8	2	-4
χ_{160}	7280	260	-10	-280	0	0	-160	-16	20	2	16	-8	-2	4
χ_{161}	7280	260	-10	-280	0	0	-160	-16	20	2	16	-8	-2	4
χ_{162}	7280	260	-10	-280	0	0	-160	-16	20	2	16	-8	-2	4
χ_{163}	7280	260	-10	-280	0	0	-160	-16	20	2	16	-8	-2	4
χ_{164}	10920	390	-15	-420	0	0	240	24	-30	-3	56	-28	-7	14
χ_{165}	10920	390	-15	-420	0	0	240	24	-30	-3	56	-28	-7	14
χ_{166}	10920	390	-15	-420	0	0	-80	-8	10	1	-8	4	1	-2
χ_{167}	10920	390	-15	-420	0	0	-80	-8	10	1	-8	4	1	-2
χ_{168}	14560	520	-20	-560	0	0	320	32	-40	-4	32	-16	-4	8
χ_{169}	14560	520	-20	-560	0	0	320	32	-40	-4	32	-16	-4	8
χ_{170}	17472	624	-24	-672	0	0	0	0	0	0	64	-32	-8	16
χ_{171}	17472	624	-24	-672	0	0	0	0	0	0	64	-32	-8	16
χ_{172}	21840	780	-30	-840	0	0	160	16	-20	-2	-80	40	10	-20
χ_{173}	21840	780	-30	-840	0	0	160	16	-20	-2	-80	40	10	-20
χ_{174}	21840	780	-30	-840	0	0	160	16	-20	-2	48	-24	-6	12
χ_{175}	21840	780	-30	-840	0	0	160	16	-20	-2	48	-24	-6	12
χ_{176}	21840	780	-30	-840	0	0	160	16	-20	-2	48	-24	-6	12
χ_{177}	21840	780	-30	-840	0	0	160	16	-20	-2	48	-24	-6	12
χ_{178}	29120	1040	-40	-1120	0	0	0	0	0	0	-64	32	8	-16
χ_{179}	29120	1040	-40	-1120	0	0	0	0	0	0	-64	32	8	-16
χ_{180}	29120	1040	-40	-1120	0	0	0	0	0	0	-64	32	8	-16

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$3A$						$3B$				$3C$				
	$3D$	$3E$	$3F$	$3G$	$3H$	$3I$	$3J$	$3K$	$3L$	$9A$	$3M$	$3N$	$9B$	$3O$	$3P$
χ_{121}	486	0	0	243	-243	-243	0	0	0	0	-648	81	0	-162	81
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{124}	1458	0	0	729	-729	-729	0	0	0	0	0	0	0	0	0
χ_{125}	1458	0	0	729	-729	-729	0	0	0	0	0	0	0	0	0
χ_{126}	-1458	0	0	-729	729	729	0	0	0	0	0	0	0	0	0
χ_{127}	-1458	0	0	-729	729	729	0	0	0	0	0	0	0	0	0
χ_{128}	-162	0	0	-81	81	81	0	0	0	0	216	-27	0	54	-27
χ_{129}	-162	0	0	-81	81	81	0	0	0	0	216	-27	0	54	-27
χ_{130}	-810	0	0	-405	405	405	0	0	0	0	432	-54	0	108	-54
χ_{131}	-810	0	0	-405	405	405	0	0	0	0	432	-54	0	108	-54
χ_{132}	-324	0	0	-162	162	162	0	0	0	0	1080	-135	0	270	-135
χ_{133}	-324	0	0	-162	162	162	0	0	0	0	1080	-135	0	270	-135
χ_{134}	972	0	0	486	-486	-486	0	0	0	0	648	-81	0	162	-81
χ_{135}	972	0	0	486	-486	-486	0	0	0	0	648	-81	0	162	-81
χ_{136}	-1296	0	0	-648	648	648	0	0	0	0	-216	27	0	-54	27
χ_{137}	-1296	0	0	-648	648	648	0	0	0	0	-216	27	0	-54	27
χ_{138}	2916	0	0	1458	-1458	-1458	0	0	0	0	0	0	0	0	0
χ_{139}	-324	0	0	-162	162	162	0	0	0	0	432	-54	0	108	-54
χ_{140}	-324	0	0	-162	162	162	0	0	0	0	432	-54	0	108	-54
χ_{141}	1296	0	0	648	-648	-648	0	0	0	0	864	-108	0	216	-108
χ_{142}	1296	0	0	648	-648	-648	0	0	0	0	864	-108	0	216	-108
χ_{143}	-1134	0	0	-567	567	567	0	0	0	0	864	-108	0	216	-108
χ_{144}	-1134	0	0	-567	567	567	0	0	0	0	864	-108	0	216	-108
χ_{145}	486	0	0	243	-243	-243	0	0	0	0	-648	81	0	-162	81
χ_{146}	486	0	0	243	-243	-243	0	0	0	0	-648	81	0	-162	81
χ_{147}	972	0	0	486	-486	-486	0	0	0	0	-1296	162	0	-324	162
χ_{148}	648	0	0	324	-324	-324	0	0	0	0	432	-54	0	108	-54
χ_{149}	648	0	0	324	-324	-324	0	0	0	0	432	-54	0	108	-54
χ_{150}	-2268	0	0	-1134	1134	1134	0	0	0	0	-216	27	0	-54	27
χ_{151}	-2268	0	0	-1134	1134	1134	0	0	0	0	-216	27	0	-54	27
χ_{152}	-28	-1	-1	26	53	-28	-28	26	-1	-1	98	17	-1	-10	-10
χ_{153}	-28	-1	-1	26	53	-28	-28	26	-1	-1	98	17	-1	-10	-10
χ_{154}	184	76	-5	-32	103	-59	40	-14	13	-5	202	40	-5	-14	-14
χ_{155}	-140	-5	-5	130	22	103	40	-14	13	-5	202	40	-5	-14	-14
χ_{156}	-140	-5	-5	130	22	103	40	-14	13	-5	202	40	-5	-14	-14
χ_{157}	184	76	-5	-32	103	-59	40	-14	13	-5	202	40	-5	-14	-14
χ_{158}	156	75	-6	-6	-87	156	-78	84	3	-6	12	12	-6	12	12
χ_{159}	156	75	-6	-6	-87	156	-78	84	3	-6	12	12	-6	12	12
χ_{160}	368	152	-10	-64	-37	125	-10	44	17	-10	116	35	-10	8	8
χ_{161}	368	152	-10	-64	-37	125	-10	44	17	-10	116	35	-10	8	8
χ_{162}	44	71	-10	98	-118	287	-10	44	17	-10	116	35	-10	8	8
χ_{163}	44	71	-10	98	-118	287	-10	44	17	-10	116	35	-10	8	8
χ_{164}	228	147	-15	66	-15	228	30	30	30	-15	318	75	-15	-6	-6
χ_{165}	228	147	-15	66	-15	228	30	30	30	-15	318	75	-15	-6	-6
χ_{166}	-96	66	-15	228	390	-96	-60	102	21	-15	30	30	-15	30	30
χ_{167}	-96	66	-15	228	390	-96	-60	102	21	-15	30	30	-15	30	30
χ_{168}	88	142	-20	196	250	88	-110	160	25	-20	-56	25	-20	52	52
χ_{169}	88	142	-20	196	250	88	-110	160	25	-20	-56	25	-20	52	52
χ_{170}	-24	138	-24	300	462	-24	48	48	48	-24	336	93	-24	12	12
χ_{171}	-24	138	-24	300	462	-24	48	48	48	-24	336	93	-24	12	12
χ_{172}	132	213	-30	294	375	132	-30	132	51	-30	348	105	-30	24	24
χ_{173}	132	213	-30	294	375	132	-30	132	51	-30	348	105	-30	24	24
χ_{174}	-192	132	-30	456	51	537	150	-12	69	-30	60	60	-30	60	60
χ_{175}	-192	132	-30	456	51	537	150	-12	69	-30	60	60	-30	60	60
χ_{176}	780	375	-30	-30	294	51	150	-12	69	-30	60	60	-30	60	60
χ_{177}	780	375	-30	-30	294	51	150	-12	69	-30	60	60	-30	60	60
χ_{178}	176	284	-40	392	14	662	140	32	86	-40	176	95	-40	68	68
χ_{179}	824	446	-40	68	176	338	140	32	86	-40	176	95	-40	68	68
χ_{180}	824	446	-40	68	176	338	140	32	86	-40	176	95	-40	68	68

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$3D$				$3E$			$3F$							$4A$	
	$9C$	$9D$	$9E$	$3Q$	$3R$	$9F$	$9G$	$9H$	$9I$	$9J$	$9K$	$3S$	$9L$	$9M$	$4A$	$12A$
χ_{121}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{124}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{125}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{126}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{127}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{128}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{129}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{130}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{131}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{132}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{133}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{134}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{135}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{136}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{137}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{140}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{141}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{142}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{143}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{144}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{145}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{146}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{149}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{150}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{151}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{152}	26	-1	-1	-1	8	-1	-1	-1	-1	-1	-1	-1	8	-1	0	0
χ_{153}	26	-1	-1	-1	8	-1	-1	-1	-1	-1	-1	-1	8	-1	0	0
χ_{154}	49	-5	-5	4	4	-5	4	13	-5	4	-5	-5	4	13	0	0
χ_{155}	49	-5	4	-5	4	-5	4	-5	-5	-5	4	13	4	-5	0	0
χ_{156}	49	-5	4	-5	4	-5	4	-5	-5	-5	4	13	4	-5	0	0
χ_{157}	49	-5	-5	4	4	-5	4	13	-5	4	-5	-5	4	13	0	0
χ_{158}	-6	-6	3	3	12	3	-6	3	12	-6	-6	3	-6	3	0	0
χ_{159}	-6	-6	3	3	12	3	-6	3	12	-6	-6	3	-6	3	0	0
χ_{160}	17	-10	-1	8	8	-1	-1	17	8	-1	-10	-1	-10	17	0	0
χ_{161}	17	-10	-1	8	8	-1	-1	17	8	-1	-10	-1	-10	17	0	0
χ_{162}	17	-10	8	-1	8	-1	-1	-1	8	-10	-1	17	-10	-1	0	0
χ_{163}	17	-10	8	-1	8	-1	-1	-1	8	-10	-1	17	-10	-1	0	0
χ_{164}	66	-15	3	3	12	-6	3	12	3	-6	-6	12	-6	12	0	0
χ_{165}	66	-15	3	3	12	-6	3	12	3	-6	-6	12	-6	12	0	0
χ_{166}	12	12	-6	-6	12	3	-6	-15	-6	3	3	-15	30	-15	0	0
χ_{167}	12	12	-6	-6	12	3	-6	-15	-6	3	3	-15	30	-15	0	0
χ_{168}	-20	7	-2	-2	16	7	-11	-11	7	-2	-2	-11	16	-11	0	0
χ_{169}	-20	7	-2	-2	16	7	-11	-11	7	-2	-2	-11	16	-11	0	0
χ_{170}	84	3	-6	-6	12	-6	3	-6	-15	3	3	-6	30	-6	0	0
χ_{171}	84	3	-6	-6	12	-6	3	-6	-15	3	3	-6	30	-6	0	0
χ_{172}	78	-3	-3	-3	24	-3	-3	-3	-3	-3	-3	-3	24	-3	0	0
χ_{173}	78	-3	-3	-3	24	-3	-3	-3	-3	-3	-3	-3	24	-3	0	0
χ_{174}	-3	-3	15	-12	-12	-3	6	-21	-3	-12	15	33	-12	-21	0	0
χ_{175}	-3	-3	15	-12	-12	-3	6	-21	-3	-12	15	33	-12	-21	0	0
χ_{176}	-3	-3	-12	15	-12	-3	6	33	-3	15	-12	-21	-12	33	0	0
χ_{177}	-3	-3	-12	15	-12	-3	6	33	-3	15	-12	-21	-12	33	0	0
χ_{178}	14	-13	14	-4	-4	-4	5	-4	5	-13	5	32	-22	-4	0	0
χ_{179}	14	-13	-4	14	-4	-4	5	32	5	5	-13	-4	-22	32	0	0
χ_{180}	14	-13	-4	14	-4	-4	5	32	5	5	-13	-4	-22	32	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	4B				4C		4D				5A				6A		6B
	4B	12B	12C	12D	4C	12E	4D	12F	12G	12H	5A	15A	15B	15C	6H	6I	6J
χ_{121}	12	6	-6	0	4	-2	-24	0	-6	6	0	0	0	0	18	-9	0
χ_{122}	-18	-9	9	0	-6	3	12	0	3	-3	-12	0	-3	3	0	0	0
χ_{123}	-18	-9	9	0	-6	3	12	0	3	-3	-12	0	-3	3	0	0	0
χ_{124}	-24	-12	12	0	-8	4	0	0	0	0	12	0	3	-3	54	-27	0
χ_{125}	-24	-12	12	0	-8	4	0	0	0	0	12	0	3	-3	54	-27	0
χ_{126}	6	3	-3	0	2	-1	12	0	3	-3	0	0	0	0	-54	27	0
χ_{127}	6	3	-3	0	2	-1	12	0	3	-3	0	0	0	0	-54	27	0
χ_{128}	12	6	-6	0	-4	2	0	0	0	0	12	0	3	-3	6	-3	0
χ_{129}	12	6	-6	0	-4	2	0	0	0	0	12	0	3	-3	6	-3	0
χ_{130}	24	12	-12	0	-8	4	0	0	0	0	-12	0	-3	3	30	-15	0
χ_{131}	24	12	-12	0	-8	4	0	0	0	0	-12	0	-3	3	30	-15	0
χ_{132}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	-6	0
χ_{133}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	-6	0
χ_{134}	12	6	-6	0	-4	2	0	0	0	0	12	0	3	-3	-36	18	0
χ_{135}	12	6	-6	0	-4	2	0	0	0	0	12	0	3	-3	-36	18	0
χ_{136}	36	18	-18	0	-12	6	0	0	0	0	0	0	0	0	48	-24	0
χ_{137}	36	18	-18	0	-12	6	0	0	0	0	0	0	0	0	48	-24	0
χ_{138}	24	12	-12	0	-8	4	0	0	0	0	0	0	0	0	-108	54	0
χ_{139}	0	0	0	0	0	0	0	0	0	0	12	0	3	-3	12	-6	0
χ_{140}	0	0	0	0	0	0	0	0	0	0	12	0	3	-3	12	-6	0
χ_{141}	0	0	0	0	0	0	0	0	0	0	-12	0	-3	3	-48	24	0
χ_{142}	0	0	0	0	0	0	0	0	0	0	-12	0	-3	3	-48	24	0
χ_{143}	-24	-12	12	0	8	-4	0	0	0	0	0	0	0	0	42	-21	0
χ_{144}	-24	-12	12	0	8	-4	0	0	0	0	0	0	0	0	42	-21	0
χ_{145}	12	6	-6	0	-4	2	0	0	0	0	0	0	0	0	-18	9	0
χ_{146}	12	6	-6	0	-4	2	0	0	0	0	0	0	0	0	-18	9	0
χ_{147}	-24	-12	12	0	8	-4	0	0	0	0	0	0	0	0	-36	18	0
χ_{148}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-24	12	0
χ_{149}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-24	12	0
χ_{150}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	-42	0
χ_{151}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	-42	0
χ_{152}	8	-4	-1	2	0	0	8	-4	-1	2	8	-4	-1	2	0	0	0
χ_{153}	8	-4	-1	2	0	0	8	-4	-1	2	8	-4	-1	2	0	0	0
χ_{154}	8	-4	-1	2	0	0	-8	4	1	-2	0	0	0	0	0	0	0
χ_{155}	8	-4	-1	2	0	0	-8	4	1	-2	0	0	0	0	0	0	0
χ_{156}	8	-4	-1	2	0	0	-8	4	1	-2	0	0	0	0	0	0	0
χ_{157}	8	-4	-1	2	0	0	-8	4	1	-2	0	0	0	0	0	0	0
χ_{158}	16	-8	-2	4	0	0	0	0	0	0	8	-4	-1	2	0	0	0
χ_{159}	16	-8	-2	4	0	0	0	0	0	0	8	-4	-1	2	0	0	0
χ_{160}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{161}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{162}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{163}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{164}	-8	4	1	-2	0	0	8	-4	-1	2	0	0	0	0	0	0	0
χ_{165}	-8	4	1	-2	0	0	8	-4	-1	2	0	0	0	0	0	0	0
χ_{166}	24	-12	-3	6	0	0	-8	4	1	-2	0	0	0	0	0	0	0
χ_{167}	24	-12	-3	6	0	0	-8	4	1	-2	0	0	0	0	0	0	0
χ_{168}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{169}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{170}	0	0	0	0	0	0	0	0	0	0	-8	4	1	-2	0	0	0
χ_{171}	0	0	0	0	0	0	0	0	0	0	-8	4	1	-2	0	0	0
χ_{172}	-16	8	2	-4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{173}	-16	8	2	-4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{174}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{175}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{176}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{177}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{178}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{179}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{180}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6C$		$6D$			$6E$		$6F$				$6G$				
	$6K$	$6L$	$6M$	$6N$	$6O$	$6P$	$18A$	$6Q$	$6R$	$6S$	$18B$	$6T$	$6U$	$6V$	$6W$	$6X$
χ_{121}	-18	9	-54	27	0	0	0	36	-18	9	0	-18	9	9	-9	0
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{124}	0	0	54	-27	0	0	0	0	0	0	0	18	-9	-9	9	0
χ_{125}	0	0	54	-27	0	0	0	0	0	0	0	18	-9	-9	9	0
χ_{126}	0	0	-54	27	0	0	0	0	0	0	0	-18	9	9	-9	0
χ_{127}	0	0	-54	27	0	0	0	0	0	0	0	-18	9	9	-9	0
χ_{128}	-6	3	-18	9	0	0	0	-12	6	-3	0	6	-3	-3	3	0
χ_{129}	-6	3	-18	9	0	0	0	-12	6	-3	0	6	-3	-3	3	0
χ_{130}	-12	6	-18	9	0	0	0	24	-12	6	0	6	-3	-3	3	0
χ_{131}	-12	6	-18	9	0	0	0	24	-12	6	0	6	-3	-3	3	0
χ_{132}	-30	15	36	-18	0	0	0	-12	6	-3	0	-12	6	6	-6	0
χ_{133}	-30	15	36	-18	0	0	0	-12	6	-3	0	-12	6	6	-6	0
χ_{134}	-18	9	-36	18	0	0	0	12	-6	3	0	12	-6	-6	6	0
χ_{135}	-18	9	-36	18	0	0	0	12	-6	3	0	12	-6	-6	6	0
χ_{136}	6	-3	0	0	0	0	0	-36	18	-9	0	0	0	0	0	0
χ_{137}	6	-3	0	0	0	0	0	-36	18	-9	0	0	0	0	0	0
χ_{138}	0	0	-108	54	0	0	0	0	0	0	0	36	-18	-18	18	0
χ_{139}	-12	6	36	-18	0	0	0	24	-12	6	0	-12	6	6	-6	0
χ_{140}	-12	6	36	-18	0	0	0	24	-12	6	0	-12	6	6	-6	0
χ_{141}	-24	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{142}	-24	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{143}	-24	12	-54	27	0	0	0	0	0	0	0	18	-9	-9	9	0
χ_{144}	-24	12	-54	27	0	0	0	0	0	0	0	18	-9	-9	9	0
χ_{145}	18	-9	54	-27	0	0	0	36	-18	9	0	-18	9	9	-9	0
χ_{146}	18	-9	54	-27	0	0	0	36	-18	9	0	-18	9	9	-9	0
χ_{147}	36	-18	-36	18	0	0	0	-24	12	-6	0	12	-6	-6	6	0
χ_{148}	-12	6	72	-36	0	0	0	-24	12	-6	0	-24	12	12	-12	0
χ_{149}	-12	6	72	-36	0	0	0	-24	12	-6	0	-24	12	12	-12	0
χ_{150}	6	-3	-36	18	0	0	0	12	-6	3	0	12	-6	-6	6	0
χ_{151}	6	-3	-36	18	0	0	0	12	-6	3	0	12	-6	-6	6	0
χ_{152}	0	0	8	8	-1	2	-1	2	2	2	-1	-4	5	-4	2	-1
χ_{153}	0	0	8	8	-1	2	-1	2	2	2	-1	-4	5	-4	2	-1
χ_{154}	0	0	8	8	-1	-6	3	2	2	2	-1	0	-9	9	0	0
χ_{155}	0	0	8	8	-1	-6	3	2	2	2	-1	12	-6	3	-6	3
χ_{156}	0	0	8	8	-1	-6	3	2	2	2	-1	12	-6	3	-6	3
χ_{157}	0	0	8	8	-1	-6	3	2	2	2	-1	0	-9	9	0	0
χ_{158}	0	0	16	16	-2	-4	2	4	4	4	-2	-4	5	-4	2	-1
χ_{159}	0	0	16	16	-2	-4	2	4	4	4	-2	-4	5	-4	2	-1
χ_{160}	0	0	-16	-16	2	4	-2	-4	-4	-4	2	16	7	-11	-8	4
χ_{161}	0	0	-16	-16	2	4	-2	-4	-4	-4	2	16	7	-11	-8	4
χ_{162}	0	0	-16	-16	2	4	-2	-4	-4	-4	2	-20	-2	7	10	-5
χ_{163}	0	0	-16	-16	2	4	-2	-4	-4	-4	2	-20	-2	7	10	-5
χ_{164}	0	0	24	24	-3	14	-7	6	6	6	-3	-4	5	-4	2	-1
χ_{165}	0	0	24	24	-3	14	-7	6	6	6	-3	-4	5	-4	2	-1
χ_{166}	0	0	-8	-8	1	-2	1	-2	-2	-2	1	-8	10	-8	4	-2
χ_{167}	0	0	-8	-8	1	-2	1	-2	-2	-2	1	-8	10	-8	4	-2
χ_{168}	0	0	32	32	-4	8	-4	8	8	8	-4	8	-10	8	-4	2
χ_{169}	0	0	32	32	-4	8	-4	8	8	8	-4	8	-10	8	-4	2
χ_{170}	0	0	0	0	0	16	-8	0	0	0	0	-8	10	-8	4	-2
χ_{171}	0	0	0	0	0	16	-8	0	0	0	0	-8	10	-8	4	-2
χ_{172}	0	0	16	16	-2	-20	10	4	4	4	-2	4	-5	4	-2	1
χ_{173}	0	0	16	16	-2	-20	10	4	4	4	-2	4	-5	4	-2	1
χ_{174}	0	0	16	16	-2	12	-6	4	4	4	-2	0	-9	9	0	0
χ_{175}	0	0	16	16	-2	12	-6	4	4	4	-2	0	-9	9	0	0
χ_{176}	0	0	16	16	-2	12	-6	4	4	4	-2	12	-6	3	-6	3
χ_{177}	0	0	16	16	-2	12	-6	4	4	4	-2	12	-6	3	-6	3
χ_{178}	0	0	0	0	0	-16	8	0	0	0	0	-16	2	2	8	-4
χ_{179}	0	0	0	0	0	-16	8	0	0	0	0	8	8	-10	-4	2
χ_{180}	0	0	0	0	0	-16	8	0	0	0	0	8	8	-10	-4	2

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6H$					$6I$					$6J$				$6K$
	$6Y$	$6Z$	$6AA$	$6AB$	$18C$	$6AC$	$6AD$	$6AE$	$6AF$	$6AG$	$6AH$	$6AI$	$6AJ$	$6AK$	$6AL$
χ_{121}	0	0	0	0	0	0	0	0	0	0	18	9	-9	0	0
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{124}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{125}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{126}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{127}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{128}	12	12	-6	-6	0	-12	6	6	-6	0	6	3	-3	0	0
χ_{129}	12	12	-6	-6	0	-12	6	6	-6	0	6	3	-3	0	0
χ_{130}	12	12	-6	-6	0	-12	6	6	-6	0	-12	-6	6	0	0
χ_{131}	12	12	-6	-6	0	-12	6	6	-6	0	-12	-6	6	0	0
χ_{132}	12	12	-6	-6	0	-12	6	6	-6	0	6	3	-3	0	0
χ_{133}	12	12	-6	-6	0	-12	6	6	-6	0	6	3	-3	0	0
χ_{134}	-12	-12	6	6	0	12	-6	-6	6	0	-6	-3	3	0	0
χ_{135}	-12	-12	6	6	0	12	-6	-6	6	0	-6	-3	3	0	0
χ_{136}	0	0	0	0	0	0	0	0	0	0	18	9	-9	0	0
χ_{137}	0	0	0	0	0	0	0	0	-0	0	18	9	-9	0	0
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	12	12	-6	-6	0	-12	6	6	-6	0	-12	-6	6	0	0
χ_{140}	12	12	-6	-6	0	-12	6	6	-6	0	-12	-6	6	0	0
χ_{141}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{142}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{143}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{144}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{145}	0	0	0	0	0	0	0	0	0	0	-18	-9	9	0	0
χ_{146}	0	0	0	0	0	0	0	0	0	0	-18	-9	9	0	0
χ_{147}	24	24	-12	-12	0	-24	12	12	-12	0	12	6	-6	0	0
χ_{148}	-12	-12	6	6	0	12	-6	-6	6	0	12	6	-6	0	0
χ_{149}	-12	-12	6	6	0	12	-6	-6	6	0	12	6	-6	0	0
χ_{150}	-12	-12	6	6	0	12	-6	-6	6	0	-6	-3	3	0	0
χ_{151}	-12	-12	6	6	0	12	-6	-6	6	0	-6	-3	3	0	0
χ_{152}	14	-4	-4	5	-1	-4	5	-4	2	-1	8	-4	-1	2	0
χ_{153}	14	-4	-4	5	-1	-4	5	-4	2	-1	8	-4	-1	2	0
χ_{154}	14	-4	-4	5	-1	12	3	-6	-6	3	0	0	0	0	0
χ_{155}	14	-4	-4	5	-1	-12	-3	6	6	-3	0	0	0	0	0
χ_{156}	14	-4	-4	5	-1	-12	-3	6	6	-3	0	0	0	0	0
χ_{157}	14	-4	-4	5	-1	12	3	-6	-6	3	0	0	0	0	0
χ_{158}	-8	10	10	1	-2	-4	5	-4	2	-1	-16	8	2	-4	0
χ_{159}	-8	10	10	1	-2	-4	5	-4	2	-1	-16	8	2	-4	0
χ_{160}	8	-10	-10	-1	2	4	-5	4	-2	1	-8	4	1	-2	0
χ_{161}	8	-10	-10	-1	2	4	-5	4	-2	1	-8	4	1	-2	0
χ_{162}	8	-10	-10	-1	2	4	-5	4	-2	1	-8	4	1	-2	0
χ_{163}	8	-10	-10	-1	2	4	-5	4	-2	1	-8	4	1	-2	0
χ_{164}	6	6	6	6	-3	8	-10	8	-4	2	8	-4	-1	2	0
χ_{165}	6	6	6	6	-3	8	-10	8	-4	2	8	-4	-1	2	0
χ_{166}	-14	4	4	-5	1	4	-5	4	-2	1	16	-8	-2	4	0
χ_{167}	-14	4	4	-5	1	4	-5	4	-2	1	16	-8	-2	4	0
χ_{168}	20	2	2	11	-4	-4	5	-4	2	-1	8	-4	-1	2	0
χ_{169}	20	2	2	11	-4	-4	5	-4	2	-1	8	-4	-1	2	0
χ_{170}	0	0	0	0	0	-8	10	-8	4	-2	-8	4	1	-2	0
χ_{171}	0	0	0	0	0	-8	10	-8	4	-2	-8	4	1	-2	0
χ_{172}	-8	10	10	1	-2	4	-5	4	-2	1	-8	4	1	-2	0
χ_{173}	-8	10	10	1	-2	4	-5	4	-2	1	-8	4	1	-2	0
χ_{174}	-8	10	10	1	-2	12	3	-6	-6	3	0	0	0	0	0
χ_{175}	-8	10	10	1	-2	12	3	-6	-6	3	0	0	0	0	0
χ_{176}	-8	10	10	1	-2	-12	-3	6	6	-3	0	0	0	0	0
χ_{177}	-8	10	10	1	-2	-12	-3	6	6	-3	0	0	0	0	0
χ_{178}	0	0	0	0	0	-16	2	2	8	-4	8	-4	-1	2	0
χ_{179}	0	0	0	0	0	8	8	-10	-4	2	8	-4	-1	2	0
χ_{180}	0	0	0	0	0	8	8	-10	-4	2	8	-4	-1	2	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	6L			6M		6N			7A		8A		8B		9A		
	18D	6AM	18E	6AN	18F	18G	6AO	18H	7A	21A	8A	24A	8B	24B	9N	9O	9P
χ_{121}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{122}	0	0	0	0	0	0	0	0	2	-1	0	0	-2	1	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	2	-1	0	0	-2	1	0	0	0
χ_{124}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{125}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{126}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0
χ_{127}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0
χ_{128}	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0
χ_{129}	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0
χ_{130}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{131}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{132}	0	0	0	0	0	0	0	0	2	-1	0	0	0	0	0	0	0
χ_{133}	0	0	0	0	0	0	0	0	2	-1	0	0	0	0	0	0	0
χ_{134}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{135}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{136}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{137}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{138}	0	0	0	0	0	0	0	0	2	-1	0	0	0	0	0	0	0
χ_{139}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{140}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{141}	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0
χ_{142}	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0
χ_{143}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{144}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{145}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{146}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{149}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{150}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{151}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{152}	2	-1	-1	2	-1	2	-1	-1	0	0	0	0	0	0	-1	-1	2
χ_{153}	2	-1	-1	2	-1	2	-1	-1	0	0	0	0	0	0	-1	-1	2
χ_{154}	-3	0	3	0	0	0	3	-3	0	0	0	0	0	0	1	1	-2
χ_{155}	-3	3	0	0	0	0	-3	3	0	0	0	0	0	0	1	1	-2
χ_{156}	-3	3	0	0	0	0	-3	3	0	0	0	0	0	0	1	1	-2
χ_{157}	-3	0	3	0	0	0	3	-3	0	0	0	0	0	0	1	1	-2
χ_{158}	2	-1	-1	-4	2	2	-1	-1	0	0	0	0	0	0	-3	-3	6
χ_{159}	2	-1	-1	-4	2	2	-1	-1	0	0	0	0	0	0	-3	-3	6
χ_{160}	1	4	-5	-2	1	-2	1	1	0	0	0	0	0	0	-1	-1	2
χ_{161}	1	4	-5	-2	1	-2	1	1	0	0	0	0	0	0	-1	-1	2
χ_{162}	1	-5	4	-2	1	-2	1	1	0	0	0	0	0	0	-1	-1	2
χ_{163}	1	-5	4	-2	1	-2	1	1	0	0	0	0	0	0	-1	-1	2
χ_{164}	2	-1	-1	2	-1	-4	2	2	0	0	0	0	0	0	0	0	0
χ_{165}	2	-1	-1	2	-1	-4	2	2	0	0	0	0	0	0	0	0	0
χ_{166}	4	-2	-2	4	-2	-2	1	1	0	0	0	0	0	0	-3	-3	6
χ_{167}	4	-2	-2	4	-2	-2	1	1	0	0	0	0	0	0	-3	-3	6
χ_{168}	-4	2	2	2	-1	2	-1	-1	0	0	0	0	0	0	-5	-5	10
χ_{169}	-4	2	2	2	-1	2	-1	-1	0	0	0	0	0	0	-5	-5	10
χ_{170}	4	-2	-2	-2	1	4	-2	-2	0	0	0	0	0	0	0	0	0
χ_{171}	4	-2	-2	-2	1	4	-2	-2	0	0	0	0	0	0	0	0	0
χ_{172}	-2	1	1	-2	1	-2	1	1	0	0	0	0	0	0	-3	-3	6
χ_{173}	-2	1	1	-2	1	-2	1	1	0	0	0	0	0	0	-3	-3	6
χ_{174}	-3	0	3	0	0	0	3	-3	0	0	0	0	0	0	3	3	-6
χ_{175}	-3	0	3	0	0	0	3	-3	0	0	0	0	0	0	3	3	-6
χ_{176}	-3	3	0	0	0	0	-3	3	0	0	0	0	0	0	3	3	-6
χ_{177}	-3	3	0	0	0	0	-3	3	0	0	0	0	0	0	3	3	-6
χ_{178}	2	-4	2	2	-1	2	-4	2	0	0	0	0	0	0	2	2	-4
χ_{179}	2	2	-4	2	-1	2	2	-4	0	0	0	0	0	0	2	2	-4
χ_{180}	2	2	-4	2	-1	2	2	-4	0	0	0	0	0	0	2	2	-4

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	9B							9C			10A		10B		12A	
	9Q	9R	9S	9T	9U	9V	9W	27A	27B	27C	10A	30A	10B	30B	12I	36A
χ_{121}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{124}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{125}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{126}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{127}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{128}	-9	9	0	0	9	0	-9	0	0	0	0	0	-2	1	0	0
χ_{129}	-9	9	0	0	9	0	-9	0	0	0	0	0	-2	1	0	0
χ_{130}	-9	0	9	0	0	9	-9	0	0	0	0	0	2	-1	0	0
χ_{131}	-9	0	9	0	0	9	-9	0	0	0	0	0	2	-1	0	0
χ_{132}	0	9	-9	0	9	-9	0	0	0	0	0	0	0	0	0	0
χ_{133}	0	9	-9	0	9	-9	0	0	0	0	0	0	0	0	0	0
χ_{134}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{135}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{136}	9	-9	0	0	-9	0	9	0	0	0	0	0	0	0	0	0
χ_{137}	9	-9	0	0	-9	0	9	0	0	0	0	0	0	0	0	0
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	9	-9	0	0	-9	0	9	0	0	0	0	0	-2	1	0	0
χ_{140}	9	-9	0	0	-9	0	9	0	0	0	0	0	-2	1	0	0
χ_{141}	9	0	-9	0	0	-9	9	0	0	0	0	0	2	-1	0	0
χ_{142}	9	0	-9	0	0	-9	9	0	0	0	0	0	2	-1	0	0
χ_{143}	0	-9	9	0	-9	9	0	0	0	0	0	0	0	0	0	0
χ_{144}	0	-9	9	0	-9	9	0	0	0	0	0	0	0	0	0	0
χ_{145}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{146}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	-9	0	9	0	0	9	-9	0	0	0	0	0	0	0	0	0
χ_{149}	-9	0	9	0	0	9	-9	0	0	0	0	0	0	0	0	0
χ_{150}	0	9	-9	0	9	-9	0	0	0	0	0	0	0	0	0	0
χ_{151}	0	9	-9	0	9	-9	0	0	0	0	0	0	0	0	0	0
χ_{152}	-4	-4	5	-1	14	-4	5	2	-1	-1	0	0	0	0	2	-1
χ_{153}	-4	-4	5	-1	14	-4	5	2	-1	-1	0	0	0	0	2	-1
χ_{154}	10	1	10	-2	10	-8	1	1	1	-2	0	0	0	0	2	-1
χ_{155}	-8	1	1	-2	10	10	10	1	-2	1	0	0	0	0	2	-1
χ_{156}	-8	1	1	-2	10	10	10	1	-2	1	0	0	0	0	2	-1
χ_{157}	10	1	10	-2	10	-8	1	1	1	-2	0	0	0	0	2	-1
χ_{158}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-2
χ_{159}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-2
χ_{160}	14	5	5	-1	-4	-4	-4	-1	2	-1	0	0	0	0	4	-2
χ_{161}	14	5	5	-1	-4	-4	-4	-1	2	-1	0	0	0	0	4	-2
χ_{162}	-4	5	-4	-1	-4	14	5	-1	-1	2	0	0	0	0	4	-2
χ_{163}	-4	5	-4	-1	-4	14	5	-1	-1	2	0	0	0	0	4	-2
χ_{164}	6	6	6	-3	6	6	6	0	0	0	0	0	0	0	-2	1
χ_{165}	6	6	6	-3	6	6	6	0	0	0	0	0	0	0	-2	1
χ_{166}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	-3
χ_{167}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	-3
χ_{168}	4	4	-5	1	-14	4	-5	-2	1	1	0	0	0	0	0	0
χ_{169}	4	4	-5	1	-14	4	-5	-2	1	1	0	0	0	0	0	0
χ_{170}	6	6	6	-3	6	6	6	0	0	0	0	0	0	0	0	0
χ_{171}	6	6	6	-3	6	6	6	0	0	0	0	0	0	0	0	0
χ_{172}	6	6	6	-3	6	6	6	0	0	0	0	0	0	0	-4	2
χ_{173}	6	6	6	-3	6	6	6	0	0	0	0	0	0	0	-4	2
χ_{174}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-2
χ_{175}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-2
χ_{176}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-2
χ_{177}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	-2
χ_{178}	14	5	5	-1	-4	-4	-4	-1	2	-1	0	0	0	0	0	0
χ_{179}	-4	5	-4	-1	-4	14	5	-1	-1	2	0	0	0	0	0	0
χ_{180}	-4	5	-4	-1	-4	14	5	-1	-1	2	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	12B					12C		12D		12E		12F			12G	
	12J	12K	12L	12M	12N	12O	12P	12Q	12R	12S	12T	36B	12U	36C	12V	36D
χ_{121}	-6	3	3	-3	0	0	0	0	0	-2	1	0	0	0	0	0
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{124}	-6	3	3	-3	0	0	0	0	0	-2	1	0	0	0	0	0
χ_{125}	-6	3	3	-3	0	0	0	0	0	-2	1	0	0	0	0	0
χ_{126}	6	-3	-3	3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{127}	6	-3	-3	3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{128}	-6	3	3	-3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{129}	-6	3	3	-3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{130}	6	-3	-3	3	0	0	0	0	0	-2	1	0	0	0	0	0
χ_{131}	6	-3	-3	3	0	0	0	0	0	-2	1	0	0	0	0	0
χ_{132}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{133}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{134}	12	-6	-6	6	0	0	0	0	0	-4	2	0	0	0	0	0
χ_{135}	12	-6	-6	6	0	0	0	0	0	-4	2	0	0	0	0	0
χ_{136}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{137}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{138}	-12	6	6	-6	0	0	0	0	0	4	-2	0	0	0	0	0
χ_{139}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{140}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{141}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{142}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{143}	-6	3	3	-3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{144}	-6	3	3	-3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{145}	-6	3	3	-3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{146}	-6	3	3	-3	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{147}	12	-6	-6	6	0	0	0	0	0	-4	2	0	0	0	0	0
χ_{148}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{149}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{150}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{151}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{152}	-4	5	-4	2	-1	0	0	0	0	0	0	2	-1	-1	2	-1
χ_{153}	-4	5	-4	2	-1	0	0	0	0	0	0	2	-1	-1	2	-1
χ_{154}	8	-1	-1	-4	2	0	0	0	0	0	0	-1	2	-1	-2	1
χ_{155}	-4	-4	5	2	-1	0	0	0	0	0	0	-1	-1	2	-2	1
χ_{156}	-4	-4	5	2	-1	0	0	0	0	0	0	-1	-1	2	-2	1
χ_{157}	8	-1	-1	-4	2	0	0	0	0	0	0	-1	2	-1	-2	1
χ_{158}	4	-5	4	-2	1	0	0	0	0	0	0	-2	1	1	0	0
χ_{159}	4	-5	4	-2	1	0	0	0	0	0	0	-2	1	1	0	0
χ_{160}	-8	1	1	4	-2	0	0	0	0	0	0	1	-2	1	0	0
χ_{161}	-8	1	1	4	-2	0	0	0	0	0	0	1	-2	1	0	0
χ_{162}	4	4	-5	-2	1	0	0	0	0	0	0	1	1	-2	0	0
χ_{163}	4	4	-5	-2	1	0	0	0	0	0	0	1	1	-2	0	0
χ_{164}	4	-5	4	-2	1	0	0	0	0	0	0	-2	1	1	2	-1
χ_{165}	4	-5	4	-2	1	0	0	0	0	0	0	-2	1	1	2	-1
χ_{166}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{167}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{168}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{169}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{170}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{171}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{172}	-4	5	-4	2	-1	0	0	0	0	0	0	2	-1	-1	0	0
χ_{173}	-4	5	-4	2	-1	0	0	0	0	0	0	2	-1	-1	0	0
χ_{174}	-8	1	1	4	-2	0	0	0	0	0	0	1	-2	1	0	0
χ_{175}	-8	1	1	4	-2	0	0	0	0	0	0	1	-2	1	0	0
χ_{176}	4	4	-5	-2	1	0	0	0	0	0	0	1	1	-2	0	0
χ_{177}	4	4	-5	-2	1	0	0	0	0	0	0	1	1	-2	0	0
χ_{178}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{179}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{180}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$13A$		$13B$		$14A$		$15A$		$18A$	$18B$			$18C$		$20A$	
	$13A$	$39A$	$13B$	$39B$	$14A$	$42A$	$15D$	$45A$	$18I$	$18J$	$18K$	$18L$	$18M$	$18N$	$20A$	$60A$
χ_{121}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{122}	0	0	0	0	2	-1	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	2	-1	0	0	0	0	0	0	0	0	0	0
χ_{124}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{125}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{126}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{127}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{128}	0	0	0	0	2	-1	0	0	0	0	3	-3	0	0	0	0
χ_{129}	0	0	0	0	2	-1	0	0	0	0	3	-3	0	0	0	0
χ_{130}	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0	0
χ_{131}	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0	0
χ_{132}	0	0	0	0	-2	1	0	0	0	3	0	-3	0	0	0	0
χ_{133}	0	0	0	0	-2	1	0	0	0	3	0	-3	0	0	0	0
χ_{134}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{135}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{136}	0	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0
χ_{137}	0	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0
χ_{138}	0	0	0	0	-2	1	0	0	0	0	0	0	0	0	0	0
χ_{139}	0	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0
χ_{140}	0	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0
χ_{141}	0	0	0	0	2	-1	0	0	0	3	-3	0	0	0	0	0
χ_{142}	0	0	0	0	2	-1	0	0	0	3	-3	0	0	0	0	0
χ_{143}	0	0	0	0	0	0	0	0	0	-3	0	3	0	0	0	0
χ_{144}	0	0	0	0	0	0	0	0	0	-3	0	3	0	0	0	0
χ_{145}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{146}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0	0
χ_{149}	0	0	0	0	0	0	0	0	0	-3	3	0	0	0	0	0
χ_{150}	0	0	0	0	0	0	0	0	0	3	0	-3	0	0	0	0
χ_{151}	0	0	0	0	0	0	0	0	0	3	0	-3	0	0	0	0
χ_{152}	0	0	0	0	0	0	2	-1	0	0	0	0	2	-1	0	0
χ_{153}	0	0	0	0	0	0	2	-1	0	0	0	0	2	-1	0	0
χ_{154}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{155}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{156}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{157}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{158}	0	0	0	0	0	0	2	-1	0	0	0	0	-2	1	0	0
χ_{159}	0	0	0	0	0	0	2	-1	0	0	0	0	-2	1	0	0
χ_{160}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{161}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{162}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{163}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{164}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{165}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{166}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{167}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{168}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{169}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{170}	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0	0
χ_{171}	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0	0
χ_{172}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{173}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{174}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{175}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{176}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{177}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{178}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{179}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{180}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$2D$				$2E$				$2F$			
	$2D$	$6AP$	$6AQ$	$6AR$	$2E$	$6AS$	$6AT$	$6AU$	$2F$	$6AV$	$6AW$	$6AX$
χ_{121}	-7020	-540	270	270	-60	-60	30	30	-180	-18	36	-18
χ_{122}	18954	1458	-729	-729	162	162	-81	-81	270	27	-54	27
χ_{123}	-18954	-1458	729	729	-162	-162	81	81	-270	-27	54	-27
χ_{124}	8424	648	-324	-324	72	72	-36	-36	-360	-36	72	-36
χ_{125}	-8424	-648	324	324	-72	-72	36	36	360	36	-72	36
χ_{126}	10530	810	-405	-405	90	90	-45	-45	-90	-9	18	-9
χ_{127}	-10530	-810	405	405	-90	-90	45	45	90	9	-18	9
χ_{128}	936	72	-36	-36	-8	-8	4	4	0	0	0	0
χ_{129}	-936	-72	36	36	8	8	-4	-4	0	0	0	0
χ_{130}	3744	288	-144	-144	-32	-32	16	16	0	0	0	0
χ_{131}	-3744	-288	144	144	32	32	-16	-16	0	0	0	0
χ_{132}	9360	720	-360	-360	-80	-80	40	40	0	0	0	0
χ_{133}	-9360	-720	360	360	80	80	-40	-40	0	0	0	0
χ_{134}	8424	648	-324	-324	-72	-72	36	36	0	0	0	0
χ_{135}	-8424	-648	324	324	72	72	-36	-36	0	0	0	0
χ_{136}	4680	360	-180	-180	-40	-40	20	20	0	0	0	0
χ_{137}	-4680	-360	180	180	40	40	-20	-20	0	0	0	0
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	3744	288	-144	-144	-32	-32	16	16	0	0	0	0
χ_{140}	-3744	-288	144	144	32	32	-16	-16	0	0	0	0
χ_{141}	14976	1152	-576	-576	-128	-128	64	64	0	0	0	0
χ_{142}	-14976	-1152	576	576	128	128	-64	-64	0	0	0	0
χ_{143}	18720	1440	-720	-720	-160	-160	80	80	0	0	0	0
χ_{144}	-18720	-1440	720	720	160	160	-80	-80	0	0	0	0
χ_{145}	14040	1080	-540	-540	-120	-120	60	60	0	0	0	0
χ_{146}	-14040	-1080	540	540	120	120	-60	-60	0	0	0	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	18720	1440	-720	-720	-160	-160	80	80	0	0	0	0
χ_{149}	-18720	-1440	720	720	160	160	-80	-80	0	0	0	0
χ_{150}	9360	720	-360	-360	-80	-80	40	40	0	0	0	0
χ_{151}	-9360	-720	360	360	80	80	-40	-40	0	0	0	0
χ_{152}	260	-10	-10	17	4	-2	-2	1	20	-7	2	2
χ_{153}	-260	10	10	-17	-4	2	2	-1	-20	7	-2	-2
χ_{154}	780	-30	-30	51	-20	10	10	-5	-20	7	-2	-2
χ_{155}	780	-30	-30	51	-20	10	10	-5	-20	7	-2	-2
χ_{156}	-780	30	30	-51	20	-10	-10	5	20	-7	2	2
χ_{157}	-780	30	30	-51	20	-10	-10	5	20	-7	2	2
χ_{158}	520	-20	-20	34	-24	12	12	-6	-40	14	-4	-4
χ_{159}	-520	20	20	-34	24	-12	-12	6	40	-14	4	4
χ_{160}	520	-20	-20	34	40	-20	-20	10	-40	14	-4	-4
χ_{161}	-520	20	20	-34	-40	20	20	-10	40	-14	4	4
χ_{162}	520	-20	-20	34	40	-20	-20	10	-40	14	-4	-4
χ_{163}	-520	20	20	-34	-40	20	20	-10	40	-14	4	4
χ_{164}	-1820	70	70	-119	-60	30	30	-15	-60	21	-6	-6
χ_{165}	1820	-70	-70	119	60	-30	-30	15	60	-21	6	6
χ_{166}	-260	10	10	-17	60	-30	-30	15	-20	7	-2	-2
χ_{167}	260	-10	-10	17	-60	30	30	-15	20	-7	2	2
χ_{168}	1040	-40	-40	68	80	-40	-40	20	80	-28	8	8
χ_{169}	-1040	40	40	-68	-80	40	40	-20	-80	28	-8	-8
χ_{170}	-2080	80	80	-136	-96	48	48	-24	0	0	0	0
χ_{171}	2080	-80	-80	136	96	-48	-48	24	0	0	0	0
χ_{172}	2600	-100	-100	170	-120	60	60	-30	-40	14	-4	-4
χ_{173}	-2600	100	100	-170	120	-60	-60	30	40	-14	4	4
χ_{174}	1560	-60	-60	102	120	-60	-60	30	40	-14	4	4
χ_{175}	-1560	60	60	-102	-120	60	60	-30	-40	14	-4	-4
χ_{176}	1560	-60	-60	102	120	-60	-60	30	40	-14	4	4
χ_{177}	-1560	60	60	-102	-120	60	60	-30	-40	14	-4	-4
χ_{178}	2080	-80	-80	136	-160	80	80	-40	0	0	0	0
χ_{179}	2080	-80	-80	136	-160	80	80	-40	0	0	0	0
χ_{180}	-2080	80	80	-136	160	-80	-80	40	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$4E$	$4F$	$4G$				$4H$			$4I$			
	$4E$	$4F$	$4G$	$12W$	$12X$	$12Y$	$4H$	$12Z$	$12AA$	$4I$	$12AB$	$12AC$	$12AD$
χ_{121}	0	0	-48	-12	6	6	-8	4	-2	-4	-4	2	2
χ_{122}	0	0	-72	-18	9	9	-12	6	-3	-6	-6	3	3
χ_{123}	0	0	72	18	-9	-9	12	-6	3	6	6	-3	-3
χ_{124}	0	0	0	0	0	0	0	0	0	8	8	-4	-4
χ_{125}	0	0	0	0	0	0	0	0	0	-8	-8	4	4
χ_{126}	0	0	-72	-18	9	9	-12	6	-3	10	10	-5	-5
χ_{127}	0	0	72	18	-9	-9	12	-6	3	-10	-10	5	5
χ_{128}	0	0	48	12	-6	-6	-8	4	-2	0	0	0	0
χ_{129}	0	0	-48	-12	6	6	8	-4	2	0	0	0	0
χ_{130}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{131}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{132}	0	0	96	24	-12	-12	-16	8	-4	0	0	0	0
χ_{133}	0	0	-96	-24	12	12	16	-8	4	0	0	0	0
χ_{134}	0	0	48	12	-6	-6	-8	4	-2	0	0	0	0
χ_{135}	0	0	-48	-12	6	6	8	-4	2	0	0	0	0
χ_{136}	0	0	48	12	-6	-6	-8	4	-2	0	0	0	0
χ_{137}	0	0	-48	-12	6	6	8	-4	2	0	0	0	0
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{140}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{141}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{142}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{143}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{144}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{145}	0	0	-48	-12	6	6	8	-4	2	0	0	0	0
χ_{146}	0	0	48	12	-6	-6	-8	4	-2	0	0	0	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{149}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{150}	0	0	-96	-24	12	12	16	-8	4	0	0	0	0
χ_{151}	0	0	96	24	-12	-12	-16	8	-4	0	0	0	0
χ_{152}	0	0	32	-4	-4	5	0	0	0	4	-2	-2	1
χ_{153}	0	0	-32	4	4	-5	0	0	0	-4	2	2	-1
χ_{154}	0	0	32	-4	-4	5	0	0	0	-4	2	2	-1
χ_{155}	0	0	32	-4	-4	5	0	0	0	-4	2	2	-1
χ_{156}	0	0	-32	4	4	-5	0	0	0	4	-2	-2	1
χ_{157}	0	0	-32	4	4	-5	0	0	0	4	-2	-2	1
χ_{158}	0	0	0	0	0	0	0	0	0	-8	4	4	-2
χ_{159}	0	0	0	0	0	0	0	0	0	8	-4	-4	2
χ_{160}	0	0	0	0	0	0	0	0	0	8	-4	-4	2
χ_{161}	0	0	0	0	0	0	0	0	0	-8	4	4	-2
χ_{162}	0	0	0	0	0	0	0	0	0	8	-4	-4	2
χ_{163}	0	0	0	0	0	0	0	0	0	-8	4	4	-2
χ_{164}	0	0	-32	4	4	-5	0	0	0	4	-2	-2	1
χ_{165}	0	0	32	-4	-4	5	0	0	0	-4	2	2	-1
χ_{166}	0	0	-32	4	4	-5	0	0	0	12	-6	-6	3
χ_{167}	0	0	32	-4	-4	5	0	0	0	-12	6	6	-3
χ_{168}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{169}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{170}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{171}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{172}	0	0	0	0	0	0	0	0	0	8	-4	-4	2
χ_{173}	0	0	0	0	0	0	0	0	0	-8	4	4	-2
χ_{174}	0	0	0	0	0	0	0	0	0	8	-4	-4	2
χ_{175}	0	0	0	0	0	0	0	0	0	-8	4	4	-2
χ_{176}	0	0	0	0	0	0	0	0	0	8	-4	-4	2
χ_{177}	0	0	0	0	0	0	0	0	0	-8	4	4	-2
χ_{178}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{179}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{180}	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6O$							$6P$						$6Q$	
	$6AY$	$6AZ$	$6BA$	$6BB$	$6BC$	$6BD$	$6BE$	$6BF$	$6BG$	$18O$	$6BH$	$6BI$	$6BJ$	$6BK$	$6BL$
χ_{121}	-135	-54	189	0	-54	189	-135	0	0	0	0	0	0	108	0
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{124}	-81	162	-81	0	162	-81	-81	0	0	0	0	0	0	0	0
χ_{125}	81	-162	81	0	-162	81	81	0	0	0	0	0	0	0	0
χ_{126}	81	-162	81	0	-162	81	81	0	0	0	0	0	0	0	0
χ_{127}	-81	162	-81	0	162	-81	-81	0	0	0	0	0	0	0	0
χ_{128}	-9	-36	45	0	-36	45	-9	-36	0	0	-18	18	18	36	0
χ_{129}	9	36	-45	0	36	-45	9	36	0	0	18	-18	-18	-36	0
χ_{130}	45	-144	99	0	-144	99	45	-36	0	0	-18	18	18	-72	0
χ_{131}	-45	144	-99	0	144	-99	-45	36	0	0	18	-18	-18	72	0
χ_{132}	-90	-36	126	0	-36	126	-90	-36	0	0	-18	18	18	36	0
χ_{133}	90	36	-126	0	36	-126	90	36	0	0	18	-18	-18	-36	0
χ_{134}	0	0	0	0	0	0	0	108	0	0	54	-54	-54	108	0
χ_{135}	0	0	0	0	0	0	0	-108	0	0	-54	54	54	-108	0
χ_{136}	36	144	-180	0	144	-180	36	-72	0	0	-36	36	36	-36	0
χ_{137}	-36	-144	180	0	-144	180	-36	72	0	0	36	-36	-36	36	0
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	-198	180	18	0	180	18	-198	-36	0	0	-18	18	18	-72	0
χ_{140}	198	-180	-18	0	-180	-18	198	36	0	0	18	-18	-18	72	0
χ_{141}	-144	72	72	0	72	72	-144	72	0	0	36	-36	-36	-72	0
χ_{142}	144	-72	-72	0	-72	-72	144	-72	0	0	-36	36	36	72	0
χ_{143}	63	-72	9	0	-72	9	63	-72	0	0	-36	36	36	72	0
χ_{144}	-63	72	-9	0	72	-9	-63	72	0	0	36	-36	-36	-72	0
χ_{145}	27	108	-135	0	108	-135	27	0	0	0	0	0	0	108	0
χ_{146}	-27	-108	135	0	-108	135	-27	0	0	0	0	0	0	-108	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	144	-72	-72	0	-72	-72	144	36	0	0	18	-18	-18	-144	0
χ_{149}	-144	72	72	0	72	72	-144	-36	0	0	-18	18	18	144	0
χ_{150}	-90	-36	126	0	-36	126	-90	-36	0	0	-18	18	18	36	0
χ_{151}	90	36	-126	0	36	-126	90	36	0	0	18	-18	-18	-36	0
χ_{152}	-10	17	-10	-1	-10	44	17	-10	-1	-1	8	17	-10	26	-10
χ_{153}	10	-17	10	1	10	-44	-17	10	1	1	-8	-17	10	-26	10
χ_{154}	-30	24	-3	-3	24	78	51	42	15	-3	-12	15	-12	6	6
χ_{155}	24	51	-3	-3	-30	78	24	-30	-3	-3	24	-3	24	6	6
χ_{156}	-24	-51	3	3	30	-78	-24	30	3	3	-24	3	-24	-6	-6
χ_{157}	30	-24	3	3	-24	-78	-51	-42	-15	3	12	-15	12	-6	-6
χ_{158}	34	7	34	-2	34	-20	7	16	7	-2	-2	-11	16	52	-20
χ_{159}	-34	-7	-34	2	-34	20	-7	-16	-7	2	2	11	-16	-52	20
χ_{160}	-74	-20	7	-2	88	34	61	16	7	-2	-2	-11	16	-20	16
χ_{161}	74	20	-7	2	-88	-34	-61	-16	-7	2	2	11	-16	20	-16
χ_{162}	88	61	7	-2	-74	34	-20	16	7	-2	-2	-11	16	-20	16
χ_{163}	-88	-61	-7	2	74	-34	20	-16	-7	2	2	11	-16	20	-16
χ_{164}	-38	-65	-38	7	-38	-92	-65	-38	-20	7	-2	16	-38	-38	-2
χ_{165}	38	65	38	-7	38	92	65	38	20	-7	2	-16	38	38	2
χ_{166}	-44	10	-44	1	-44	64	10	10	1	1	-8	-17	10	46	-26
χ_{167}	44	-10	44	-1	44	-64	-10	-10	-1	-1	8	17	-10	-46	26
χ_{168}	68	14	68	-4	68	-40	14	-4	5	-4	14	23	-4	32	-4
χ_{169}	-68	-14	-68	4	-68	40	-14	4	-5	4	-14	-23	4	-32	4
χ_{170}	-28	-82	-28	8	-28	-136	-82	8	-10	8	-28	-46	8	8	-28
χ_{171}	28	82	28	-8	28	136	82	-8	10	-8	28	46	-8	-8	28
χ_{172}	62	89	62	-10	62	116	89	8	17	-10	26	35	8	44	8
χ_{173}	-62	-89	-62	10	-62	-116	-89	-8	-17	10	-26	-35	-8	-44	-8
χ_{174}	102	48	75	-6	48	-6	21	-24	3	-6	30	3	30	12	12
χ_{175}	-102	-48	-75	6	-48	6	-21	24	-3	6	-30	-3	-30	-12	-12
χ_{176}	48	21	75	-6	102	-6	48	48	21	-6	-6	21	-6	12	12
χ_{177}	-48	-21	-75	6	-102	6	-48	-48	-21	6	6	-21	6	-12	-12
χ_{178}	28	28	82	-8	136	28	82	-8	10	-8	28	-8	46	-8	28
χ_{179}	136	82	82	-8	28	28	28	64	28	-8	-8	10	10	-8	28
χ_{180}	-136	-82	-82	8	-28	-28	-28	-64	-28	8	8	-10	-10	8	-28

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6Q$			$6R$			$6S$						$6T$			
	$6BM$	$6BN$	$18P$	$6BO$	$6BP$	$6BQ$	$6BR$	$6BS$	$6BT$	$6BU$	$6BV$	$6BW$	$6BX$	$6BY$	$6BZ$	$6CA$
χ_{121}	27	-27	0	0	0	0	21	-6	-15	21	-15	-6	0	0	0	0
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{124}	0	0	0	0	0	0	-9	18	-9	-9	-9	18	0	0	0	0
χ_{125}	0	0	0	0	0	0	9	-18	9	9	9	-18	0	0	0	0
χ_{126}	0	0	0	0	0	0	9	-18	9	9	9	-18	0	0	0	0
χ_{127}	0	0	0	0	0	0	-9	18	-9	-9	-9	18	0	0	0	0
χ_{128}	9	-9	0	0	0	0	-5	4	1	-5	1	4	4	4	-2	-2
χ_{129}	-9	9	0	0	0	0	5	-4	-1	5	-1	-4	-4	-4	2	2
χ_{130}	-18	18	0	0	0	0	-11	16	-5	-11	-5	16	4	4	-2	-2
χ_{131}	18	-18	0	0	0	0	11	-16	5	11	5	-16	-4	-4	2	2
χ_{132}	9	-9	0	0	0	0	-14	4	10	-14	10	4	4	4	-2	-2
χ_{133}	-9	9	0	0	0	0	14	-4	-10	14	-10	-4	-4	-4	2	2
χ_{134}	27	-27	0	0	0	0	0	0	0	0	0	0	-12	-12	6	6
χ_{135}	-27	27	0	0	0	0	0	0	0	0	0	0	12	12	-6	-6
χ_{136}	-9	9	0	0	0	0	20	-16	-4	20	-4	-16	8	8	-4	-4
χ_{137}	9	-9	0	0	0	0	-20	16	4	-20	4	16	-8	-8	4	4
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	-18	18	0	0	0	0	-2	-20	22	-2	22	-20	4	4	-2	-2
χ_{140}	18	-18	0	0	0	0	2	20	-22	2	-22	20	-4	-4	2	2
χ_{141}	-18	18	0	0	0	0	-8	-8	16	-8	16	-8	-8	-8	4	4
χ_{142}	18	-18	0	0	0	0	8	8	-16	8	-16	8	8	8	-4	-4
χ_{143}	18	-18	0	0	0	0	-1	8	-7	-1	-7	8	8	8	-4	-4
χ_{144}	-18	18	0	0	0	0	1	-8	7	1	7	-8	-8	-8	4	4
χ_{145}	27	-27	0	0	0	0	15	-12	-3	15	-3	-12	0	0	0	0
χ_{146}	-27	27	0	0	0	0	-15	12	3	-15	3	12	0	0	0	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	-36	36	0	0	0	0	8	8	-16	8	-16	8	-4	-4	2	2
χ_{149}	36	-36	0	0	0	0	-8	-8	16	-8	16	-8	4	4	-2	-2
χ_{150}	9	-9	0	0	0	0	-14	4	10	-14	10	4	4	4	-2	-2
χ_{151}	-9	9	0	0	0	0	14	-4	-10	14	-10	-4	-4	-4	2	2
χ_{152}	-1	8	-1	-10	8	-1	-2	-2	4	1	-2	1	4	-2	-2	1
χ_{153}	1	-8	1	10	-8	1	2	2	-4	-1	2	-1	-4	2	2	-1
χ_{154}	6	6	-3	10	-8	1	10	-8	-2	-5	1	4	4	-2	-2	1
χ_{155}	6	6	-3	10	-8	1	-8	10	-2	4	1	-5	4	-2	-2	1
χ_{156}	-6	-6	3	-10	8	-1	8	-10	2	-4	-1	5	-4	2	2	-1
χ_{157}	-6	-6	3	-10	8	-1	-10	8	2	5	-1	-4	-4	2	2	-1
χ_{158}	-2	16	-2	-10	8	-1	-6	-6	12	3	-6	3	-12	6	6	-3
χ_{159}	2	-16	2	10	-8	1	6	6	-12	-3	6	-3	12	-6	-6	3
χ_{160}	7	-2	-2	-10	8	-1	-2	16	-14	1	7	-8	4	-2	-2	1
χ_{161}	-7	2	2	10	-8	1	2	-16	14	-1	-7	8	-4	2	2	-1
χ_{162}	7	-2	-2	-10	8	-1	16	-2	-14	-8	7	1	4	-2	-2	1
χ_{163}	-7	2	2	10	-8	1	-16	2	14	8	-7	-1	-4	2	2	-1
χ_{164}	-11	-20	7	0	0	0	-6	-6	12	3	-6	3	0	0	0	0
χ_{165}	11	20	-7	0	0	0	6	6	-12	-3	6	-3	0	0	0	0
χ_{166}	-8	10	1	10	-8	1	-12	-12	24	6	-12	6	12	-6	-6	3
χ_{167}	8	-10	-1	-10	8	-1	12	12	-24	-6	12	-6	-12	6	6	-3
χ_{168}	5	14	-4	-10	8	-1	-4	-4	8	2	-4	2	20	-10	-10	5
χ_{169}	-5	-14	4	10	-8	1	4	4	-8	-2	4	-2	-20	10	10	-5
χ_{170}	-19	-10	8	0	0	0	12	12	-24	-6	12	-6	0	0	0	0
χ_{171}	19	10	-8	0	0	0	-12	-12	24	6	-12	6	0	0	0	0
χ_{172}	17	26	-10	-10	8	-1	6	6	-12	-3	6	-3	-12	6	6	-3
χ_{173}	-17	-26	10	10	-8	1	-6	-6	12	3	-6	3	12	-6	-6	3
χ_{174}	12	12	-6	10	-8	1	30	-24	-6	-15	3	12	-12	6	6	-3
χ_{175}	-12	-12	6	-10	8	-1	-30	24	6	15	-3	-12	12	-6	-6	3
χ_{176}	12	12	-6	10	-8	1	-24	30	-6	12	3	-15	-12	6	6	-3
χ_{177}	-12	-12	6	-10	8	-1	24	-30	6	-12	-3	15	12	-6	-6	3
χ_{178}	19	10	-8	0	0	0	-28	8	20	14	-10	-4	8	-4	-4	2
χ_{179}	19	10	-8	0	0	0	8	-28	20	-4	-10	14	8	-4	-4	2
χ_{180}	-19	-10	8	0	0	0	-8	28	-20	4	10	-14	-8	4	4	-2

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6U$		$6V$			$6W$				$6X$						$6Y$	
	$6CB$	$18Q$	$6CC$	$6CD$	$18R$	$6CE$	$6CF$	$6CG$	$6CH$	$18S$	$18T$	$6CI$	$18U$	$18V$	$18W$	$6CJ$	$18X$
χ_{121}	0	0	0	0	0	6	6	-3	-3	0	0	0	0	0	0	0	0
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{124}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{125}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{126}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{127}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{128}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{129}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{130}	0	0	0	0	0	4	4	-2	-2	0	0	0	0	0	0	0	0
χ_{131}	0	0	0	0	0	-4	-4	2	2	0	0	0	0	0	0	0	0
χ_{132}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{133}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{134}	0	0	0	0	0	-6	-6	3	3	0	0	0	0	0	0	0	0
χ_{135}	0	0	0	0	0	6	6	-3	-3	0	0	0	0	0	0	0	0
χ_{136}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{137}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	0	0	0	0	0	4	4	-2	-2	0	0	0	0	0	0	0	0
χ_{140}	0	0	0	0	0	-4	-4	2	2	0	0	0	0	0	0	0	0
χ_{141}	0	0	0	0	0	4	4	-2	-2	0	0	0	0	0	0	0	0
χ_{142}	0	0	0	0	0	-4	-4	2	2	0	0	0	0	0	0	0	0
χ_{143}	0	0	0	0	0	-4	-4	2	2	0	0	0	0	0	0	0	0
χ_{144}	0	0	0	0	0	4	4	-2	-2	0	0	0	0	0	0	0	0
χ_{145}	0	0	0	0	0	-6	-6	3	3	0	0	0	0	0	0	0	0
χ_{146}	0	0	0	0	0	6	6	-3	-3	0	0	0	0	0	0	0	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	0	0	0	0	0	8	8	-4	-4	0	0	0	0	0	0	0	0
χ_{149}	0	0	0	0	0	-8	-8	4	4	0	0	0	0	0	0	0	0
χ_{150}	0	0	0	0	0	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{151}	0	0	0	0	0	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{152}	2	-1	2	2	-1	4	-2	-2	1	-1	8	-1	-1	-1	-1	2	-1
χ_{153}	-2	1	-2	-2	1	-4	2	2	-1	1	-8	1	1	1	1	-2	1
χ_{154}	-2	1	-2	-2	1	-8	4	4	-2	-3	6	-3	-3	6	-3	-2	1
χ_{155}	-2	1	-2	-2	1	-8	4	4	-2	-3	6	-3	6	-3	-3	-2	1
χ_{156}	2	-1	2	2	-1	8	-4	-4	2	3	-6	3	-6	3	3	2	-1
χ_{157}	2	-1	2	2	-1	8	-4	-4	2	3	-6	3	3	-6	3	2	-1
χ_{158}	-4	2	-4	-4	2	0	0	0	0	7	-2	7	-2	-2	-2	2	-1
χ_{159}	4	-2	4	4	-2	0	0	0	0	-7	2	-7	2	2	2	-2	1
χ_{160}	-4	2	-4	-4	2	4	-2	-2	1	7	-2	-11	-2	7	-2	2	-1
χ_{161}	4	-2	4	4	-2	-4	2	2	-1	-7	2	11	2	-7	2	-2	1
χ_{162}	-4	2	-4	-4	2	4	-2	-2	1	-11	-2	7	7	-2	-2	2	-1
χ_{163}	4	-2	4	4	-2	-4	2	2	-1	11	2	-7	-7	2	2	-2	1
χ_{164}	-6	3	-6	-6	3	-12	6	6	-3	-2	-2	-2	-2	-2	7	0	0
χ_{165}	6	-3	6	6	-3	12	-6	-6	3	2	2	2	2	2	-7	0	0
χ_{166}	-2	1	-2	-2	1	0	0	0	0	1	10	1	1	1	-8	-2	1
χ_{167}	2	-1	2	2	-1	0	0	0	0	-1	-10	-1	-1	-1	8	2	-1
χ_{168}	8	-4	8	8	-4	-4	2	2	-1	5	-4	5	-4	-4	5	2	-1
χ_{169}	-8	4	-8	-8	4	4	-2	-2	1	-5	4	-5	4	4	-5	-2	1
χ_{170}	0	0	0	0	0	-12	6	6	-3	8	-10	8	-1	-1	-1	0	0
χ_{171}	0	0	0	0	0	12	-6	-6	3	-8	10	-8	1	1	1	0	0
χ_{172}	-4	2	-4	-4	2	-12	6	6	-3	-1	8	-1	-1	-1	-1	2	-1
χ_{173}	4	-2	4	4	-2	12	-6	-6	3	1	-8	1	1	1	1	-2	1
χ_{174}	4	-2	4	4	-2	0	0	0	0	3	-6	3	3	-6	3	-2	1
χ_{175}	-4	2	-4	-4	2	0	0	0	0	-3	6	-3	-3	6	-3	2	-1
χ_{176}	4	-2	4	4	-2	0	0	0	0	3	-6	3	-6	3	3	-2	1
χ_{177}	-4	2	-4	-4	2	0	0	0	0	-3	6	-3	6	-3	-3	2	-1
χ_{178}	0	0	0	0	0	-4	2	2	-1	10	-8	-8	1	1	1	0	0
χ_{179}	0	0	0	0	0	-4	2	2	-1	-8	-8	10	1	1	1	0	0
χ_{180}	0	0	0	0	0	4	-2	-2	1	8	8	-10	-1	-1	-1	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	6Z				8C				10C	10D			10E				12H
	18Y	18Z	18AA	6CK	8C	8D	24C	24D	10C	10D	30C	30D	10E	30E	30F	30G	12AE
χ_{121}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{122}	0	0	0	0	0	-4	2	-1	0	4	-2	1	2	2	-1	-1	0
χ_{123}	0	0	0	0	0	4	-2	1	0	-4	2	-1	-2	-2	1	1	0
χ_{124}	0	0	0	0	0	0	0	0	0	4	-2	1	2	2	-1	-1	0
χ_{125}	0	0	0	0	0	0	0	0	0	-4	2	-1	-2	-2	1	1	0
χ_{126}	0	0	0	0	0	4	-2	1	0	0	0	0	0	0	0	0	0
χ_{127}	0	0	0	0	0	-4	2	-1	0	0	0	0	0	0	0	0	0
χ_{128}	0	0	0	0	0	0	0	0	0	-4	2	-1	2	2	-1	-1	0
χ_{129}	0	0	0	0	0	0	0	0	0	4	-2	1	-2	-2	1	1	0
χ_{130}	0	0	0	0	0	0	0	0	0	4	-2	1	-2	-2	1	1	0
χ_{131}	0	0	0	0	0	0	0	0	0	-4	2	-1	2	2	-1	-1	0
χ_{132}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{133}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{134}	0	0	0	0	0	0	0	0	0	4	-2	1	-2	-2	1	1	0
χ_{135}	0	0	0	0	0	0	0	0	0	-4	2	-1	2	2	-1	-1	0
χ_{136}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{137}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	0	0	0	0	0	0	0	0	0	4	-2	1	-2	-2	1	1	0
χ_{140}	0	0	0	0	0	0	0	0	0	-4	2	-1	2	2	-1	-1	0
χ_{141}	0	0	0	0	0	0	0	0	0	-4	2	-1	2	2	-1	-1	0
χ_{142}	0	0	0	0	0	0	0	0	0	4	-2	1	-2	-2	1	1	0
χ_{143}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{144}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{145}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{146}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{149}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{150}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{151}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{152}	-1	-1	2	-1	0	0	0	0	0	0	0	0	4	-2	-2	1	0
χ_{153}	1	1	-2	1	0	0	0	0	0	0	0	0	-4	2	2	-1	0
χ_{154}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{155}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{156}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{157}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{158}	-1	-1	2	-1	0	0	0	0	0	0	0	0	-4	2	2	-1	0
χ_{159}	1	1	-2	1	0	0	0	0	0	0	0	0	4	-2	-2	1	0
χ_{160}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{161}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{162}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{163}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{164}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{165}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{166}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{167}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{168}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{169}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{170}	0	0	0	0	0	0	0	0	0	0	0	0	4	-2	-2	1	0
χ_{171}	0	0	0	0	0	0	0	0	0	0	0	0	-4	2	2	-1	0
χ_{172}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{173}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{174}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{175}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{176}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{177}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{178}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{179}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{180}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7 \cdot (O_7(3){:}2)$ (continued)

	$12I$	$12J$	$12K$	$12L$		$12M$			$12N$			$12O$		
	$12AF$	$12AG$	$12AH$	$12AI$	$12AJ$	$12AK$	$12AL$	$36E$	$12AM$	$12AN$	$36F$	$12AO$	$12AP$	$12AQ$
χ_{121}	0	0	0	0	0	6	-3	0	0	0	0	4	-2	1
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{124}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{125}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{126}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{127}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{128}	0	0	0	0	0	-6	3	0	0	0	0	4	-2	1
χ_{129}	0	0	0	0	0	6	-3	0	0	0	0	-4	2	-1
χ_{130}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{131}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{132}	0	0	0	0	0	6	-3	0	0	0	0	-4	2	-1
χ_{133}	0	0	0	0	0	-6	3	0	0	0	0	4	-2	1
χ_{134}	0	0	0	0	0	-6	3	0	0	0	0	4	-2	1
χ_{135}	0	0	0	0	0	6	-3	0	0	0	0	-4	2	-1
χ_{136}	0	0	0	0	0	-6	3	0	0	0	0	4	-2	1
χ_{137}	0	0	0	0	0	6	-3	0	0	0	0	-4	2	-1
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{140}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{141}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{142}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{143}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{144}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{145}	0	0	0	0	0	6	-3	0	0	0	0	-4	2	-1
χ_{146}	0	0	0	0	0	-6	3	0	0	0	0	4	-2	1
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{149}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{150}	0	0	0	0	0	-6	3	0	0	0	0	4	-2	1
χ_{151}	0	0	0	0	0	6	-3	0	0	0	0	-4	2	-1
χ_{152}	0	0	0	8	-1	2	2	-1	2	2	-1	0	0	0
χ_{153}	0	0	0	-8	1	-2	-2	1	-2	-2	1	0	0	0
χ_{154}	0	0	0	8	-1	2	2	-1	2	2	-1	0	0	0
χ_{155}	0	0	0	8	-1	2	2	-1	2	2	-1	0	0	0
χ_{156}	0	0	0	-8	1	-2	-2	1	-2	-2	1	0	0	0
χ_{157}	0	0	0	-8	1	-2	-2	1	-2	-2	1	0	0	0
χ_{158}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{159}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{160}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{161}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{162}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{163}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{164}	0	0	0	-8	1	-2	-2	1	-2	-2	1	0	0	0
χ_{165}	0	0	0	8	-1	2	2	-1	2	2	-1	0	0	0
χ_{166}	0	0	0	-8	1	-2	-2	1	-2	-2	1	0	0	0
χ_{167}	0	0	0	8	-1	2	2	-1	2	2	-1	0	0	0
χ_{168}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{169}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{170}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{171}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{172}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{173}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{174}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{175}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{176}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{177}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{178}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{179}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{180}	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	12P						12Q	18D				18E		
	12AR	12AS	12AT	12AU	12AV	12AW	12AX	18AB	18AC	18AD	18AE	18AF	18AG	18AH
χ_{121}	-1	2	-1	-1	-1	2	0	0	0	0	0	0	0	0
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{124}	-1	2	-1	-1	-1	2	0	0	0	0	0	0	0	0
χ_{125}	1	-2	1	1	1	-2	0	0	0	0	0	0	0	0
χ_{126}	1	-2	1	1	1	-2	0	0	0	0	0	0	0	0
χ_{127}	-1	2	-1	-1	-1	2	0	0	0	0	0	0	0	0
χ_{128}	-3	0	3	-3	3	0	0	0	0	0	0	6	-3	-3
χ_{129}	3	0	-3	3	-3	0	0	0	0	0	0	-6	3	3
χ_{130}	-3	0	3	-3	3	0	0	0	0	0	0	-3	6	-3
χ_{131}	3	0	-3	3	-3	0	0	0	0	0	0	3	-6	3
χ_{132}	0	0	0	0	0	0	0	0	0	0	0	-3	-3	6
χ_{133}	0	0	0	0	0	0	0	0	0	0	0	3	3	-6
χ_{134}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{135}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{136}	0	0	0	0	0	0	0	0	0	0	0	-6	3	3
χ_{137}	0	0	0	0	0	0	0	0	0	0	0	6	-3	-3
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	0	0	0	0	0	0	0	0	0	0	0	6	-3	-3
χ_{140}	0	0	0	0	0	0	0	0	0	0	0	-6	3	3
χ_{141}	0	0	0	0	0	0	0	0	0	0	0	-3	6	-3
χ_{142}	0	0	0	0	0	0	0	0	0	0	0	3	-6	3
χ_{143}	3	0	-3	3	-3	0	0	0	0	0	0	3	3	-6
χ_{144}	-3	0	3	-3	3	0	0	0	0	0	0	-3	-3	6
χ_{145}	-3	0	3	-3	3	0	0	0	0	0	0	0	0	0
χ_{146}	3	0	-3	3	-3	0	0	0	0	0	0	0	0	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	0	0	0	0	0	0	0	0	0	0	0	3	-6	3
χ_{149}	0	0	0	0	0	0	0	0	0	0	0	-3	6	-3
χ_{150}	0	0	0	0	0	0	0	0	0	0	0	-3	-3	6
χ_{151}	0	0	0	0	0	0	0	0	0	0	0	3	3	-6
χ_{152}	-2	-2	4	1	-2	1	0	-1	-1	2	-1	2	2	2
χ_{153}	2	2	-4	-1	2	-1	0	1	1	-2	1	-2	-2	-2
χ_{154}	2	-4	2	-1	-1	2	0	3	3	0	-3	0	0	0
χ_{155}	-4	2	2	2	-1	-1	0	-3	-3	0	3	0	0	0
χ_{156}	4	-2	-2	-2	1	1	0	3	3	0	-3	0	0	0
χ_{157}	-2	4	-2	1	1	-2	0	-3	-3	0	3	0	0	0
χ_{158}	-2	-2	4	1	-2	1	0	1	1	-2	1	4	4	4
χ_{159}	2	2	-4	-1	2	-1	0	-1	-1	2	-1	-4	-4	-4
χ_{160}	2	-4	2	-1	-1	2	0	1	1	-2	1	-2	-2	-2
χ_{161}	-2	4	-2	1	1	-2	0	-1	-1	2	-1	2	2	2
χ_{162}	-4	2	2	2	-1	-1	0	1	1	-2	1	-2	-2	-2
χ_{163}	4	-2	-2	-2	1	1	0	-1	-1	2	-1	2	2	2
χ_{164}	-2	-2	4	1	-2	1	0	-2	-2	4	-2	-2	-2	-2
χ_{165}	2	2	-4	-1	2	-1	0	2	2	-4	2	2	2	2
χ_{166}	0	0	0	0	0	0	0	1	1	-2	1	4	4	4
χ_{167}	0	0	0	0	0	0	0	-1	-1	2	-1	-4	-4	-4
χ_{168}	0	0	0	0	0	0	0	-1	-1	2	-1	2	2	2
χ_{169}	0	0	0	0	0	0	0	1	1	-2	1	-2	-2	-2
χ_{170}	0	0	0	0	0	0	0	2	2	-4	2	2	2	2
χ_{171}	0	0	0	0	0	0	0	-2	-2	4	-2	-2	-2	-2
χ_{172}	2	2	-4	-1	2	-1	0	-1	-1	2	-1	2	2	2
χ_{173}	-2	-2	4	1	-2	1	0	1	1	-2	1	-2	-2	-2
χ_{174}	2	-4	2	-1	-1	2	0	-3	-3	0	3	0	0	0
χ_{175}	-2	4	-2	1	1	-2	0	3	3	0	-3	0	0	0
χ_{176}	-4	2	2	2	-1	-1	0	3	3	0	-3	0	0	0
χ_{177}	4	-2	-2	-2	1	1	0	-3	-3	0	3	0	0	0
χ_{178}	0	0	0	0	0	0	0	-2	-2	-2	4	-2	-2	-2
χ_{179}	0	0	0	0	0	0	0	4	4	-2	-2	-2	-2	-2
χ_{180}	0	0	0	0	0	0	0	-4	-4	2	2	2	2	2

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

		18F						20B	24A	26A		28A		30A	26A
	18AI	18AJ	18AK	18AL	18AM	18AN	18AO	20B	24E	26A	26B	28A	28B	30H	36G
χ_{121}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{122}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{123}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{124}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{125}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{126}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{127}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{128}	0	1	-2	1	1	1	-2	0	0	0	0	0	0	0	0
χ_{129}	0	-1	2	-1	-1	-1	2	0	0	0	0	0	0	0	0
χ_{130}	0	1	1	-2	1	-2	1	0	0	0	0	0	0	0	0
χ_{131}	0	-1	-1	2	-1	2	-1	0	0	0	0	0	0	0	0
χ_{132}	0	-2	1	1	-2	1	1	0	0	0	0	0	0	0	0
χ_{133}	0	2	-1	-1	2	-1	-1	0	0	0	0	0	0	0	0
χ_{134}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{135}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{136}	0	-1	2	-1	-1	-1	2	0	0	0	0	0	0	0	0
χ_{137}	0	1	-2	1	1	1	-2	0	0	0	0	0	0	0	0
χ_{138}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{139}	0	1	-2	1	1	1	-2	0	0	0	0	0	0	0	0
χ_{140}	0	-1	2	-1	-1	-1	2	0	0	0	0	0	0	0	0
χ_{141}	0	1	1	-2	1	-2	1	0	0	0	0	0	0	0	0
χ_{142}	0	-1	-1	2	-1	2	-1	0	0	0	0	0	0	0	0
χ_{143}	0	2	-1	-1	2	-1	-1	0	0	0	0	0	0	0	0
χ_{144}	0	-2	1	1	-2	1	1	0	0	0	0	0	0	0	0
χ_{145}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{146}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{147}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{148}	0	-1	-1	2	-1	2	-1	0	0	0	0	0	0	0	0
χ_{149}	0	1	1	-2	1	-2	1	0	0	0	0	0	0	0	0
χ_{150}	0	-2	1	1	-2	1	1	0	0	0	0	0	0	0	0
χ_{151}	0	2	-1	-1	2	-1	-1	0	0	0	0	0	0	0	0
χ_{152}	-1	-2	-2	4	1	-2	1	0	0	0	0	0	0	0	0
χ_{153}	1	2	2	-4	-1	2	-1	0	0	0	0	0	0	0	0
χ_{154}	0	-2	4	-2	1	1	-2	0	0	0	0	0	0	0	0
χ_{155}	0	4	-2	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{156}	0	-4	2	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{157}	0	2	-4	2	-1	-1	2	0	0	0	0	0	0	0	0
χ_{158}	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{159}	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{160}	1	4	-2	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{161}	-1	-4	2	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{162}	1	-2	4	-2	1	1	-2	0	0	0	0	0	0	0	0
χ_{163}	-1	2	-4	2	-1	-1	2	0	0	0	0	0	0	0	0
χ_{164}	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{165}	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{166}	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{167}	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{168}	-1	2	2	-4	-1	2	-1	0	0	0	0	0	0	0	0
χ_{169}	1	-2	-2	4	1	-2	1	0	0	0	0	0	0	0	0
χ_{170}	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{171}	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{172}	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{173}	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{174}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{175}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{176}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{177}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{178}	1	-4	2	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{179}	1	2	-4	2	-1	-1	2	0	0	0	0	0	0	0	0
χ_{180}	-1	-2	4	-2	1	1	-2	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	1A				2A		2B				2C			
	1A	3A	3B	3C	2A	6A	2B	6B	6C	6D	2C	6E	6F	6G
χ_{181}	29120	1040	-40	-1120	0	0	0	0	0	0	-64	32	8	-16
χ_{182}	32760	1170	-45	-1260	0	0	-240	-24	30	3	-24	12	3	-6
χ_{183}	32760	1170	-45	-1260	0	0	-240	-24	30	3	-24	12	3	-6
χ_{184}	32760	1170	-45	-1260	0	0	-240	-24	30	3	-24	12	3	-6
χ_{185}	32760	1170	-45	-1260	0	0	-240	-24	30	3	-24	12	3	-6
χ_{186}	43680	1560	-60	-1680	0	0	320	32	-40	-4	-32	16	4	-8
χ_{187}	43680	1560	-60	-1680	0	0	320	32	-40	-4	-32	16	4	-8
χ_{188}	46592	1664	-64	-1792	0	0	0	0	0	0	0	0	0	0
χ_{189}	46592	1664	-64	-1792	0	0	0	0	0	0	0	0	0	0
χ_{190}	52416	1872	-72	-2016	0	0	960	96	-120	-12	0	0	0	0
χ_{191}	52416	1872	-72	-2016	0	0	960	96	-120	-12	0	0	0	0
χ_{192}	58240	2080	-80	-2240	0	0	640	64	-80	-8	0	0	0	0
χ_{193}	58240	2080	-80	-2240	0	0	640	64	-80	-8	0	0	0	0
χ_{194}	58968	2106	-81	-2268	0	0	-240	-24	30	3	72	-36	-9	18
χ_{195}	58968	2106	-81	-2268	0	0	-240	-24	30	3	72	-36	-9	18
χ_{196}	65520	2340	-90	-2520	0	0	480	48	-60	-6	16	-8	-2	4
χ_{197}	65520	2340	-90	-2520	0	0	480	48	-60	-6	16	-8	-2	4
χ_{198}	65520	2340	-90	-2520	0	0	480	48	-60	-6	16	-8	-2	4
χ_{199}	65520	2340	-90	-2520	0	0	480	48	-60	-6	16	-8	-2	4
χ_{200}	65520	2340	-90	-2520	0	0	480	48	-60	-6	16	-8	-2	4
χ_{201}	65520	2340	-90	-2520	0	0	480	48	-60	-6	16	-8	-2	4
χ_{202}	116480	4160	-160	-4480	0	0	1280	128	-160	-16	0	0	0	0
χ_{203}	131040	4680	-180	-5040	0	0	960	96	-120	-12	32	-16	-4	8
χ_{204}	131040	4680	-180	-5040	0	0	960	96	-120	-12	32	-16	-4	8
χ_{205}	131040	4680	-180	-5040	0	0	960	96	-120	-12	32	-16	-4	8
χ_{206}	174720	6240	-240	-6720	0	0	-640	-64	80	8	0	0	0	0
χ_{207}	174720	6240	-240	-6720	0	0	-640	-64	80	8	0	0	0	0
χ_{208}	232960	8320	-320	-8960	0	0	0	0	0	0	0	0	0	0
χ_{209}	232960	8320	-320	-8960	0	0	0	0	0	0	0	0	0	0
χ_{210}	232960	8320	-320	-8960	0	0	0	0	0	0	0	0	0	0
χ_{211}	232960	8320	-320	-8960	0	0	0	0	0	0	0	0	0	0
χ_{212}	262080	9360	-360	-10080	0	0	960	96	-120	-12	0	0	0	0
χ_{213}	262080	9360	-360	-10080	0	0	960	96	-120	-12	0	0	0	0
χ_{214}	262080	9360	-360	-10080	0	0	960	96	-120	-12	0	0	0	0
χ_{215}	262080	9360	-360	-10080	0	0	960	96	-120	-12	0	0	0	0
χ_{216}	262080	9360	-360	-10080	0	0	0	0	0	0	-64	32	8	-16
χ_{217}	262080	9360	-360	-10080	0	0	0	0	0	0	-64	32	8	-16
χ_{218}	262080	9360	-360	-10080	0	0	0	0	0	0	-64	32	8	-16
χ_{219}	262080	9360	-360	-10080	0	0	0	0	0	0	-64	32	8	-16
χ_{220}	262080	9360	-360	-10080	0	0	0	0	0	0	-64	32	8	-16
χ_{221}	262080	9360	-360	-10080	0	0	0	0	0	0	-64	32	8	-16
χ_{222}	349440	12480	-480	-13440	0	0	1280	128	-160	-16	0	0	0	0
χ_{223}	349440	12480	-480	-13440	0	0	1280	128	-160	-16	0	0	0	0
χ_{224}	349440	12480	-480	-13440	0	0	-1280	-128	160	16	0	0	0	0
χ_{225}	349440	12480	-480	-13440	0	0	-1280	-128	160	16	0	0	0	0
χ_{226}	393120	14040	-540	-15120	0	0	-960	-96	120	12	96	-48	-12	24
χ_{227}	393120	14040	-540	-15120	0	0	-960	-96	120	12	96	-48	-12	24
χ_{228}	393120	14040	-540	-15120	0	0	-960	-96	120	12	96	-48	-12	24
χ_{229}	465920	16640	-640	-17920	0	0	0	0	0	0	0	0	0	0
χ_{230}	465920	16640	-640	-17920	0	0	0	0	0	0	0	0	0	0
χ_{231}	471744	16848	-648	-18144	0	0	960	96	-120	-12	0	0	0	0
χ_{232}	471744	16848	-648	-18144	0	0	960	96	-120	-12	0	0	0	0
χ_{233}	524160	18720	-720	-20160	0	0	-1920	-192	240	24	0	0	0	0
χ_{234}	524160	18720	-720	-20160	0	0	-1920	-192	240	24	0	0	0	0
χ_{235}	524160	18720	-720	-20160	0	0	0	0	0	0	-128	64	16	-32

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	3A						3B				3C				
	$3D$	$3E$	$3F$	$3G$	$3H$	$3I$	$3J$	$3K$	$3L$	$9A$	$3M$	$3N$	$9B$	$3O$	$3P$
χ_{181}	176	284	-40	392	14	662	140	32	86	-40	176	95	-40	68	68
χ_{182}	684	441	-45	198	684	-45	90	90	90	-45	90	90	-45	90	90
χ_{183}	684	441	-45	198	684	-45	90	90	90	-45	90	90	-45	90	90
χ_{184}	-288	198	-45	684	441	441	90	90	90	-45	90	90	-45	90	90
χ_{185}	-288	198	-45	684	441	441	90	90	90	-45	90	90	-45	90	90
χ_{186}	264	426	-60	588	750	264	210	48	129	-60	-168	75	-60	156	156
χ_{187}	264	426	-60	588	750	264	210	48	129	-60	-168	75	-60	156	156
χ_{188}	800	584	-64	368	152	800	8	224	116	-64	-64	98	-64	152	152
χ_{189}	800	584	-64	368	152	800	8	224	116	-64	-64	98	-64	152	152
χ_{190}	-72	-72	9	-72	-72	-72	-342	306	-18	-9	576	90	0	-72	-72
χ_{191}	-72	-72	9	-72	-72	-72	-342	306	-18	-9	576	90	0	-72	-72
χ_{192}	-296	-80	1	136	352	-296	-80	28	-26	10	1360	226	-8	-152	-152
χ_{193}	-296	-80	1	136	352	-296	-80	28	-26	10	1360	226	-8	-152	-152
χ_{194}	648	648	-81	648	648	648	162	162	162	-81	162	162	-81	162	162
χ_{195}	648	648	-81	648	648	648	162	162	162	-81	162	162	-81	162	162
χ_{196}	-576	-90	-9	396	882	-576	-360	288	-36	0	558	72	9	-90	-90
χ_{197}	-576	-90	-9	396	882	-576	-360	288	-36	0	558	72	9	-90	-90
χ_{198}	1368	396	-9	-576	-90	-90	180	-144	18	0	558	72	9	-90	-90
χ_{199}	-576	-90	-9	396	-576	882	180	-144	18	0	558	72	9	-90	-90
χ_{200}	1368	396	-9	-576	-90	-90	180	-144	18	0	558	72	9	-90	-90
χ_{201}	-576	-90	-9	396	-576	882	180	-144	18	0	558	72	9	-90	-90
χ_{202}	-592	-160	2	272	704	-592	-160	56	-52	20	-736	-88	-16	128	128
χ_{203}	792	306	-18	-180	-666	792	-720	576	-72	0	-612	-126	18	36	36
χ_{204}	792	306	-18	-180	792	-666	360	-288	36	0	-612	-126	18	36	36
χ_{205}	-1152	-180	-18	792	306	306	360	-288	36	0	-612	-126	18	36	36
χ_{206}	-888	-240	3	408	1056	-888	-240	84	-78	30	624	138	-24	-24	-24
χ_{207}	-888	-240	3	408	1056	-888	-240	84	-78	30	624	138	-24	-24	-24
χ_{208}	-1184	-320	4	544	-536	760	40	-176	-68	40	1408	274	-32	-104	-104
χ_{209}	1408	328	4	-752	112	-536	40	-176	-68	40	1408	274	-32	-104	-104
χ_{210}	1408	328	4	-752	112	-536	40	-176	-68	40	1408	274	-32	-104	-104
χ_{211}	-1184	-320	4	544	-536	760	40	-176	-68	40	1408	274	-32	-104	-104
χ_{212}	-360	-360	45	-360	-360	-360	450	-198	126	-45	1152	180	0	-144	-144
χ_{213}	-360	-360	45	-360	-360	-360	450	-198	126	-45	1152	180	0	-144	-144
χ_{214}	-360	-360	45	-360	-360	-360	-630	666	18	-45	-576	-90	0	72	72
χ_{215}	-360	-360	45	-360	-360	-360	-630	666	18	-45	-576	-90	0	72	72
χ_{216}	1584	612	-36	-360	-1332	1584	-360	288	-36	0	504	18	36	-144	-144
χ_{217}	1584	612	-36	-360	-1332	1584	-360	288	-36	0	504	18	36	-144	-144
χ_{218}	-2304	-360	-36	1584	612	612	180	-144	18	0	504	18	36	-144	-144
χ_{219}	1584	612	-36	-360	1584	-1332	180	-144	18	0	504	18	36	-144	-144
χ_{220}	-2304	-360	-36	1584	612	612	180	-144	18	0	504	18	36	-144	-144
χ_{221}	1584	612	-36	-360	1584	-1332	180	-144	18	0	504	18	36	-144	-144
χ_{222}	816	168	6	-480	-1128	816	-300	24	-138	60	96	96	-48	96	96
χ_{223}	816	168	6	-480	-1128	816	-300	24	-138	60	96	96	-48	96	96
χ_{224}	816	168	6	-480	-1128	816	-300	24	-138	60	96	96	-48	96	96
χ_{225}	816	168	6	-480	-1128	816	-300	24	-138	60	96	96	-48	96	96
χ_{226}	-1512	-54	-54	1404	2862	-1512	0	0	0	0	-108	-108	54	-108	-108
χ_{227}	4320	1404	-54	-1512	-54	-54	0	0	0	0	-108	-108	54	-108	-108
χ_{228}	-1512	-54	-54	1404	-1512	2862	0	0	0	0	-108	-108	54	-108	-108
χ_{229}	2816	656	8	-1504	224	-1072	80	-352	-136	80	-640	8	-64	224	224
χ_{230}	-2368	-640	8	1088	-1072	1520	80	-352	-136	80	-640	8	-64	224	224
χ_{231}	-648	-648	81	-648	-648	-648	162	162	162	-81	0	0	0	0	0
χ_{232}	-648	-648	81	-648	-648	-648	162	162	162	-81	0	0	0	0	0
χ_{233}	-720	-720	90	-720	-720	-720	-180	468	144	-90	576	90	0	-72	-72
χ_{234}	-720	-720	90	-720	-720	-720	-180	468	144	-90	576	90	0	-72	-72
χ_{235}	-720	252	-72	1224	2196	-720	-720	576	-72	0	-720	-234	72	-72	-72

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$3D$				$3E$			$3F$							$4A$	
	$9C$	$9D$	$9E$	$3Q$	$3R$	$9F$	$9G$	$9H$	$9I$	$9J$	$9K$	$3S$	$9L$	$9M$	$4A$	$12A$
χ_{181}	14	-13	14	-4	-4	-4	5	-4	5	-13	5	32	-22	-4	0	0
χ_{182}	9	9	-18	9	0	0	0	18	-9	18	-9	-36	18	18	0	0
χ_{183}	9	9	-18	9	0	0	0	18	-9	18	-9	-36	18	18	0	0
χ_{184}	9	9	9	-18	0	0	0	-36	-9	-9	18	18	18	-36	0	0
χ_{185}	9	9	9	-18	0	0	0	-36	-9	-9	18	18	18	-36	0	0
χ_{186}	-60	21	-6	-6	-24	3	3	-15	-15	12	12	-15	12	-15	0	0
χ_{187}	-60	21	-6	-6	-24	3	3	-15	-15	12	12	-15	12	-15	0	0
χ_{188}	-64	-10	8	8	8	8	-10	8	26	-10	-10	8	-28	8	0	0
χ_{189}	-64	-10	8	8	8	8	-10	8	26	-10	-10	8	-28	8	0	0
χ_{190}	-72	9	0	0	36	-9	0	0	-9	9	9	0	-18	0	0	0
χ_{191}	-72	9	0	0	36	-9	0	0	-9	9	9	0	-18	0	0	0
χ_{192}	136	1	-8	-8	-8	10	-8	-8	10	1	1	-8	-8	-8	0	0
χ_{193}	136	1	-8	-8	-8	10	-8	-8	10	1	1	-8	-8	-8	0	0
χ_{194}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{195}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{196}	-90	-9	9	9	-36	0	9	9	0	-9	-9	9	18	9	0	0
χ_{197}	-90	-9	9	9	-36	0	9	9	0	-9	-9	9	18	9	0	0
χ_{198}	-63	18	9	-18	0	9	-9	27	-9	-18	9	0	9	27	0	0
χ_{199}	-63	18	-18	9	0	9	-9	0	-9	9	-18	27	9	0	0	0
χ_{200}	-63	18	9	-18	0	9	-9	27	-9	-18	9	0	9	27	0	0
χ_{201}	-63	18	-18	9	0	9	-9	0	-9	9	-18	27	9	0	0	0
χ_{202}	56	29	-16	-16	56	-16	2	20	2	-16	-16	20	20	20	0	0
χ_{203}	90	9	-9	-9	-36	-18	27	-18	18	0	0	-18	0	-18	0	0
χ_{204}	63	-18	18	-9	36	0	-9	-36	0	36	-18	18	-18	-36	0	0
χ_{205}	63	-18	-9	18	36	0	-9	18	0	-18	36	-36	-18	18	0	0
χ_{206}	192	30	-24	-24	48	-6	-6	12	12	-15	-15	12	12	12	0	0
χ_{207}	192	30	-24	-24	48	-6	-6	12	12	-15	-15	12	12	12	0	0
χ_{208}	112	-23	40	-32	-32	4	4	4	-5	13	4	-14	-14	4	0	0
χ_{209}	112	-23	-32	40	-32	4	4	-14	-5	4	13	4	-14	-14	0	0
χ_{210}	112	-23	-32	40	-32	4	4	-14	-5	4	13	4	-14	-14	0	0
χ_{211}	112	-23	40	-32	-32	4	4	4	-5	13	4	-14	-14	4	0	0
χ_{212}	-144	18	0	0	36	-27	18	-18	18	0	0	-18	0	-18	0	0
χ_{213}	-144	18	0	0	36	-27	18	-18	18	0	0	-18	0	-18	0	0
χ_{214}	72	-9	0	0	0	18	-18	18	-27	9	9	18	-18	18	0	0
χ_{215}	72	-9	0	0	0	18	-18	18	-27	9	9	18	-18	18	0	0
χ_{216}	-36	45	-18	-18	-36	0	9	9	0	-9	-9	9	18	9	0	0
χ_{217}	-36	45	-18	-18	-36	0	9	9	0	-9	-9	9	18	9	0	0
χ_{218}	-90	-9	-18	36	0	9	-9	27	-9	-18	9	0	9	27	0	0
χ_{219}	-90	-9	36	-18	0	9	-9	0	-9	9	-18	27	9	0	0	0
χ_{220}	-90	-9	-18	36	0	9	-9	27	-9	-18	9	0	9	27	0	0
χ_{221}	-90	-9	36	-18	0	9	-9	0	-9	9	-18	27	9	0	0	0
χ_{222}	-48	-48	24	24	24	6	-12	-12	6	-3	-3	-12	24	-12	0	0
χ_{223}	-48	-48	24	24	24	6	-12	-12	6	-3	-3	-12	24	-12	0	0
χ_{224}	-48	-48	24	24	24	6	-12	-12	6	-3	-3	-12	24	-12	0	0
χ_{225}	-48	-48	24	24	24	6	-12	-12	6	-3	-3	-12	24	-12	0	0
χ_{226}	-54	-54	27	27	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	27	27	27	-54	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	27	27	-54	27	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	8	-19	-64	80	8	-28	26	8	-28	-10	8	44	8	8	0	0
χ_{230}	8	-19	80	-64	8	-28	26	44	-28	8	-10	8	8	44	0	0
χ_{231}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{232}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{233}	-72	9	0	0	36	-9	0	0	-9	9	9	0	-18	0	0	0
χ_{234}	-72	9	0	0	36	-9	0	0	-9	9	9	0	-18	0	0	0
χ_{235}	36	-45	18	18	-36	-18	27	-18	18	0	0	-18	0	-18	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$4B$				$4C$		$4D$				$5A$				$6A$		$6B$
	$4B$	$12B$	$12C$	$12D$	$4C$	$12E$	$4D$	$12F$	$12G$	$12H$	$5A$	$15A$	$15B$	$15C$	$6H$	$6I$	$6J$
χ_{181}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{182}	8	-4	-1	2	0	0	8	-4	-1	2	0	0	0	0	0	0	0
χ_{183}	8	-4	-1	2	0	0	8	-4	-1	2	0	0	0	0	0	0	0
χ_{184}	8	-4	-1	2	0	0	8	-4	-1	2	0	0	0	0	0	0	0
χ_{185}	8	-4	-1	2	0	0	8	-4	-1	2	0	0	0	0	0	0	0
χ_{186}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{187}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{188}	0	0	0	0	0	0	0	0	0	0	-8	4	1	-2	0	0	0
χ_{189}	0	0	0	0	0	0	0	0	0	0	-8	4	1	-2	0	0	0
χ_{190}	0	0	0	0	0	0	16	-8	-2	4	16	-8	-2	4	0	0	0
χ_{191}	0	0	0	0	0	0	16	-8	-2	4	16	-8	-2	4	0	0	0
χ_{192}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{193}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{194}	-24	12	3	-6	0	0	-8	4	1	-2	8	-4	-1	2	0	0	0
χ_{195}	-24	12	3	-6	0	0	-8	4	1	-2	8	-4	-1	2	0	0	0
χ_{196}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{197}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{198}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{199}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{200}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{201}	16	-8	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{203}	32	-16	-4	8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{204}	32	-16	-4	8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{205}	32	-16	-4	8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{206}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{207}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{208}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{209}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{210}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{211}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{212}	0	0	0	0	0	0	-16	8	2	-4	0	0	0	0	0	0	0
χ_{213}	0	0	0	0	0	0	-16	8	2	-4	0	0	0	0	0	0	0
χ_{214}	0	0	0	0	0	0	-16	8	2	-4	0	0	0	0	0	0	0
χ_{215}	0	0	0	0	0	0	-16	8	2	-4	0	0	0	0	0	0	0
χ_{216}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{217}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{218}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{219}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{220}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{221}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{222}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{223}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{226}	32	-16	-4	8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	32	-16	-4	8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	32	-16	-4	8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	0	0	0	0	0	0	16	-8	-2	4	-16	8	2	-4	0	0	0
χ_{232}	0	0	0	0	0	0	16	-8	-2	4	-16	8	2	-4	0	0	0
χ_{233}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{234}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6C$		$6D$			$6E$		$6F$				$6G$				
	$6K$	$6L$	$6M$	$6N$	$6O$	$6P$	$18A$	$6Q$	$6R$	$6S$	$18B$	$6T$	$6U$	$6V$	$6W$	$6X$
χ_{181}	0	0	0	0	0	-16	8	0	0	0	0	-16	2	2	8	-4
χ_{182}	0	0	-24	-24	3	-6	3	-6	-6	-6	3	-12	-12	15	6	-3
χ_{183}	0	0	-24	-24	3	-6	3	-6	-6	-6	3	-12	-12	15	6	-3
χ_{184}	0	0	-24	-24	3	-6	3	-6	-6	-6	3	24	-3	-3	-12	6
χ_{185}	0	0	-24	-24	3	-6	3	-6	-6	-6	3	24	-3	-3	-12	6
χ_{186}	0	0	32	32	-4	-8	4	8	8	8	-4	-8	10	-8	4	-2
χ_{187}	0	0	32	32	-4	-8	4	8	8	8	-4	-8	10	-8	4	-2
χ_{188}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{189}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{190}	0	0	24	24	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{191}	0	0	24	24	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{192}	0	0	-8	-8	1	0	0	-8	-8	-8	4	0	0	0	0	0
χ_{193}	0	0	-8	-8	1	0	0	-8	-8	-8	4	0	0	0	0	0
χ_{194}	0	0	-24	-24	3	18	-9	-6	-6	-6	3	0	0	0	0	0
χ_{195}	0	0	-24	-24	3	18	-9	-6	-6	-6	3	0	0	0	0	0
χ_{196}	0	0	-24	-24	3	-2	1	6	6	6	-3	-8	10	-8	4	-2
χ_{197}	0	0	-24	-24	3	-2	1	6	6	6	-3	-8	10	-8	4	-2
χ_{198}	0	0	-24	-24	3	-2	1	6	6	6	-3	16	-2	-2	-8	4
χ_{199}	0	0	-24	-24	3	-2	1	6	6	6	-3	-8	-8	10	4	-2
χ_{200}	0	0	-24	-24	3	-2	1	6	6	6	-3	16	-2	-2	-8	4
χ_{201}	0	0	-24	-24	3	-2	1	6	6	6	-3	-8	-8	10	4	-2
χ_{202}	0	0	-16	-16	2	0	0	-16	-16	-16	8	0	0	0	0	0
χ_{203}	0	0	-48	-48	6	-4	2	12	12	12	-6	8	-10	8	-4	2
χ_{204}	0	0	-48	-48	6	-4	2	12	12	12	-6	8	8	-10	-4	2
χ_{205}	0	0	-48	-48	6	-4	2	12	12	12	-6	-16	2	2	8	-4
χ_{206}	0	0	8	8	-1	0	0	8	8	8	-4	0	0	0	0	0
χ_{207}	0	0	8	8	-1	0	0	8	8	8	-4	0	0	0	0	0
χ_{208}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{209}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{210}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{211}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{212}	0	0	24	24	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{213}	0	0	24	24	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{214}	0	0	24	24	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{215}	0	0	24	24	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{216}	0	0	0	0	0	8	-4	0	0	0	0	-16	20	-16	8	-4
χ_{217}	0	0	0	0	0	8	-4	0	0	0	0	-16	20	-16	8	-4
χ_{218}	0	0	0	0	0	8	-4	0	0	0	0	32	-4	-4	-16	8
χ_{219}	0	0	0	0	0	8	-4	0	0	0	0	-16	-16	20	8	-4
χ_{220}	0	0	0	0	0	8	-4	0	0	0	0	32	-4	-4	-16	8
χ_{221}	0	0	0	0	0	8	-4	0	0	0	0	-16	-16	20	8	-4
χ_{222}	0	0	-16	-16	2	0	0	-16	-16	-16	8	0	0	0	0	0
χ_{223}	0	0	-16	-16	2	0	0	-16	-16	-16	8	0	0	0	0	0
χ_{224}	0	0	16	16	-2	0	0	16	16	16	-8	0	0	0	0	0
χ_{225}	0	0	16	16	-2	0	0	16	16	16	-8	0	0	0	0	0
χ_{226}	0	0	48	48	-6	-12	6	-12	-12	-12	6	-24	30	-24	12	-6
χ_{227}	0	0	48	48	-6	-12	6	-12	-12	-12	6	48	-6	-6	-24	12
χ_{228}	0	0	48	48	-6	-12	6	-12	-12	-12	6	-24	-24	30	12	-6
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	0	0	24	24	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{232}	0	0	24	24	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{233}	0	0	-48	-48	6	0	0	0	0	0	0	0	0	0	0	0
χ_{234}	0	0	-48	-48	6	0	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	16	-8	0	0	0	0	16	-20	16	-8	4

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6H$					$6I$					$6J$				$6K$
	$6Y$	$6Z$	$6AA$	$6AB$	$18C$	$6AC$	$6AD$	$6AE$	$6AF$	$6AG$	$6AH$	$6AI$	$6AJ$	$6AK$	$6AL$
χ_{181}	0	0	0	0	0	-16	2	2	8	-4	8	-4	-1	2	0
χ_{182}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{183}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{184}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{185}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{186}	20	2	2	11	-4	4	-5	4	-2	1	-8	4	1	-2	0
χ_{187}	20	2	2	11	-4	4	-5	4	-2	1	-8	4	1	-2	0
χ_{188}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{189}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{190}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{191}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{192}	28	-8	-8	10	-2	0	0	0	0	0	0	0	0	0	0
χ_{193}	28	-8	-8	10	-2	0	0	0	0	0	0	0	0	0	0
χ_{194}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{195}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{196}	0	0	0	0	0	-8	10	-8	4	-2	16	-8	-2	4	0
χ_{197}	0	0	0	0	0	-8	10	-8	4	-2	16	-8	-2	4	0
χ_{198}	0	0	0	0	0	16	-2	-2	-8	4	16	-8	-2	4	0
χ_{199}	0	0	0	0	0	-8	-8	10	4	-2	16	-8	-2	4	0
χ_{200}	0	0	0	0	0	16	-2	-2	-8	4	16	-8	-2	4	0
χ_{201}	0	0	0	0	0	-8	-8	10	4	-2	16	-8	-2	4	0
χ_{202}	56	-16	-16	20	-4	0	0	0	0	0	0	0	0	0	0
χ_{203}	0	0	0	0	0	-16	20	-16	8	-4	-16	8	2	-4	0
χ_{204}	0	0	0	0	0	-16	-16	20	8	-4	-16	8	2	-4	0
χ_{205}	0	0	0	0	0	32	-4	-4	-16	8	-16	8	2	-4	0
χ_{206}	-28	8	8	-10	2	0	0	0	0	0	0	0	0	0	0
χ_{207}	-28	8	8	-10	2	0	0	0	0	0	0	0	0	0	0
χ_{208}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{209}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{210}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{211}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{212}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{213}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{214}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{215}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{216}	0	0	0	0	0	8	-10	8	-4	2	-16	8	2	-4	0
χ_{217}	0	0	0	0	0	8	-10	8	-4	2	-16	8	2	-4	0
χ_{218}	0	0	0	0	0	-16	2	2	8	-4	-16	8	2	-4	0
χ_{219}	0	0	0	0	0	8	8	-10	-4	2	-16	8	2	-4	0
χ_{220}	0	0	0	0	0	-16	2	2	8	-4	-16	8	2	-4	0
χ_{221}	0	0	0	0	0	8	8	-10	-4	2	-16	8	2	-4	0
χ_{222}	-16	20	20	2	-4	0	0	0	0	0	0	0	0	0	0
χ_{223}	-16	20	20	2	-4	0	0	0	0	0	0	0	0	0	0
χ_{224}	16	-20	-20	-2	4	0	0	0	0	0	0	0	0	0	0
χ_{225}	16	-20	-20	-2	4	0	0	0	0	0	0	0	0	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{232}	-6	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0
χ_{233}	12	12	12	12	-6	0	0	0	0	0	0	0	0	0	0
χ_{234}	12	12	12	12	-6	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	16	-20	16	-8	4	16	-8	-2	4	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	6L			6M		6N			7A		8A		8B		9A		
	18D	6AM	18E	6AN	18F	18G	6AO	18H	7A	21A	8A	24A	8B	24B	9N	9O	9P
χ_{181}	2	-4	2	2	-1	2	-4	2	0	0	0	0	0	0	2	2	-4
χ_{182}	-3	-3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{183}	-3	-3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{184}	-3	6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{185}	-3	6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{186}	4	-2	-2	-2	1	-2	1	1	0	0	0	0	0	0	3	3	-6
χ_{187}	4	-2	-2	-2	1	-2	1	1	0	0	0	0	0	0	3	3	-6
χ_{188}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	-4	8
χ_{189}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	-4	8
χ_{190}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{191}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{192}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	-2
χ_{193}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	-2
χ_{194}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{195}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{196}	-2	1	1	-2	1	-2	1	1	0	0	0	0	0	0	0	0	0
χ_{197}	-2	1	1	-2	1	-2	1	1	0	0	0	0	0	0	0	0	0
χ_{198}	1	-2	1	-2	1	1	-2	1	0	0	0	0	0	0	0	0	0
χ_{199}	1	1	-2	-2	1	1	1	-2	0	0	0	0	0	0	0	0	0
χ_{200}	1	-2	1	-2	1	1	-2	1	0	0	0	0	0	0	0	0	0
χ_{201}	1	1	-2	-2	1	1	1	-2	0	0	0	0	0	0	0	0	0
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	-4
χ_{203}	2	-1	-1	2	-1	-4	2	2	0	0	0	0	0	0	0	0	0
χ_{204}	-1	-1	2	2	-1	2	2	-4	0	0	0	0	0	0	0	0	0
χ_{205}	-1	2	-1	2	-1	2	-4	2	0	0	0	0	0	0	0	0	0
χ_{206}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	-6
χ_{207}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	-6
χ_{208}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	-2	4
χ_{209}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	-2	4
χ_{210}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	-2	4
χ_{211}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	-2	4
χ_{212}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{213}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{214}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{215}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{216}	-4	2	2	2	-1	2	-1	-1	0	0	0	0	0	0	0	0	0
χ_{217}	-4	2	2	2	-1	2	-1	-1	0	0	0	0	0	0	0	0	0
χ_{218}	2	-4	2	2	-1	-1	2	-1	0	0	0	0	0	0	0	0	0
χ_{219}	2	2	-4	2	-1	-1	-1	2	0	0	0	0	0	0	0	0	0
χ_{220}	2	-4	2	2	-1	-1	2	-1	0	0	0	0	0	0	0	0	0
χ_{221}	2	2	-4	2	-1	-1	-1	2	0	0	0	0	0	0	0	0	0
χ_{222}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	-6
χ_{223}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	-6
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	-6
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	-6
χ_{226}	-6	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	3	-6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	3	3	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	-4	8
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	-4	8
χ_{231}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{232}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{233}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{234}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{235}	4	-2	-2	-2	1	4	-2	-2	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	9B							9C			10A		10B		12A	
	9Q	9R	9S	9T	9U	9V	9W	27A	27B	27C	10A	30A	10B	30B	12I	36A
χ_{181}	14	5	5	-1	-4	-4	-4	-1	2	-1	0	0	0	0	0	0
χ_{182}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{183}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{184}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{185}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{186}	-6	-6	-6	3	-6	-6	-6	0	0	0	0	0	0	0	0	0
χ_{187}	-6	-6	-6	3	-6	-6	-6	0	0	0	0	0	0	0	0	0
χ_{188}	-10	-10	-1	2	8	-10	-1	2	-1	-1	0	0	0	0	0	0
χ_{189}	-10	-10	-1	2	8	-10	-1	2	-1	-1	0	0	0	0	0	0
χ_{190}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{191}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{192}	-14	-14	4	1	22	-14	4	-2	1	1	0	0	0	0	0	0
χ_{193}	-14	-14	4	1	22	-14	4	-2	1	1	0	0	0	0	0	0
χ_{194}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3
χ_{195}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3
χ_{196}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{197}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{198}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{199}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{200}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{201}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{202}	8	8	-10	2	-28	8	-10	2	-1	-1	0	0	0	0	0	0
χ_{203}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	2
χ_{204}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	2
χ_{205}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	2
χ_{206}	-6	-6	-6	3	-6	-6	-6	0	0	0	0	0	0	0	0	0
χ_{207}	-6	-6	-6	3	-6	-6	-6	0	0	0	0	0	0	0	0	0
χ_{208}	-14	4	-14	1	-14	22	4	1	1	-2	0	0	0	0	0	0
χ_{209}	22	4	4	1	-14	-14	-14	1	-2	1	0	0	0	0	0	0
χ_{210}	22	4	4	1	-14	-14	-14	1	-2	1	0	0	0	0	0	0
χ_{211}	-14	4	-14	1	-14	22	4	1	1	-2	0	0	0	0	0	0
χ_{212}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{213}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{214}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{215}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{216}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{217}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{218}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{219}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{220}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{221}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{222}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{223}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	2
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	2
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	2
χ_{229}	-28	-10	-10	2	8	8	8	-1	2	-1	0	0	0	0	0	0
χ_{230}	8	-10	8	2	8	-28	-10	-1	-1	2	0	0	0	0	0	0
χ_{231}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{232}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{233}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{234}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$12B$					$12C$		$12D$		$12E$		$12F$			$12G$	
	$12J$	$12K$	$12L$	$12M$	$12N$	$12O$	$12P$	$12Q$	$12R$	$12S$	$12T$	$36B$	$12U$	$36C$	$12V$	$36D$
χ_{181}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{182}	-4	-4	5	2	-1	0	0	0	0	0	0	-1	-1	2	2	-1
χ_{183}	-4	-4	5	2	-1	0	0	0	0	0	0	-1	-1	2	2	-1
χ_{184}	8	-1	-1	-4	2	0	0	0	0	0	0	-1	2	-1	2	-1
χ_{185}	8	-1	-1	-4	2	0	0	0	0	0	0	-1	2	-1	2	-1
χ_{186}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{187}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{188}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{189}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{190}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{191}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{192}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{193}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{194}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{195}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{196}	-8	10	-8	4	-2	0	0	0	0	0	0	-2	1	1	0	0
χ_{197}	-8	10	-8	4	-2	0	0	0	0	0	0	-2	1	1	0	0
χ_{198}	16	-2	-2	-8	4	0	0	0	0	0	0	1	-2	1	0	0
χ_{199}	-8	-8	10	4	-2	0	0	0	0	0	0	1	1	-2	0	0
χ_{200}	16	-2	-2	-8	4	0	0	0	0	0	0	1	-2	1	0	0
χ_{201}	-8	-8	10	4	-2	0	0	0	0	0	0	1	1	-2	0	0
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{203}	8	-10	8	-4	2	0	0	0	0	0	0	2	-1	-1	0	0
χ_{204}	8	8	-10	-4	2	0	0	0	0	0	0	-1	-1	2	0	0
χ_{205}	-16	2	2	8	-4	0	0	0	0	0	0	-1	2	-1	0	0
χ_{206}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{207}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{208}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{209}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{210}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{211}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{212}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{213}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{214}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{215}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{216}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{217}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{218}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{219}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{220}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{221}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{222}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{223}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{226}	8	-10	8	-4	2	0	0	0	0	0	0	2	-1	-1	0	0
χ_{227}	-16	2	2	8	-4	0	0	0	0	0	0	-1	2	-1	0	0
χ_{228}	8	8	-10	-4	2	0	0	0	0	0	0	-1	-1	2	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{232}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{233}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{234}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	13A		13B		14A		15A		18A	18B			18C		20A	
	13A	39A	13B	39B	14A	42A	15D	45A	18I	18J	18K	18L	18M	18N	20A	60A
χ_{181}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{182}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{183}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{184}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{185}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{186}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{187}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{188}	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0	0
χ_{189}	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0	0
χ_{190}	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0	0
χ_{191}	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0	0
χ_{192}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{193}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{194}	0	0	0	0	0	0	2	-1	0	0	0	0	0	0	0	0
χ_{195}	0	0	0	0	0	0	2	-1	0	0	0	0	0	0	0	0
χ_{196}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{197}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{198}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{199}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{200}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{201}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	-4	2	0	0
χ_{203}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{204}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{205}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{206}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{207}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{208}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{209}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{210}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{211}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{212}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{213}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{214}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{215}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{216}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{217}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{218}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{219}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{220}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{221}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{222}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{223}	0	0	0	0	0	0	0	0	0	0	0	0	2	-1	0	0
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	0	0	0	0	0	0	2	-1	0	0	0	0	0	0	0	0
χ_{232}	0	0	0	0	0	0	2	-1	0	0	0	0	0	0	0	0
χ_{233}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{234}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	2D				2E				2F			
	$2D$	$6AP$	$6AQ$	$6AR$	$2E$	$6AS$	$6AT$	$6AU$	$2F$	$6AV$	$6AW$	$6AX$
χ_{181}	-2080	80	80	-136	160	-80	-80	40	0	0	0	0
χ_{182}	-780	30	30	-51	180	-90	-90	45	-60	21	-6	-6
χ_{183}	780	-30	-30	51	-180	90	90	-45	60	-21	6	6
χ_{184}	-780	30	30	-51	180	-90	-90	45	-60	21	-6	-6
χ_{185}	780	-30	-30	51	-180	90	90	-45	60	-21	6	6
χ_{186}	-1040	40	40	-68	240	-120	-120	60	80	-28	8	8
χ_{187}	1040	-40	-40	68	-240	120	120	-60	-80	28	-8	-8
χ_{188}	0	0	0	0	-256	128	128	-64	0	0	0	0
χ_{189}	0	0	0	0	256	-128	-128	64	0	0	0	0
χ_{190}	-6240	240	240	-408	0	0	0	0	-80	28	-8	-8
χ_{191}	6240	-240	-240	408	0	0	0	0	80	-28	8	8
χ_{192}	8320	-320	-320	544	0	0	0	0	0	0	0	0
χ_{193}	-8320	320	320	-544	0	0	0	0	0	0	0	0
χ_{194}	-2340	90	90	-153	-324	162	162	-81	60	-21	6	6
χ_{195}	2340	-90	-90	153	324	-162	-162	81	-60	21	-6	-6
χ_{196}	6240	-240	-240	408	0	0	0	0	80	-28	8	8
χ_{197}	-6240	240	240	-408	0	0	0	0	-80	28	-8	-8
χ_{198}	6240	-240	-240	408	0	0	0	0	80	-28	8	8
χ_{199}	6240	-240	-240	408	0	0	0	0	80	-28	8	8
χ_{200}	-6240	240	240	-408	0	0	0	0	-80	28	-8	-8
χ_{201}	-6240	240	240	-408	0	0	0	0	-80	28	-8	-8
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{203}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{204}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{205}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{206}	-8320	320	320	-544	0	0	0	0	0	0	0	0
χ_{207}	8320	-320	-320	544	0	0	0	0	0	0	0	0
χ_{208}	16640	-640	-640	1088	0	0	0	0	0	0	0	0
χ_{209}	16640	-640	-640	1088	0	0	0	0	0	0	0	0
χ_{210}	-16640	640	640	-1088	0	0	0	0	0	0	0	0
χ_{211}	-16640	640	640	-1088	0	0	0	0	0	0	0	0
χ_{212}	18720	-720	-720	1224	0	0	0	0	-80	28	-8	-8
χ_{213}	-18720	720	720	-1224	0	0	0	0	80	-28	8	8
χ_{214}	6240	-240	-240	408	0	0	0	0	-240	84	-24	-24
χ_{215}	-6240	240	240	-408	0	0	0	0	240	-84	24	24
χ_{216}	12480	-480	-480	816	0	0	0	0	-160	56	-16	-16
χ_{217}	-12480	480	480	-816	0	0	0	0	160	-56	16	16
χ_{218}	12480	-480	-480	816	0	0	0	0	-160	56	-16	-16
χ_{219}	12480	-480	-480	816	0	0	0	0	-160	56	-16	-16
χ_{220}	-12480	480	480	-816	0	0	0	0	160	-56	16	16
χ_{221}	-12480	480	480	-816	0	0	0	0	160	-56	16	16
χ_{222}	16640	-640	-640	1088	0	0	0	0	0	0	0	0
χ_{223}	-16640	640	640	-1088	0	0	0	0	0	0	0	0
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	18720	-720	-720	1224	0	0	0	0	240	-84	24	24
χ_{232}	-18720	720	720	-1224	0	0	0	0	-240	84	-24	-24
χ_{233}	12480	-480	-480	816	0	0	0	0	-160	56	-16	-16
χ_{234}	-12480	480	480	-816	0	0	0	0	160	-56	16	16
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$4E$	$4F$	$4G$				$4H$			$4I$			
	$4E$	$4F$	$4G$	$12W$	$12X$	$12Y$	$4H$	$12Z$	$12AA$	$4I$	$12AB$	$12AC$	$12AD$
χ_{181}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{182}	0	0	32	-4	-4	5	0	0	0	4	-2	-2	1
χ_{183}	0	0	-32	4	4	-5	0	0	0	-4	2	2	-1
χ_{184}	0	0	32	-4	-4	5	0	0	0	4	-2	-2	1
χ_{185}	0	0	-32	4	4	-5	0	0	0	-4	2	2	-1
χ_{186}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{187}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{188}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{189}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{190}	0	0	-64	8	8	-10	0	0	0	0	0	0	0
χ_{191}	0	0	64	-8	-8	10	0	0	0	0	0	0	0
χ_{192}	0	0	128	-16	-16	20	0	0	0	0	0	0	0
χ_{193}	0	0	-128	16	16	-20	0	0	0	0	0	0	0
χ_{194}	0	0	32	-4	-4	5	0	0	0	12	-6	-6	3
χ_{195}	0	0	-32	4	4	-5	0	0	0	-12	6	6	-3
χ_{196}	0	0	64	-8	-8	10	0	0	0	0	0	0	0
χ_{197}	0	0	-64	8	8	-10	0	0	0	0	0	0	0
χ_{198}	0	0	64	-8	-8	10	0	0	0	0	0	0	0
χ_{199}	0	0	64	-8	-8	10	0	0	0	0	0	0	0
χ_{200}	0	0	-64	8	8	-10	0	0	0	0	0	0	0
χ_{201}	0	0	-64	8	8	-10	0	0	0	0	0	0	0
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{203}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{204}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{205}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{206}	0	0	128	-16	-16	20	0	0	0	0	0	0	0
χ_{207}	0	0	-128	16	16	-20	0	0	0	0	0	0	0
χ_{208}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{209}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{210}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{211}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{212}	0	0	64	-8	-8	10	0	0	0	0	0	0	0
χ_{213}	0	0	-64	8	8	-10	0	0	0	0	0	0	0
χ_{214}	0	0	-64	8	8	-10	0	0	0	0	0	0	0
χ_{215}	0	0	64	-8	-8	10	0	0	0	0	0	0	0
χ_{216}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{217}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{218}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{219}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{220}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{221}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{222}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{223}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	0	0	-64	8	8	-10	0	0	0	0	0	0	0
χ_{232}	0	0	64	-8	-8	10	0	0	0	0	0	0	0
χ_{233}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{234}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	6O							6P						6Q	
	6AY	6AZ	6BA	6BB	6BC	6BD	6BE	6BF	6BG	18O	6BH	6BI	6BJ	6BK	6BL
χ_{181}	-28	-28	-82	8	-136	-28	-82	8	-10	8	-28	8	-46	8	-28
χ_{182}	84	3	3	3	-78	-78	-78	-6	-6	3	-6	-6	-6	-6	-6
χ_{183}	-84	-3	-3	-3	78	78	78	6	6	-3	6	6	6	6	6
χ_{184}	-78	-78	3	3	84	-78	3	-6	-6	3	-6	-6	-6	-6	-6
χ_{185}	78	78	-3	-3	-84	78	-3	6	6	-3	6	6	6	6	6
χ_{186}	-68	-14	-68	4	-68	40	-14	4	-5	4	-14	-23	4	-32	4
χ_{187}	68	14	68	-4	68	-40	14	-4	5	-4	14	23	-4	32	-4
χ_{188}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{189}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{190}	24	24	24	-3	24	24	24	6	6	-3	6	6	6	-156	60
χ_{191}	-24	-24	-24	3	-24	-24	-24	-6	-6	3	-6	-6	-6	156	-60
χ_{192}	-104	112	-104	-5	-104	328	112	-32	-14	4	4	22	-32	40	-32
χ_{193}	104	-112	104	5	104	-328	-112	32	14	-4	-4	-22	32	-40	32
χ_{194}	-72	-72	-72	9	-72	-72	-72	-18	-18	9	-18	-18	-18	-18	-18
χ_{195}	72	72	72	-9	72	72	72	18	18	-9	18	18	18	18	18
χ_{196}	-24	-24	-24	3	-24	-24	-24	-60	-6	-6	48	102	-60	-6	-6
χ_{197}	24	24	24	-3	24	24	24	60	6	6	-48	-102	60	6	6
χ_{198}	-24	-24	-24	3	-24	-24	-24	156	48	-6	-60	-6	-6	-6	-6
χ_{199}	-24	-24	-24	3	-24	-24	-24	-60	-6	-6	48	-60	102	-6	-6
χ_{200}	24	24	24	-3	24	24	24	-156	-48	6	60	6	6	6	6
χ_{201}	24	24	24	-3	24	24	24	60	6	6	-48	60	-102	6	6
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{203}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{204}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{205}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{206}	104	-112	104	5	104	-328	-112	32	14	-4	-4	-22	32	-40	32
χ_{207}	-104	112	-104	-5	-104	328	112	-32	-14	4	4	22	-32	40	-32
χ_{208}	224	224	8	-10	-208	224	8	-64	-28	8	8	-64	44	-64	8
χ_{209}	-208	8	8	-10	224	224	224	80	8	8	-64	-28	-28	-64	8
χ_{210}	208	-8	-8	10	-224	-224	-224	-80	-8	-8	64	28	28	64	-8
χ_{211}	-224	-224	-8	10	208	-224	-8	64	28	-8	-8	64	-44	64	-8
χ_{212}	-72	-72	-72	9	-72	-72	-72	-18	-18	9	-18	-18	-18	36	36
χ_{213}	72	72	72	-9	72	72	72	18	18	-9	18	18	18	-36	-36
χ_{214}	-24	-24	-24	3	-24	-24	-24	-6	-6	3	-6	-6	-6	156	-60
χ_{215}	24	24	24	-3	24	24	24	6	6	-3	6	6	6	-156	60
χ_{216}	-48	-48	-48	6	-48	-48	-48	96	42	-12	-12	-66	96	-12	-12
χ_{217}	48	48	48	-6	48	48	48	-96	-42	12	12	66	-96	12	12
χ_{218}	-48	-48	-48	6	-48	-48	-48	-120	-12	-12	96	42	42	-12	-12
χ_{219}	-48	-48	-48	6	-48	-48	-48	96	42	-12	-12	96	-66	-12	-12
χ_{220}	48	48	48	-6	48	48	48	120	12	12	-96	-42	-42	12	12
χ_{221}	48	48	48	-6	48	48	48	-96	-42	12	12	-96	66	12	12
χ_{222}	224	8	224	-10	224	-208	8	8	-10	8	-28	-46	8	80	-64
χ_{223}	-224	-8	-224	10	-224	208	-8	-8	10	-8	28	46	-8	-80	64
χ_{224}	432	216	0	0	-432	0	-216	72	18	0	-36	18	-36	0	0
χ_{225}	-432	-216	0	0	432	0	216	-72	-18	0	36	-18	36	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	-72	-72	-72	9	-72	-72	-72	-18	-18	9	-18	-18	-18	36	36
χ_{232}	72	72	72	-9	72	72	72	18	18	-9	18	18	18	-36	-36
χ_{233}	-48	-48	-48	6	-48	-48	-48	-12	-12	6	-12	-12	-12	-120	96
χ_{234}	48	48	48	-6	48	48	48	12	12	-6	12	12	12	120	-96
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	6Q			6R			6S						6T			
	$6BM$	$6BN$	$18P$	$6BO$	$6BP$	$6BQ$	$6BR$	$6BS$	$6BT$	$6BU$	$6BV$	$6BW$	$6BX$	$6BY$	$6BZ$	$6CA$
χ_{181}	-19	-10	8	0	0	0	28	-8	-20	-14	10	4	-8	4	4	-2
χ_{182}	-6	-6	3	0	0	0	-36	18	18	18	-9	-9	0	0	0	0
χ_{183}	6	6	-3	0	0	0	36	-18	-18	-18	9	9	0	0	0	0
χ_{184}	-6	-6	3	0	0	0	18	-36	18	-9	-9	18	0	0	0	0
χ_{185}	6	6	-3	0	0	0	-18	36	-18	9	9	-18	0	0	0	0
χ_{186}	-5	-14	4	-10	8	-1	-12	-12	24	6	-12	6	-12	6	6	-3
χ_{187}	5	14	-4	10	-8	1	12	12	-24	-6	12	-6	12	-6	-6	3
χ_{188}	0	0	0	0	0	0	-16	-16	32	8	-16	8	-16	8	8	-4
χ_{189}	0	0	0	0	0	0	16	16	-32	-8	16	-8	16	-8	-8	4
χ_{190}	6	-48	6	40	-32	4	0	0	0	0	0	0	0	0	0	0
χ_{191}	-6	48	-6	-40	32	-4	0	0	0	0	0	0	0	0	0	0
χ_{192}	-14	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{193}	14	-4	-4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{194}	-18	-18	9	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{195}	18	18	-9	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{196}	-6	-6	3	-40	32	-4	0	0	0	0	0	0	0	0	0	0
χ_{197}	6	6	-3	40	-32	4	0	0	0	0	0	0	0	0	0	0
χ_{198}	-6	-6	3	20	-16	2	0	0	0	0	0	0	0	0	0	0
χ_{199}	-6	-6	3	20	-16	2	0	0	0	0	0	0	0	0	0	0
χ_{200}	6	6	-3	-20	16	-2	0	0	0	0	0	0	0	0	0	0
χ_{201}	6	6	-3	-20	16	-2	0	0	0	0	0	0	0	0	0	0
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{203}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{204}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{205}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{206}	14	-4	-4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{207}	-14	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{208}	-10	-28	8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{209}	-10	-28	8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{210}	10	28	-8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{211}	10	28	-8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{212}	36	36	-18	40	-32	4	0	0	0	0	0	0	0	0	0	0
χ_{213}	-36	-36	18	-40	32	-4	0	0	0	0	0	0	0	0	0	0
χ_{214}	-6	48	-6	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{215}	6	-48	6	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{216}	-12	-12	6	-40	32	-4	0	0	0	0	0	0	0	0	0	0
χ_{217}	12	12	-6	40	-32	4	0	0	0	0	0	0	0	0	0	0
χ_{218}	-12	-12	6	20	-16	2	0	0	0	0	0	0	0	0	0	0
χ_{219}	-12	-12	6	20	-16	2	0	0	0	0	0	0	0	0	0	0
χ_{220}	12	12	-6	-20	16	-2	0	0	0	0	0	0	0	0	0	0
χ_{221}	12	12	-6	-20	16	-2	0	0	0	0	0	0	0	0	0	0
χ_{222}	-28	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{223}	28	-8	-8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	36	36	-18	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{232}	-36	-36	18	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{233}	42	-12	-12	-40	32	-4	0	0	0	0	0	0	0	0	0	0
χ_{234}	-42	12	12	40	-32	4	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6U$		$6V$			$6W$				$6X$						$6Y$	
	$6CB$	$18Q$	$6CC$	$6CD$	$18R$	$6CE$	$6CF$	$6CG$	$6CH$	$18S$	$18T$	$6CI$	$18U$	$18V$	$18W$	$6CJ$	$18X$
χ_{181}	0	0	0	0	0	4	-2	-2	1	-10	8	8	-1	-1	-1	0	0
χ_{182}	-6	3	-6	-6	3	0	0	0	0	-6	-6	12	3	-6	3	0	0
χ_{183}	6	-3	6	6	-3	0	0	0	0	6	6	-12	-3	6	-3	0	0
χ_{184}	-6	3	-6	-6	3	0	0	0	0	12	-6	-6	-6	3	3	0	0
χ_{185}	6	-3	6	6	-3	0	0	0	0	-12	6	6	6	-3	-3	0	0
χ_{186}	8	-4	8	8	-4	-12	6	6	-3	-5	4	-5	4	4	-5	2	-1
χ_{187}	-8	4	-8	-8	4	12	-6	-6	3	5	-4	5	-4	-4	5	-2	1
χ_{188}	0	0	0	0	0	8	-4	-4	2	0	0	0	0	0	0	0	0
χ_{189}	0	0	0	0	0	-8	4	4	-2	0	0	0	0	0	0	0	0
χ_{190}	-2	1	4	4	-2	0	0	0	0	6	6	6	-3	-3	-3	-2	1
χ_{191}	2	-1	-4	-4	2	0	0	0	0	-6	-6	-6	3	3	3	2	-1
χ_{192}	0	0	0	0	0	0	0	0	0	4	4	4	-5	-5	4	0	0
χ_{193}	0	0	0	0	0	0	0	0	0	-4	-4	-4	5	5	-4	0	0
χ_{194}	6	-3	6	6	-3	0	0	0	0	0	0	0	0	0	0	0	0
χ_{195}	-6	3	-6	-6	3	0	0	0	0	0	0	0	0	0	0	0	0
χ_{196}	-4	2	2	2	-1	0	0	0	0	3	-6	3	3	3	-6	-4	2
χ_{197}	4	-2	-2	-2	1	0	0	0	0	-3	6	-3	-3	-3	6	4	-2
χ_{198}	-4	2	2	2	-1	0	0	0	0	3	3	-6	3	-6	3	2	-1
χ_{199}	-4	2	2	2	-1	0	0	0	0	-6	3	3	-6	3	3	2	-1
χ_{200}	4	-2	-2	-2	1	0	0	0	0	-3	-3	6	-3	6	-3	-2	1
χ_{201}	4	-2	-2	-2	1	0	0	0	0	6	-3	-3	6	-3	-3	-2	1
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{203}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{204}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{205}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{206}	0	0	0	0	0	0	0	0	0	-4	-4	-4	5	5	-4	0	0
χ_{207}	0	0	0	0	0	0	0	0	0	4	4	4	-5	-5	4	0	0
χ_{208}	0	0	0	0	0	0	0	0	0	8	-10	-10	8	-1	-1	0	0
χ_{209}	0	0	0	0	0	0	0	0	0	-10	-10	8	-1	8	-1	0	0
χ_{210}	0	0	0	0	0	0	0	0	0	10	10	-8	1	-8	1	0	0
χ_{211}	0	0	0	0	0	0	0	0	0	-8	10	10	-8	1	1	0	0
χ_{212}	-2	1	4	4	-2	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{213}	2	-1	-4	-4	2	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{214}	-6	3	12	12	-6	0	0	0	0	-6	-6	-6	3	3	3	0	0
χ_{215}	6	-3	-12	-12	6	0	0	0	0	6	6	6	-3	-3	-3	0	0
χ_{216}	8	-4	-4	-4	2	0	0	0	0	-3	6	-3	-3	-3	6	-4	2
χ_{217}	-8	4	4	4	-2	0	0	0	0	3	-6	3	3	3	-6	4	-2
χ_{218}	8	-4	-4	-4	2	0	0	0	0	-3	-3	6	-3	6	-3	2	-1
χ_{219}	8	-4	-4	-4	2	0	0	0	0	6	-3	-3	6	-3	-3	2	-1
χ_{220}	-8	4	4	4	-2	0	0	0	0	3	3	-6	3	-6	3	-2	1
χ_{221}	-8	4	4	4	-2	0	0	0	0	-6	3	3	-6	3	3	-2	1
χ_{222}	0	0	0	0	0	0	0	0	0	8	8	8	-1	-1	-10	0	0
χ_{223}	0	0	0	0	0	0	0	0	0	-8	-8	-8	1	1	10	0	0
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0	-9	9	0	0	0
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0	9	-9	0	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	6	-3	-12	-12	6	0	0	0	0	0	0	0	0	0	0	0	0
χ_{232}	-6	3	12	12	-6	0	0	0	0	0	0	0	0	0	0	0	0
χ_{233}	-4	2	8	8	-4	0	0	0	0	6	6	6	-3	-3	-3	2	-1
χ_{234}	4	-2	-8	-8	4	0	0	0	0	-6	-6	-6	3	3	3	-2	1
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6Z$				$8C$				$10C$	$10D$			$10E$				$12H$
	$18Y$	$18Z$	$18AA$	$6CK$	$8C$	$8D$	$24C$	$24D$	$10C$	$10D$	$30C$	$30D$	$10E$	$30E$	$30F$	$30G$	$12AE$
χ_{181}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{182}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{183}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{184}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{185}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{186}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{187}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{188}	0	0	0	0	0	0	0	0	0	0	0	0	4	-2	-2	1	0
χ_{189}	0	0	0	0	0	0	0	0	0	0	0	0	-4	2	2	-1	0
χ_{190}	-2	-2	4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{191}	2	2	-4	2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{192}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{193}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{194}	0	0	0	0	0	0	0	0	0	0	0	0	-4	2	2	-1	0
χ_{195}	0	0	0	0	0	0	0	0	0	0	0	0	4	-2	-2	1	0
χ_{196}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{197}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{198}	5	5	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{199}	-4	-4	-1	5	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{200}	-5	-5	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{201}	4	4	1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{203}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{204}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{205}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{206}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{207}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{208}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{209}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{210}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{211}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{212}	-2	-2	4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{213}	2	2	-4	2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{214}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{215}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{216}	-1	-1	2	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{217}	1	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{218}	5	5	-1	-4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{219}	-4	-4	-1	5	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{220}	-5	-5	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{221}	4	4	1	-5	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{222}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{223}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{232}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{233}	2	2	-4	2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{234}	-2	-2	4	-2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$12I$	$12J$	$12K$	$12L$		$12M$			$12N$			$12O$		
	$12AF$	$12AG$	$12AH$	$12AI$	$12AJ$	$12AK$	$12AL$	$36E$	$12AM$	$12AN$	$36F$	$12AO$	$12AP$	$12AQ$
χ_{181}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{182}	0	0	0	8	-1	2	2	-1	2	2	-1	0	0	0
χ_{183}	0	0	0	-8	1	-2	-2	1	-2	-2	1	0	0	0
χ_{184}	0	0	0	8	-1	2	2	-1	2	2	-1	0	0	0
χ_{185}	0	0	0	-8	1	-2	-2	1	-2	-2	1	0	0	0
χ_{186}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{187}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{188}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{189}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{190}	0	0	0	8	-1	-4	-4	2	2	2	-1	0	0	0
χ_{191}	0	0	0	-8	1	4	4	-2	-2	-2	1	0	0	0
χ_{192}	0	0	0	8	-1	-4	-4	2	-4	-4	2	0	0	0
χ_{193}	0	0	0	-8	1	4	4	-2	4	4	-2	0	0	0
χ_{194}	0	0	0	8	-1	2	2	-1	2	2	-1	0	0	0
χ_{195}	0	0	0	-8	1	-2	-2	1	-2	-2	1	0	0	0
χ_{196}	0	0	0	-8	1	-2	-2	1	4	4	-2	0	0	0
χ_{197}	0	0	0	8	-1	2	2	-1	-4	-4	2	0	0	0
χ_{198}	0	0	0	-8	1	-2	-2	1	4	4	-2	0	0	0
χ_{199}	0	0	0	-8	1	-2	-2	1	4	4	-2	0	0	0
χ_{200}	0	0	0	8	-1	2	2	-1	-4	-4	2	0	0	0
χ_{201}	0	0	0	8	-1	2	2	-1	-4	-4	2	0	0	0
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{203}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{204}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{205}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{206}	0	0	0	8	-1	-4	-4	2	-4	-4	2	0	0	0
χ_{207}	0	0	0	-8	1	4	4	-2	4	4	-2	0	0	0
χ_{208}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{209}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{210}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{211}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{212}	0	0	0	-8	1	4	4	-2	-2	-2	1	0	0	0
χ_{213}	0	0	0	8	-1	-4	-4	2	2	2	-1	0	0	0
χ_{214}	0	0	0	8	-1	-4	-4	2	2	2	-1	0	0	0
χ_{215}	0	0	0	-8	1	4	4	-2	-2	-2	1	0	0	0
χ_{216}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{217}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{218}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{219}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{220}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{221}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{222}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{223}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	0	0	0	8	-1	-4	-4	2	2	2	-1	0	0	0
χ_{232}	0	0	0	-8	1	4	4	-2	-2	-2	1	0	0	0
χ_{233}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{234}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$12P$						$12Q$	$18D$				$18E$		
	$12AR$	$12AS$	$12AT$	$12AU$	$12AV$	$12AW$	$12AX$	$18AB$	$18AC$	$18AD$	$18AE$	$18AF$	$18AG$	$18AH$
χ_{181}	0	0	0	0	0	0	0	2	2	2	-4	2	2	2
χ_{182}	4	-2	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{183}	-4	2	2	2	-1	-1	0	0	0	0	0	0	0	0
χ_{184}	-2	4	-2	1	1	-2	0	0	0	0	0	0	0	0
χ_{185}	2	-4	2	-1	-1	2	0	0	0	0	0	0	0	0
χ_{186}	0	0	0	0	0	0	0	1	1	-2	1	-2	-2	-2
χ_{187}	0	0	0	0	0	0	0	-1	-1	2	-1	2	2	2
χ_{188}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{189}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{190}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{191}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{192}	0	0	0	0	0	0	0	1	1	-2	1	-2	-2	-2
χ_{193}	0	0	0	0	0	0	0	-1	-1	2	-1	2	2	2
χ_{194}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{195}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{196}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{197}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{198}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{199}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{200}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{201}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{203}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{204}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{205}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{206}	0	0	0	0	0	0	0	-1	-1	2	-1	2	2	2
χ_{207}	0	0	0	0	0	0	0	1	1	-2	1	-2	-2	-2
χ_{208}	0	0	0	0	0	0	0	2	2	2	-4	2	2	2
χ_{209}	0	0	0	0	0	0	0	-4	-4	2	2	2	2	2
χ_{210}	0	0	0	0	0	0	0	4	4	-2	-2	-2	-2	-2
χ_{211}	0	0	0	0	0	0	0	-2	-2	-2	4	-2	-2	-2
χ_{212}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{213}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{214}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{215}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{216}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{217}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{218}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{219}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{220}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{221}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{222}	0	0	0	0	0	0	0	-1	-1	2	-1	-4	-4	-4
χ_{223}	0	0	0	0	0	0	0	1	1	-2	1	4	4	4
χ_{224}	0	0	0	0	0	0	0	-3	-3	0	3	0	0	0
χ_{225}	0	0	0	0	0	0	0	3	3	0	-3	0	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{232}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{233}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{234}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

		18F						20B	24A	26A		28A		30A	26A
	18AI	18AJ	18AK	18AL	18AM	18AN	18AO	20B	24E	26A	26B	28A	28B	30H	36G
χ_{181}	-1	4	-2	-2	-2	1	1	0	0	0	0	0	0	0	0
χ_{182}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{183}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{184}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{185}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{186}	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{187}	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{188}	0	2	2	-4	-1	2	-1	0	0	0	0	0	0	0	0
χ_{189}	0	-2	-2	4	1	-2	1	0	0	0	0	0	0	0	0
χ_{190}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{191}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{192}	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{193}	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{194}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{195}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{196}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{197}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{198}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{199}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{200}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{201}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{202}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{203}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{204}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{205}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{206}	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{207}	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{208}	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{209}	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{210}	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{211}	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{212}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{213}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{214}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{215}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{216}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{217}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{218}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{219}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{220}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{221}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{222}	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{223}	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{224}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{225}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{226}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{227}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{228}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{229}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{230}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{231}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{232}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{233}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{234}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{235}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$1A$				$2A$		$2B$				$2C$			
	$1A$	$3A$	$3B$	$3C$	$2A$	$6A$	$2B$	$6B$	$6C$	$6D$	$2C$	$6E$	$6F$	$6G$
χ_{236}	524160	18720	-720	-20160	0	0	0	0	0	0	-128	64	16	-32
χ_{237}	524160	18720	-720	-20160	0	0	0	0	0	0	-128	64	16	-32
χ_{238}	589680	21060	-810	-22680	0	0	480	48	-60	-6	144	-72	-18	36
χ_{239}	589680	21060	-810	-22680	0	0	480	48	-60	-6	144	-72	-18	36
χ_{240}	698880	24960	-960	-26880	0	0	0	0	0	0	0	0	0	0
χ_{241}	698880	24960	-960	-26880	0	0	0	0	0	0	0	0	0	0
χ_{242}	838656	29952	-1152	-32256	0	0	0	0	0	0	0	0	0	0
χ_{243}	756	-27	27	0	0	0	72	0	9	-9	12	0	3	-3
χ_{244}	756	-27	27	0	0	0	72	0	9	-9	12	0	3	-3
χ_{245}	19656	-702	702	0	0	0	432	0	54	-54	24	0	6	-6
χ_{246}	19656	-702	702	0	0	0	432	0	54	-54	24	0	6	-6
χ_{247}	19656	-702	702	0	0	0	432	0	54	-54	24	0	6	-6
χ_{248}	19656	-702	702	0	0	0	432	0	54	-54	24	0	6	-6
χ_{249}	29484	-1053	1053	0	0	0	-72	0	-9	9	84	0	21	-21
χ_{250}	29484	-1053	1053	0	0	0	-72	0	-9	9	84	0	21	-21
χ_{251}	39312	-1404	1404	0	0	0	576	0	72	-72	-48	0	-12	12
χ_{252}	39312	-1404	1404	0	0	0	576	0	72	-72	-48	0	-12	12
χ_{253}	49140	-1755	1755	0	0	0	360	0	45	-45	-84	0	-21	21
χ_{254}	49140	-1755	1755	0	0	0	360	0	45	-45	-84	0	-21	21
χ_{255}	49140	-1755	1755	0	0	0	360	0	45	-45	-84	0	-21	21
χ_{256}	49140	-1755	1755	0	0	0	360	0	45	-45	-84	0	-21	21
χ_{257}	68040	-2430	2430	0	0	0	720	0	90	-90	120	0	30	-30
χ_{258}	68040	-2430	2430	0	0	0	720	0	90	-90	120	0	30	-30
χ_{259}	176904	-6318	6318	0	0	0	1008	0	126	-126	24	0	6	-6
χ_{260}	176904	-6318	6318	0	0	0	1008	0	126	-126	24	0	6	-6
χ_{261}	176904	-6318	6318	0	0	0	1008	0	126	-126	24	0	6	-6
χ_{262}	176904	-6318	6318	0	0	0	1008	0	126	-126	24	0	6	-6
χ_{263}	196560	-7020	7020	0	0	0	0	0	0	0	-48	0	-12	12
χ_{264}	196560	-7020	7020	0	0	0	0	0	0	0	-48	0	-12	12
χ_{265}	196560	-7020	7020	0	0	0	0	0	0	0	-48	0	-12	12
χ_{266}	196560	-7020	7020	0	0	0	0	0	0	0	-48	0	-12	12
χ_{267}	196560	-7020	7020	0	0	0	1440	0	180	-180	48	0	12	-12
χ_{268}	196560	-7020	7020	0	0	0	1440	0	180	-180	48	0	12	-12
χ_{269}	265356	-9477	9477	0	0	0	-648	0	-81	81	180	0	45	-45
χ_{270}	265356	-9477	9477	0	0	0	-648	0	-81	81	180	0	45	-45
χ_{271}	294840	-10530	10530	0	0	0	-720	0	-90	90	-120	0	-30	30
χ_{272}	294840	-10530	10530	0	0	0	-720	0	-90	90	-120	0	-30	30
χ_{273}	314496	-11232	11232	0	0	0	1152	0	144	-144	0	0	0	0
χ_{274}	314496	-11232	11232	0	0	0	1152	0	144	-144	0	0	0	0
χ_{275}	314496	-11232	11232	0	0	0	1152	0	144	-144	0	0	0	0
χ_{276}	314496	-11232	11232	0	0	0	1152	0	144	-144	0	0	0	0
χ_{277}	628992	-22464	22464	0	0	0	-2304	0	-288	288	0	0	0	0
χ_{278}	353808	-12636	12636	0	0	0	-576	0	-72	72	-48	0	-12	12
χ_{279}	353808	-12636	12636	0	0	0	-576	0	-72	72	-48	0	-12	12
χ_{280}	442260	-15795	15795	0	0	0	360	0	45	-45	12	0	3	-3
χ_{281}	442260	-15795	15795	0	0	0	360	0	45	-45	12	0	3	-3
χ_{282}	442260	-15795	15795	0	0	0	360	0	45	-45	12	0	3	-3
χ_{283}	442260	-15795	15795	0	0	0	360	0	45	-45	12	0	3	-3
χ_{284}	967680	-34560	34560	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	967680	-34560	34560	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	551124	-19683	19683	0	0	0	648	0	81	-81	108	0	27	-27
χ_{287}	551124	-19683	19683	0	0	0	648	0	81	-81	108	0	27	-27
χ_{288}	589680	-21060	21060	0	0	0	-1440	0	-180	180	144	0	36	-36
χ_{289}	589680	-21060	21060	0	0	0	-1440	0	-180	180	144	0	36	-36
χ_{290}	786240	-28080	28080	0	0	0	0	0	0	0	-192	0	-48	48
χ_{291}	786240	-28080	28080	0	0	0	0	0	0	0	-192	0	-48	48

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	3A						3B				3C				
	$3D$	$3E$	$3F$	$3G$	$3H$	$3I$	$3J$	$3K$	$3L$	$9A$	$3M$	$3N$	$9B$	$3O$	$3P$
χ_{236}	3168	1224	-72	-720	252	252	360	-288	36	0	-720	-234	72	-72	-72
χ_{237}	-720	252	-72	1224	-720	2196	360	-288	36	0	-720	-234	72	-72	-72
χ_{238}	648	648	-81	648	648	648	0	0	0	0	-162	-162	81	-162	-162
χ_{239}	648	648	-81	648	648	648	0	0	0	0	-162	-162	81	-162	-162
χ_{240}	-960	-312	12	336	984	-960	-240	-240	-240	120	-384	102	-96	264	264
χ_{241}	-960	-312	12	336	984	-960	-240	-240	-240	120	-384	102	-96	264	264
χ_{242}	-1152	-1152	144	-1152	-1152	-1152	1008	-288	360	-144	-1152	-180	0	144	144
χ_{243}	108	-27	0	0	27	27	45	18	-9	0	72	-9	0	-9	18
χ_{244}	108	-27	0	0	27	27	45	18	-9	0	72	-9	0	-9	18
χ_{245}	-108	27	0	0	-27	-27	-45	-18	9	0	576	-72	0	-72	144
χ_{246}	-108	27	0	0	-27	-27	-45	-18	9	0	576	-72	0	-72	144
χ_{247}	-108	27	0	0	-27	-27	360	144	-72	0	-72	9	0	9	-18
χ_{248}	-108	27	0	0	-27	-27	360	144	-72	0	-72	9	0	9	-18
χ_{249}	1296	-324	0	0	324	324	135	54	-27	0	216	-27	0	-27	54
χ_{250}	1296	-324	0	0	324	324	135	54	-27	0	216	-27	0	-27	54
χ_{251}	-216	54	0	0	-54	-54	315	126	-63	0	504	-63	0	-63	126
χ_{252}	-216	54	0	0	-54	-54	315	126	-63	0	504	-63	0	-63	126
χ_{253}	1188	-297	0	0	297	297	90	36	-18	0	792	-99	0	-99	198
χ_{254}	1188	-297	0	0	297	297	90	36	-18	0	792	-99	0	-99	198
χ_{255}	1188	-297	0	0	297	297	495	198	-99	0	144	-18	0	-18	36
χ_{256}	1188	-297	0	0	297	297	495	198	-99	0	144	-18	0	-18	36
χ_{257}	972	-243	0	0	243	243	405	162	-81	0	648	-81	0	-81	162
χ_{258}	972	-243	0	0	243	243	405	162	-81	0	648	-81	0	-81	162
χ_{259}	-972	243	0	0	-243	-243	810	324	-162	0	-648	81	0	81	-162
χ_{260}	-972	243	0	0	-243	-243	810	324	-162	0	-648	81	0	81	-162
χ_{261}	-972	243	0	0	-243	-243	-405	-162	81	0	1296	-162	0	-162	324
χ_{262}	-972	243	0	0	-243	-243	-405	-162	81	0	1296	-162	0	-162	324
χ_{263}	-1080	270	0	0	-270	-270	765	306	-153	0	-72	9	0	9	-18
χ_{264}	-1080	270	0	0	-270	-270	765	306	-153	0	-72	9	0	9	-18
χ_{265}	-1080	270	0	0	-270	-270	-45	-18	9	0	1224	-153	0	-153	306
χ_{266}	-1080	270	0	0	-270	-270	-45	-18	9	0	1224	-153	0	-153	306
χ_{267}	1836	-459	0	0	459	459	-450	-180	90	0	-720	90	0	90	-180
χ_{268}	1836	-459	0	0	459	459	-450	-180	90	0	-720	90	0	90	-180
χ_{269}	2916	-729	0	0	729	729	0	0	0	0	0	0	0	0	0
χ_{270}	2916	-729	0	0	729	729	0	0	0	0	0	0	0	0	0
χ_{271}	4212	-1053	0	0	1053	1053	135	54	-27	0	216	-27	0	-27	54
χ_{272}	4212	-1053	0	0	1053	1053	135	54	-27	0	216	-27	0	-27	54
χ_{273}	-1728	432	0	0	-432	-432	90	36	-18	0	144	-18	0	-18	36
χ_{274}	-1728	432	0	0	-432	-432	90	36	-18	0	144	-18	0	-18	36
χ_{275}	-1728	432	0	0	-432	-432	90	36	-18	0	144	-18	0	-18	36
χ_{276}	-1728	432	0	0	-432	-432	90	36	-18	0	144	-18	0	-18	36
χ_{277}	-3456	864	0	0	-864	-864	180	72	-36	0	288	-36	0	-36	72
χ_{278}	-1944	486	0	0	-486	-486	405	162	-81	0	648	-81	0	-81	162
χ_{279}	-1944	486	0	0	-486	-486	405	162	-81	0	648	-81	0	-81	162
χ_{280}	1944	-486	0	0	486	486	-405	-162	81	0	1296	-162	0	-162	324
χ_{281}	1944	-486	0	0	486	486	-405	-162	81	0	1296	-162	0	-162	324
χ_{282}	1944	-486	0	0	486	486	810	324	-162	0	-648	81	0	81	-162
χ_{283}	1944	-486	0	0	486	486	810	324	-162	0	-648	81	0	81	-162
χ_{284}	-1728	432	0	0	-432	-432	-720	-288	144	0	-1152	144	0	144	-288
χ_{285}	-1728	432	0	0	-432	-432	-720	-288	144	0	-1152	144	0	144	-288
χ_{286}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{288}	-324	81	0	0	-81	-81	270	108	-54	0	432	-54	0	-54	108
χ_{289}	-324	81	0	0	-81	-81	270	108	-54	0	432	-54	0	-54	108
χ_{290}	1512	-378	0	0	378	378	-180	-72	36	0	-288	36	0	36	-72
χ_{291}	1512	-378	0	0	378	378	-180	-72	36	0	-288	36	0	36	-72

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$3D$				$3E$			$3F$							$4A$	
	$9C$	$9D$	$9E$	$3Q$	$3R$	$9F$	$9G$	$9H$	$9I$	$9J$	$9K$	$3S$	$9L$	$9M$	$4A$	$12A$
χ_{236}	90	9	18	-36	36	0	-9	18	0	-18	36	-36	-18	18	0	0
χ_{237}	90	9	-36	18	36	0	-9	-36	0	36	-18	18	-18	-36	0	0
χ_{238}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{239}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{240}	-96	66	-24	-24	-24	12	-6	-6	12	3	3	-6	-24	-6	0	0
χ_{241}	-96	66	-24	-24	-24	12	-6	-6	12	3	3	-6	-24	-6	0	0
χ_{242}	144	-18	0	0	-72	18	0	0	18	-18	-18	0	36	0	0	0
χ_{243}	0	0	0	0	0	0	0	18	0	0	0	0	0	-9	2	-1
χ_{244}	0	0	0	0	0	0	0	18	0	0	0	0	0	-9	2	-1
χ_{245}	0	0	0	0	0	0	0	-18	0	0	0	0	0	9	8	-4
χ_{246}	0	0	0	0	0	0	0	-18	0	0	0	0	0	9	8	-4
χ_{247}	0	0	0	0	0	0	0	-18	0	0	0	0	0	9	8	-4
χ_{248}	0	0	0	0	0	0	0	-18	0	0	0	0	0	9	8	-4
χ_{249}	0	0	0	0	0	0	0	54	0	0	0	0	0	-27	-2	1
χ_{250}	0	0	0	0	0	0	0	54	0	0	0	0	0	-27	-2	1
χ_{251}	0	0	0	0	0	0	0	-36	0	0	0	0	0	18	-20	10
χ_{252}	0	0	0	0	0	0	0	-36	0	0	0	0	0	18	-20	10
χ_{253}	0	0	0	0	0	0	0	36	0	0	0	0	0	-18	-10	5
χ_{254}	0	0	0	0	0	0	0	36	0	0	0	0	0	-18	-10	5
χ_{255}	0	0	0	0	0	0	0	36	0	0	0	0	0	-18	-10	5
χ_{256}	0	0	0	0	0	0	0	36	0	0	0	0	0	-18	-10	5
χ_{257}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	-10
χ_{258}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	-10
χ_{259}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	4
χ_{260}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	4
χ_{261}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	4
χ_{262}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8	4
χ_{263}	0	0	0	0	0	0	0	-18	0	0	0	0	0	9	20	-10
χ_{264}	0	0	0	0	0	0	0	-18	0	0	0	0	0	9	20	-10
χ_{265}	0	0	0	0	0	0	0	-18	0	0	0	0	0	9	20	-10
χ_{266}	0	0	0	0	0	0	0	-18	0	0	0	0	0	9	20	-10
χ_{267}	0	0	0	0	0	0	0	-18	0	0	0	0	0	9	0	0
χ_{268}	0	0	0	0	0	0	0	-18	0	0	0	0	0	9	0	0
χ_{269}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	9
χ_{270}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-18	9
χ_{271}	0	0	0	0	0	0	0	54	0	0	0	0	0	-27	20	-10
χ_{272}	0	0	0	0	0	0	0	54	0	0	0	0	0	-27	20	-10
χ_{273}	0	0	0	0	0	0	0	36	0	0	0	0	0	-18	32	-16
χ_{274}	0	0	0	0	0	0	0	36	0	0	0	0	0	-18	32	-16
χ_{275}	0	0	0	0	0	0	0	36	0	0	0	0	0	-18	-32	16
χ_{276}	0	0	0	0	0	0	0	36	0	0	0	0	0	-18	-32	16
χ_{277}	0	0	0	0	0	0	0	72	0	0	0	0	0	-36	0	0
χ_{278}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	10
χ_{279}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	10
χ_{280}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	5
χ_{281}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	5
χ_{282}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	5
χ_{283}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	5
χ_{284}	0	0	0	0	0	0	0	36	0	0	0	0	0	-18	0	0
χ_{285}	0	0	0	0	0	0	0	36	0	0	0	0	0	-18	0	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	-9
χ_{287}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	-9
χ_{288}	0	0	0	0	0	0	0	-54	0	0	0	0	0	27	0	0
χ_{289}	0	0	0	0	0	0	0	-54	0	0	0	0	0	27	0	0
χ_{290}	0	0	0	0	0	0	0	-72	0	0	0	0	0	36	0	0
χ_{291}	0	0	0	0	0	0	0	-72	0	0	0	0	0	36	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$4B$				$4C$		$4D$				$5A$				$6A$		$6B$
	$4B$	$12B$	$12C$	$12D$	$4C$	$12E$	$4D$	$12F$	$12G$	$12H$	$5A$	$15A$	$15B$	$15C$	$6H$	$6I$	$6J$
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	-48	24	6	-12	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{239}	-48	24	6	-12	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{240}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{241}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	16	-8	-2	4	0	0	0
χ_{243}	12	0	3	-3	0	0	6	3	-3	0	6	3	-3	0	0	0	0
χ_{244}	12	0	3	-3	0	0	6	3	-3	0	6	3	-3	0	0	0	0
χ_{245}	24	0	6	-6	0	0	0	0	0	0	6	3	-3	0	0	0	0
χ_{246}	24	0	6	-6	0	0	0	0	0	0	6	3	-3	0	0	0	0
χ_{247}	24	0	6	-6	0	0	0	0	0	0	6	3	-3	0	0	0	0
χ_{248}	24	0	6	-6	0	0	0	0	0	0	6	3	-3	0	0	0	0
χ_{249}	36	0	9	-9	0	0	-6	-3	3	0	-6	-3	3	0	0	0	0
χ_{250}	36	0	9	-9	0	0	-6	-3	3	0	-6	-3	3	0	0	0	0
χ_{251}	0	0	0	0	0	0	12	6	-6	0	12	6	-6	0	0	0	0
χ_{252}	0	0	0	0	0	0	12	6	-6	0	12	6	-6	0	0	0	0
χ_{253}	12	0	3	-3	0	0	-6	-3	3	0	0	0	0	0	0	0	0
χ_{254}	12	0	3	-3	0	0	-6	-3	3	0	0	0	0	0	0	0	0
χ_{255}	12	0	3	-3	0	0	-6	-3	3	0	0	0	0	0	0	0	0
χ_{256}	12	0	3	-3	0	0	-6	-3	3	0	0	0	0	0	0	0	0
χ_{257}	-24	0	-6	6	0	0	12	6	-6	0	0	0	0	0	0	0	0
χ_{258}	-24	0	-6	6	0	0	12	6	-6	0	0	0	0	0	0	0	0
χ_{259}	24	0	6	-6	0	0	0	0	0	0	-6	-3	3	0	0	0	0
χ_{260}	24	0	6	-6	0	0	0	0	0	0	-6	-3	3	0	0	0	0
χ_{261}	24	0	6	-6	0	0	0	0	0	0	-6	-3	3	0	0	0	0
χ_{262}	24	0	6	-6	0	0	0	0	0	0	-6	-3	3	0	0	0	0
χ_{263}	0	0	0	0	0	0	-12	-6	6	0	0	0	0	0	0	0	0
χ_{264}	0	0	0	0	0	0	-12	-6	6	0	0	0	0	0	0	0	0
χ_{265}	0	0	0	0	0	0	-12	-6	6	0	0	0	0	0	0	0	0
χ_{266}	0	0	0	0	0	0	-12	-6	6	0	0	0	0	0	0	0	0
χ_{267}	48	0	12	-12	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{268}	48	0	12	-12	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{269}	-12	0	-3	3	0	0	-6	-3	3	0	6	3	-3	0	0	0	0
χ_{270}	-12	0	-3	3	0	0	-6	-3	3	0	6	3	-3	0	0	0	0
χ_{271}	24	0	6	-6	0	0	12	6	-6	0	0	0	0	0	0	0	0
χ_{272}	24	0	6	-6	0	0	12	6	-6	0	0	0	0	0	0	0	0
χ_{273}	0	0	0	0	0	0	0	0	0	0	6	3	-3	0	0	0	0
χ_{274}	0	0	0	0	0	0	0	0	0	0	6	3	-3	0	0	0	0
χ_{275}	0	0	0	0	0	0	0	0	0	0	6	3	-3	0	0	0	0
χ_{276}	0	0	0	0	0	0	0	0	0	0	6	3	-3	0	0	0	0
χ_{277}	0	0	0	0	0	0	0	0	0	0	12	6	-6	0	0	0	0
χ_{278}	0	0	0	0	0	0	12	6	-6	0	-12	-6	6	0	0	0	0
χ_{279}	0	0	0	0	0	0	12	6	-6	0	-12	-6	6	0	0	0	0
χ_{280}	-36	0	-9	9	0	0	-6	-3	3	0	0	0	0	0	0	0	0
χ_{281}	-36	0	-9	9	0	0	-6	-3	3	0	0	0	0	0	0	0	0
χ_{282}	-36	0	-9	9	0	0	-6	-3	3	0	0	0	0	0	0	0	0
χ_{283}	-36	0	-9	9	0	0	-6	-3	3	0	0	0	0	0	0	0	0
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	-36	0	-9	9	0	0	6	3	-3	0	-6	-3	3	0	0	0	0
χ_{287}	-36	0	-9	9	0	0	6	3	-3	0	-6	-3	3	0	0	0	0
χ_{288}	48	0	12	-12	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{289}	48	0	12	-12	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{290}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{291}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6C$		$6D$			$6E$		$6F$				$6G$				
	$6K$	$6L$	$6M$	$6N$	$6O$	$6P$	$18A$	$6Q$	$6R$	$6S$	$18B$	$6T$	$6U$	$6V$	$6W$	$6X$
χ_{236}	0	0	0	0	0	16	-8	0	0	0	0	-32	4	4	16	-8
χ_{237}	0	0	0	0	0	16	-8	0	0	0	0	16	16	-20	-8	4
χ_{238}	0	0	-24	-24	3	-18	9	6	6	6	-3	0	0	0	0	0
χ_{239}	0	0	-24	-24	3	-18	9	6	6	6	-3	0	0	0	0	0
χ_{240}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{241}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	0	0	0	0	0	0	0	12	3	-6	0	12	3	3	0	-3
χ_{244}	0	0	0	0	0	0	0	12	3	-6	0	12	3	3	0	-3
χ_{245}	0	0	0	0	0	0	0	0	0	0	0	-12	-3	-3	0	3
χ_{246}	0	0	0	0	0	0	0	0	0	0	0	-12	-3	-3	0	3
χ_{247}	0	0	0	0	0	0	0	36	9	-18	0	-12	-3	-3	0	3
χ_{248}	0	0	0	0	0	0	0	36	9	-18	0	-12	-3	-3	0	3
χ_{249}	0	0	0	0	0	0	0	-12	-3	6	0	48	12	12	0	-12
χ_{250}	0	0	0	0	0	0	0	-12	-3	6	0	48	12	12	0	-12
χ_{251}	0	0	0	0	0	0	0	-12	-3	6	0	24	6	6	0	-6
χ_{252}	0	0	0	0	0	0	0	-12	-3	6	0	24	6	6	0	-6
χ_{253}	0	0	0	0	0	0	0	-12	-3	6	0	-12	-3	-3	0	3
χ_{254}	0	0	0	0	0	0	0	-12	-3	6	0	-12	-3	-3	0	3
χ_{255}	0	0	0	0	0	0	0	24	6	-12	0	-12	-3	-3	0	3
χ_{256}	0	0	0	0	0	0	0	24	6	-12	0	-12	-3	-3	0	3
χ_{257}	0	0	0	0	0	0	0	12	3	-6	0	12	3	3	0	-3
χ_{258}	0	0	0	0	0	0	0	12	3	-6	0	12	3	3	0	-3
χ_{259}	0	0	0	0	0	0	0	-12	-3	6	0	-12	-3	-3	0	3
χ_{260}	0	0	0	0	0	0	0	-12	-3	6	0	-12	-3	-3	0	3
χ_{261}	0	0	0	0	0	0	0	24	6	-12	0	-12	-3	-3	0	3
χ_{262}	0	0	0	0	0	0	0	24	6	-12	0	-12	-3	-3	0	3
χ_{263}	0	0	0	0	0	0	0	36	9	-18	0	24	6	6	0	-6
χ_{264}	0	0	0	0	0	0	0	36	9	-18	0	24	6	6	0	-6
χ_{265}	0	0	0	0	0	0	0	-36	-9	18	0	24	6	6	0	-6
χ_{266}	0	0	0	0	0	0	0	-36	-9	18	0	24	6	6	0	-6
χ_{267}	0	0	0	0	0	0	0	24	6	-12	0	12	3	3	0	-3
χ_{268}	0	0	0	0	0	0	0	24	6	-12	0	12	3	3	0	-3
χ_{269}	0	0	0	0	0	0	0	0	0	0	0	36	9	9	0	-9
χ_{270}	0	0	0	0	0	0	0	0	0	0	0	36	9	9	0	-9
χ_{271}	0	0	0	0	0	0	0	-12	-3	6	0	-12	-3	-3	0	3
χ_{272}	0	0	0	0	0	0	0	-12	-3	6	0	-12	-3	-3	0	3
χ_{273}	0	0	0	0	0	0	0	-24	-6	12	0	0	0	0	0	0
χ_{274}	0	0	0	0	0	0	0	-24	-6	12	0	0	0	0	0	0
χ_{275}	0	0	0	0	0	0	0	-24	-6	12	0	0	0	0	0	0
χ_{276}	0	0	0	0	0	0	0	-24	-6	12	0	0	0	0	0	0
χ_{277}	0	0	0	0	0	0	0	48	12	-24	0	0	0	0	0	0
χ_{278}	0	0	0	0	0	0	0	12	3	-6	0	24	6	6	0	-6
χ_{279}	0	0	0	0	0	0	0	12	3	-6	0	24	6	6	0	-6
χ_{280}	0	0	0	0	0	0	0	24	6	-12	0	-24	-6	-6	0	6
χ_{281}	0	0	0	0	0	0	0	24	6	-12	0	-24	-6	-6	0	6
χ_{282}	0	0	0	0	0	0	0	-12	-3	6	0	-24	-6	-6	0	6
χ_{283}	0	0	0	0	0	0	0	-12	-3	6	0	-24	-6	-6	0	6
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{288}	0	0	0	0	0	0	0	-24	-6	12	0	-36	-9	-9	0	9
χ_{289}	0	0	0	0	0	0	0	-24	-6	12	0	-36	-9	-9	0	9
χ_{290}	0	0	0	0	0	0	0	0	0	0	0	24	6	6	0	-6
χ_{291}	0	0	0	0	0	0	0	0	0	0	0	24	6	6	0	-6

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6H$					$6I$					$6J$				$6K$
	$6Y$	$6Z$	$6AA$	$6AB$	$18C$	$6AC$	$6AD$	$6AE$	$6AF$	$6AG$	$6AH$	$6AI$	$6AJ$	$6AK$	$6AL$
χ_{236}	0	0	0	0	0	-32	4	4	16	-8	16	-8	-2	4	0
χ_{237}	0	0	0	0	0	16	16	-20	-8	4	16	-8	-2	4	0
χ_{238}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{239}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{240}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{241}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	6	-3	6	-3	0	12	3	3	0	-3	12	0	3	-3	0
χ_{244}	6	-3	6	-3	0	12	3	3	0	-3	12	0	3	-3	0
χ_{245}	18	-9	18	-9	0	-12	-3	-3	0	3	24	0	6	-6	0
χ_{246}	18	-9	18	-9	0	-12	-3	-3	0	3	24	0	6	-6	0
χ_{247}	0	0	0	0	0	24	6	6	0	-6	-12	0	-3	3	0
χ_{248}	0	0	0	0	0	24	6	6	0	-6	-12	0	-3	3	0
χ_{249}	-6	3	-6	3	0	12	3	3	0	-3	12	0	3	-3	0
χ_{250}	-6	3	-6	3	0	12	3	3	0	-3	12	0	3	-3	0
χ_{251}	-6	3	-6	3	0	-12	-3	-3	0	3	-12	0	-3	3	0
χ_{252}	-6	3	-6	3	0	-12	-3	-3	0	3	-12	0	-3	3	0
χ_{253}	12	-6	12	-6	0	24	6	6	0	-6	-12	0	-3	3	0
χ_{254}	12	-6	12	-6	0	24	6	6	0	-6	-12	0	-3	3	0
χ_{255}	-6	3	-6	3	0	-12	-3	-3	0	3	24	0	6	-6	0
χ_{256}	-6	3	-6	3	0	-12	-3	-3	0	3	24	0	6	-6	0
χ_{257}	6	-3	6	-3	0	12	3	3	0	-3	12	0	3	-3	0
χ_{258}	6	-3	6	-3	0	12	3	3	0	-3	12	0	3	-3	0
χ_{259}	12	-6	12	-6	0	24	6	6	0	-6	-12	0	-3	3	0
χ_{260}	12	-6	12	-6	0	24	6	6	0	-6	-12	0	-3	3	0
χ_{261}	-6	3	-6	3	0	-12	-3	-3	0	3	24	0	6	-6	0
χ_{262}	-6	3	-6	3	0	-12	-3	-3	0	3	24	0	6	-6	0
χ_{263}	-18	9	-18	9	0	-12	-3	-3	0	3	-12	0	-3	3	0
χ_{264}	-18	9	-18	9	0	-12	-3	-3	0	3	-12	0	-3	3	0
χ_{265}	18	-9	18	-9	0	-12	-3	-3	0	3	-12	0	-3	3	0
χ_{266}	18	-9	18	-9	0	-12	-3	-3	0	3	-12	0	-3	3	0
χ_{267}	12	-6	12	-6	0	-24	-6	-6	0	6	-24	0	-6	6	0
χ_{268}	12	-6	12	-6	0	-24	-6	-6	0	6	-24	0	-6	6	0
χ_{269}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{270}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{271}	-6	3	-6	3	0	-12	-3	-3	0	3	-12	0	-3	3	0
χ_{272}	-6	3	-6	3	0	-12	-3	-3	0	3	-12	0	-3	3	0
χ_{273}	-12	6	-12	6	0	0	0	0	0	0	0	0	0	0	0
χ_{274}	-12	6	-12	6	0	0	0	0	0	0	0	0	0	0	0
χ_{275}	-12	6	-12	6	0	0	0	0	0	0	0	0	0	0	0
χ_{276}	-12	6	-12	6	0	0	0	0	0	0	0	0	0	0	0
χ_{277}	24	-12	24	-12	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	6	-3	6	-3	0	-12	-3	-3	0	3	-12	0	-3	3	0
χ_{279}	6	-3	6	-3	0	-12	-3	-3	0	3	-12	0	-3	3	0
χ_{280}	-6	3	-6	3	0	12	3	3	0	-3	-24	0	-6	6	0
χ_{281}	-6	3	-6	3	0	12	3	3	0	-3	-24	0	-6	6	0
χ_{282}	12	-6	12	-6	0	-24	-6	-6	0	6	12	0	3	-3	0
χ_{283}	12	-6	12	-6	0	-24	-6	-6	0	6	12	0	3	-3	0
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{288}	-12	6	-12	6	0	0	0	0	0	0	0	0	0	0	0
χ_{289}	-12	6	-12	6	0	0	0	0	0	0	0	0	0	0	0
χ_{290}	0	0	0	0	0	24	6	6	0	-6	24	0	6	-6	0
χ_{291}	0	0	0	0	0	24	6	6	0	-6	24	0	6	-6	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6L$			$6M$		$6N$			$7A$		$8A$		$8B$		$9A$		
	$18D$	$6AM$	$18E$	$6AN$	$18F$	$18G$	$6AO$	$18H$	$7A$	$21A$	$8A$	$24A$	$8B$	$24B$	$9N$	$9O$	$9P$
χ_{236}	-2	4	-2	-2	1	-2	4	-2	0	0	0	0	0	0	0	0	0
χ_{237}	-2	-2	4	-2	1	-2	-2	4	0	0	0	0	0	0	0	0	0
χ_{238}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{239}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{240}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{241}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	6	-3	0
χ_{244}	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	6	-3	0
χ_{245}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0
χ_{246}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0
χ_{247}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	-6	0
χ_{248}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	-6	0
χ_{249}	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{250}	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{251}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	-3	0
χ_{252}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	-3	0
χ_{253}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	-6	3	0
χ_{254}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	-6	3	0
χ_{255}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	12	-6	0
χ_{256}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	12	-6	0
χ_{257}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{258}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{259}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{260}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{261}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{262}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{263}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0
χ_{264}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0
χ_{265}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	-6	0
χ_{266}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	-6	0
χ_{267}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0
χ_{268}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0
χ_{269}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0
χ_{270}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0
χ_{271}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{272}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{273}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0
χ_{274}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0
χ_{275}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0
χ_{276}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-12	6	0
χ_{278}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{279}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{280}	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{281}	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{282}	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{283}	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0	0	0
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	-6	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	-6	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0
χ_{288}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{289}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{290}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0
χ_{291}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6	3	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$9B$							$9C$			$10A$		$10B$		$12A$	
	$9Q$	$9R$	$9S$	$9T$	$9U$	$9V$	$9W$	$27A$	$27B$	$27C$	$10A$	$30A$	$10B$	$30B$	$12I$	$36A$
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	-3
χ_{239}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	-3
χ_{240}	6	6	6	-3	6	6	6	0	0	0	0	0	0	0	0	0
χ_{241}	6	6	6	-3	6	6	6	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	6	-3	-3	0	6	6	-3	0	0	0	2	-1	0	0	0	0
χ_{244}	6	-3	-3	0	6	6	-3	0	0	0	2	-1	0	0	0	0
χ_{245}	12	-6	-6	0	12	12	-6	0	0	0	2	-1	0	0	0	0
χ_{246}	12	-6	-6	0	12	12	-6	0	0	0	2	-1	0	0	0	0
χ_{247}	-6	3	3	0	-6	-6	3	0	0	0	2	-1	0	0	0	0
χ_{248}	-6	3	3	0	-6	-6	3	0	0	0	2	-1	0	0	0	0
χ_{249}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0
χ_{250}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0
χ_{251}	6	-3	-3	0	6	6	-3	0	0	0	-4	2	0	0	0	0
χ_{252}	6	-3	-3	0	6	6	-3	0	0	0	-4	2	0	0	0	0
χ_{253}	12	-6	-6	0	12	12	-6	0	0	0	0	0	0	0	0	0
χ_{254}	12	-6	-6	0	12	12	-6	0	0	0	0	0	0	0	0	0
χ_{255}	-6	3	3	0	-6	-6	3	0	0	0	0	0	0	0	0	0
χ_{256}	-6	3	3	0	-6	-6	3	0	0	0	0	0	0	0	0	0
χ_{257}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{258}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{259}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0
χ_{260}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0
χ_{261}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0
χ_{262}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0
χ_{263}	12	-6	-6	0	12	12	-6	0	0	0	0	0	0	0	0	0
χ_{264}	12	-6	-6	0	12	12	-6	0	0	0	0	0	0	0	0	0
χ_{265}	-6	3	3	0	-6	-6	3	0	0	0	0	0	0	0	0	0
χ_{266}	-6	3	3	0	-6	-6	3	0	0	0	0	0	0	0	0	0
χ_{267}	-6	3	3	0	-6	-6	3	0	0	0	0	0	0	0	0	0
χ_{268}	-6	3	3	0	-6	-6	3	0	0	0	0	0	0	0	0	0
χ_{269}	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0	0
χ_{270}	0	0	0	0	0	0	0	0	0	0	2	-1	0	0	0	0
χ_{271}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{272}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{273}	-6	3	3	0	-6	-6	3	0	0	0	2	-1	0	0	0	0
χ_{274}	-6	3	3	0	-6	-6	3	0	0	0	2	-1	0	0	0	0
χ_{275}	-6	3	3	0	-6	-6	3	0	0	0	2	-1	0	0	0	0
χ_{276}	-6	3	3	0	-6	-6	3	0	0	0	2	-1	0	0	0	0
χ_{277}	-12	6	6	0	-12	-12	6	0	0	0	-4	2	0	0	0	0
χ_{278}	0	0	0	0	0	0	0	0	0	0	4	-2	0	0	0	0
χ_{279}	0	0	0	0	0	0	0	0	0	0	4	-2	0	0	0	0
χ_{280}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{281}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{282}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{283}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{284}	12	-6	-6	0	12	12	-6	0	0	0	0	0	0	0	0	0
χ_{285}	12	-6	-6	0	12	12	-6	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0
χ_{288}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{289}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{290}	-6	3	3	0	-6	-6	3	0	0	0	0	0	0	0	0	0
χ_{291}	-6	3	3	0	-6	-6	3	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$12B$					$12C$		$12D$		$12E$		$12F$			$12G$	
	$12J$	$12K$	$12L$	$12M$	$12N$	$12O$	$12P$	$12Q$	$12R$	$12S$	$12T$	$36B$	$12U$	$36C$	$12V$	$36D$
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{239}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{240}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{241}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	12	3	3	0	-3	2	-1	2	-1	0	0	0	0	0	0	0
χ_{244}	12	3	3	0	-3	2	-1	2	-1	0	0	0	0	0	0	0
χ_{245}	-12	-3	-3	0	3	-4	2	2	-1	0	0	0	0	0	0	0
χ_{246}	-12	-3	-3	0	3	-4	2	2	-1	0	0	0	0	0	0	0
χ_{247}	-12	-3	-3	0	3	2	-1	-4	2	0	0	0	0	0	0	0
χ_{248}	-12	-3	-3	0	3	2	-1	-4	2	0	0	0	0	0	0	0
χ_{249}	0	0	0	0	0	-2	1	-2	1	0	0	0	0	0	0	0
χ_{250}	0	0	0	0	0	-2	1	-2	1	0	0	0	0	0	0	0
χ_{251}	0	0	0	0	0	-2	1	-2	1	0	0	0	0	0	0	0
χ_{252}	0	0	0	0	0	-2	1	-2	1	0	0	0	0	0	0	0
χ_{253}	12	3	3	0	-3	2	-1	-4	2	0	0	0	0	0	0	0
χ_{254}	12	3	3	0	-3	2	-1	-4	2	0	0	0	0	0	0	0
χ_{255}	12	3	3	0	-3	-4	2	2	-1	0	0	0	0	0	0	0
χ_{256}	12	3	3	0	-3	-4	2	2	-1	0	0	0	0	0	0	0
χ_{257}	12	3	3	0	-3	2	-1	2	-1	0	0	0	0	0	0	0
χ_{258}	12	3	3	0	-3	2	-1	2	-1	0	0	0	0	0	0	0
χ_{259}	-12	-3	-3	0	3	-2	1	4	-2	0	0	0	0	0	0	0
χ_{260}	-12	-3	-3	0	3	-2	1	4	-2	0	0	0	0	0	0	0
χ_{261}	-12	-3	-3	0	3	4	-2	-2	1	0	0	0	0	0	0	0
χ_{262}	-12	-3	-3	0	3	4	-2	-2	1	0	0	0	0	0	0	0
χ_{263}	0	0	0	0	0	2	-1	2	-1	0	0	0	0	0	0	0
χ_{264}	0	0	0	0	0	2	-1	2	-1	0	0	0	0	0	0	0
χ_{265}	0	0	0	0	0	2	-1	2	-1	0	0	0	0	0	0	0
χ_{266}	0	0	0	0	0	2	-1	2	-1	0	0	0	0	0	0	0
χ_{267}	12	3	3	0	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{268}	12	3	3	0	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{269}	-12	-3	-3	0	3	0	0	0	0	0	0	0	0	0	0	0
χ_{270}	-12	-3	-3	0	3	0	0	0	0	0	0	0	0	0	0	0
χ_{271}	-12	-3	-3	0	3	2	-1	2	-1	0	0	0	0	0	0	0
χ_{272}	-12	-3	-3	0	3	2	-1	2	-1	0	0	0	0	0	0	0
χ_{273}	0	0	0	0	0	-4	2	-4	2	0	0	0	0	0	0	0
χ_{274}	0	0	0	0	0	-4	2	-4	2	0	0	0	0	0	0	0
χ_{275}	0	0	0	0	0	4	-2	4	-2	0	0	0	0	0	0	0
χ_{276}	0	0	0	0	0	4	-2	4	-2	0	0	0	0	0	0	0
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	0	0	0	0	0	-2	1	-2	1	0	0	0	0	0	0	0
χ_{279}	0	0	0	0	0	-2	1	-2	1	0	0	0	0	0	0	0
χ_{280}	0	0	0	0	0	-4	2	2	-1	0	0	0	0	0	0	0
χ_{281}	0	0	0	0	0	-4	2	2	-1	0	0	0	0	0	0	0
χ_{282}	0	0	0	0	0	2	-1	-4	2	0	0	0	0	0	0	0
χ_{283}	0	0	0	0	0	2	-1	-4	2	0	0	0	0	0	0	0
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{288}	12	3	3	0	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{289}	12	3	3	0	-3	0	0	0	0	0	0	0	0	0	0	0
χ_{290}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{291}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$13A$		$13B$		$14A$		$15A$		$18A$	$18B$			$18C$		$20A$	
	$13A$	$39A$	$13B$	$39B$	$14A$	$42A$	$15D$	$45A$	$18I$	$18J$	$18K$	$18L$	$18M$	$18N$	$20A$	$60A$
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{239}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{240}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{241}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0	0
χ_{243}	2	-1	2	-1	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{244}	2	-1	2	-1	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{245}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{246}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{247}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{248}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{249}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{250}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{251}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{252}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{253}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{254}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{255}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{256}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{257}	-2	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0
χ_{258}	-2	1	-2	1	0	0	0	0	0	0	0	0	0	0	0	0
χ_{259}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{260}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{261}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{262}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{263}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{264}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{265}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{266}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{267}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{268}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{269}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{270}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{271}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{272}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{273}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{274}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{275}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{276}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{279}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{280}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{281}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{282}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{283}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{284}	B	$-A$	$\bar{B}$	$-\bar{A}$	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	$\bar{B}$	$-\bar{A}$	B	$-A$	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	2	-1	2	-1	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{287}	2	-1	2	-1	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{288}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{289}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{290}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{291}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$2D$				$2E$				$2F$			
	$2D$	$6AP$	$6AQ$	$6AR$	$2E$	$6AS$	$6AT$	$6AU$	$2F$	$6AV$	$6AW$	$6AX$
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	-18720	720	720	-1224	0	0	0	0	-240	84	-24	-24
χ_{239}	18720	-720	-720	1224	0	0	0	0	240	-84	24	24
χ_{240}	-16640	640	640	-1088	0	0	0	0	0	0	0	0
χ_{241}	16640	-640	-640	1088	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	234	-9	18	-9	2	-1	2	-1	30	3	3	-6
χ_{244}	-234	9	-18	9	-2	1	-2	1	-30	-3	-3	6
χ_{245}	3276	-126	252	-126	12	-6	12	-6	60	6	6	-12
χ_{246}	-3276	126	-252	126	-12	6	-12	6	-60	-6	-6	12
χ_{247}	1404	-54	108	-54	28	-14	28	-14	60	6	6	-12
χ_{248}	-1404	54	-108	54	-28	14	-28	14	-60	-6	-6	12
χ_{249}	2106	-81	162	-81	18	-9	18	-9	30	3	3	-6
χ_{250}	-2106	81	-162	81	-18	9	-18	9	-30	-3	-3	6
χ_{251}	4680	-180	360	-180	-40	20	-40	20	0	0	0	0
χ_{252}	-4680	180	-360	180	40	-20	40	-20	0	0	0	0
χ_{253}	5850	-225	450	-225	-30	15	-30	15	-90	-9	-9	18
χ_{254}	-5850	225	-450	225	30	-15	30	-15	90	9	9	-18
χ_{255}	-3510	135	-270	135	50	-25	50	-25	-90	-9	-9	18
χ_{256}	3510	-135	270	-135	-50	25	-50	25	90	9	9	-18
χ_{257}	7020	-270	540	-270	60	-30	60	-30	180	18	18	-36
χ_{258}	-7020	270	-540	270	-60	30	-60	30	-180	-18	-18	36
χ_{259}	-1404	54	-108	54	132	-66	132	-66	180	18	18	-36
χ_{260}	1404	-54	108	-54	-132	66	-132	66	-180	-18	-18	36
χ_{261}	15444	-594	1188	-594	-12	6	-12	6	180	18	18	-36
χ_{262}	-15444	594	-1188	594	12	-6	12	-6	-180	-18	-18	36
χ_{263}	4680	-180	360	-180	120	-60	120	-60	-240	-24	-24	48
χ_{264}	-4680	180	-360	180	-120	60	-120	60	240	24	24	-48
χ_{265}	14040	-540	1080	-540	40	-20	40	-20	-240	-24	-24	48
χ_{266}	-14040	540	-1080	540	-40	20	-40	20	240	24	24	-48
χ_{267}	4680	-180	360	-180	40	-20	40	-20	120	12	12	-24
χ_{268}	-4680	180	-360	180	-40	20	-40	20	-120	-12	-12	24
χ_{269}	2106	-81	162	-81	18	-9	18	-9	270	27	27	-54
χ_{270}	-2106	81	-162	81	-18	9	-18	9	-270	-27	-27	54
χ_{271}	-7020	270	-540	270	-60	30	-60	30	300	30	30	-60
χ_{272}	7020	-270	540	-270	60	-30	60	-30	-300	-30	-30	60
χ_{273}	14976	-576	1152	-576	128	-64	128	-64	0	0	0	0
χ_{274}	-14976	576	-1152	576	-128	64	-128	64	0	0	0	0
χ_{275}	14976	-576	1152	-576	-128	64	-128	64	0	0	0	0
χ_{276}	-14976	576	-1152	576	128	-64	128	-64	0	0	0	0
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	14040	-540	1080	-540	-120	60	-120	60	0	0	0	0
χ_{279}	-14040	540	-1080	540	120	-60	120	-60	0	0	0	0
χ_{280}	-24570	945	-1890	945	30	-15	30	-15	90	9	9	-18
χ_{281}	24570	-945	1890	-945	-30	15	-30	15	-90	-9	-9	18
χ_{282}	3510	-135	270	-135	-210	105	-210	105	90	9	9	-18
χ_{283}	-3510	135	-270	135	210	-105	210	-105	-90	-9	-9	18
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	18954	-729	1458	-729	162	-81	162	-81	270	27	27	-54
χ_{287}	-18954	729	-1458	729	-162	81	-162	81	-270	-27	-27	54
χ_{288}	14040	-540	1080	-540	120	-60	120	-60	-120	-12	-12	24
χ_{289}	-14040	540	-1080	540	-120	60	-120	60	120	12	12	-24
χ_{290}	18720	-720	1440	-720	-160	80	-160	80	0	0	0	0
χ_{291}	-18720	720	-1440	720	160	-80	160	-80	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$4E$	$4F$	$4G$				$4H$			$4I$			
	$4E$	$4F$	$4G$	$12W$	$12X$	$12Y$	$4H$	$12Z$	$12AA$	$4I$	$12AB$	$12AC$	$12AD$
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	0	0	64	-8	-8	10	0	0	0	0	0	0	0
χ_{239}	0	0	-64	8	8	-10	0	0	0	0	0	0	0
χ_{240}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{241}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	0	0	24	-3	6	-3	4	1	-2	2	-1	2	-1
χ_{244}	0	0	-24	3	-6	3	-4	-1	2	-2	1	-2	1
χ_{245}	0	0	96	-12	24	-12	0	0	0	-4	2	-4	2
χ_{246}	0	0	-96	12	-24	12	0	0	0	4	-2	4	-2
χ_{247}	0	0	0	0	0	0	16	4	-8	-4	2	-4	2
χ_{248}	0	0	0	0	0	0	-16	-4	8	4	-2	4	-2
χ_{249}	0	0	24	-3	6	-3	4	1	-2	-6	3	-6	3
χ_{250}	0	0	-24	3	-6	3	-4	-1	2	6	-3	6	-3
χ_{251}	0	0	48	-6	12	-6	-8	-2	4	0	0	0	0
χ_{252}	0	0	-48	6	-12	6	8	2	-4	0	0	0	0
χ_{253}	0	0	72	-9	18	-9	-4	-1	2	2	-1	2	-1
χ_{254}	0	0	-72	9	-18	9	4	1	-2	-2	1	-2	1
χ_{255}	0	0	-24	3	-6	3	12	3	-6	2	-1	2	-1
χ_{256}	0	0	24	-3	6	-3	-12	-3	6	-2	1	-2	1
χ_{257}	0	0	48	-6	12	-6	8	2	-4	4	-2	4	-2
χ_{258}	0	0	-48	6	-12	6	-8	-2	4	-4	2	-4	2
χ_{259}	0	0	0	0	0	0	16	4	-8	4	-2	4	-2
χ_{260}	0	0	0	0	0	0	-16	-4	8	-4	2	-4	2
χ_{261}	0	0	96	-12	24	-12	0	0	0	4	-2	4	-2
χ_{262}	0	0	-96	12	-24	12	0	0	0	-4	2	-4	2
χ_{263}	0	0	-48	6	-12	6	8	2	-4	0	0	0	0
χ_{264}	0	0	48	-6	12	-6	-8	-2	4	0	0	0	0
χ_{265}	0	0	48	-6	12	-6	-8	-2	4	0	0	0	0
χ_{266}	0	0	-48	6	-12	6	8	2	-4	0	0	0	0
χ_{267}	0	0	0	0	0	0	0	0	0	8	-4	8	-4
χ_{268}	0	0	0	0	0	0	0	0	0	-8	4	-8	4
χ_{269}	0	0	-72	9	-18	9	-12	-3	6	2	-1	2	-1
χ_{270}	0	0	72	-9	18	-9	12	3	-6	-2	1	-2	1
χ_{271}	0	0	48	-6	12	-6	8	2	-4	-4	2	-4	2
χ_{272}	0	0	-48	6	-12	6	-8	-2	4	4	-2	4	-2
χ_{273}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{274}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{275}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{276}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	0	0	-48	6	-12	6	8	2	-4	0	0	0	0
χ_{279}	0	0	48	-6	12	-6	-8	-2	4	0	0	0	0
χ_{280}	0	0	24	-3	6	-3	-12	-3	6	6	-3	6	-3
χ_{281}	0	0	-24	3	-6	3	12	3	-6	-6	3	-6	3
χ_{282}	0	0	-72	9	-18	9	4	1	-2	6	-3	6	-3
χ_{283}	0	0	72	-9	18	-9	-4	-1	2	-6	3	-6	3
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	-72	9	-18	9	-12	-3	6	-6	3	-6	3
χ_{287}	0	0	72	-9	18	-9	12	3	-6	6	-3	6	-3
χ_{288}	0	0	0	0	0	0	0	0	0	8	-4	8	-4
χ_{289}	0	0	0	0	0	0	0	0	0	-8	4	-8	4
χ_{290}	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{291}	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	6O							6P						6Q	
	6AY	6AZ	6BA	6BB	6BC	6BD	6BE	6BF	6BG	18O	6BH	6BI	6BJ	6BK	6BL
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	72	72	72	-9	72	72	72	-36	-36	18	-36	-36	-36	18	18
χ_{239}	-72	-72	-72	9	-72	-72	-72	36	36	-18	36	36	36	-18	-18
χ_{240}	-224	-8	-224	10	-224	208	-8	64	28	-8	-8	-44	64	64	-8
χ_{241}	224	8	224	-10	224	-208	8	-64	-28	8	8	44	-64	-64	8
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	18	-9	-9	0	18	18	-9	36	-9	0	0	9	9	18	9
χ_{244}	-18	9	9	0	-18	-18	9	-36	9	0	0	-9	-9	-18	-9
χ_{245}	90	-45	-45	0	90	90	-45	-36	9	0	0	-9	-9	36	18
χ_{246}	-90	45	45	0	-90	-90	45	36	-9	0	0	9	9	-36	-18
χ_{247}	-54	27	27	0	-54	-54	27	0	0	0	0	0	0	54	27
χ_{248}	54	-27	-27	0	54	54	-27	0	0	0	0	0	0	-54	-27
χ_{249}	0	0	0	0	0	0	0	108	-27	0	0	27	27	-54	-27
χ_{250}	0	0	0	0	0	0	0	-108	27	0	0	-27	-27	54	27
χ_{251}	36	-18	-18	0	36	36	-18	-36	9	0	0	-9	-9	90	45
χ_{252}	-36	18	18	0	-36	-36	18	36	-9	0	0	9	9	-90	-45
χ_{253}	126	-63	-63	0	126	126	-63	144	-36	0	0	36	36	18	9
χ_{254}	-126	63	63	0	-126	-126	63	-144	36	0	0	-36	-36	-18	-9
χ_{255}	54	-27	-27	0	54	54	-27	-108	27	0	0	-27	-27	0	0
χ_{256}	-54	27	27	0	-54	-54	27	108	-27	0	0	27	27	0	0
χ_{257}	54	-27	-27	0	54	54	-27	108	-27	0	0	27	27	54	27
χ_{258}	-54	27	27	0	-54	-54	27	-108	27	0	0	-27	-27	-54	-27
χ_{259}	54	-27	-27	0	54	54	-27	0	0	0	0	0	0	-54	-27
χ_{260}	-54	27	27	0	-54	-54	27	0	0	0	0	0	0	54	27
χ_{261}	54	-27	-27	0	54	54	-27	-108	27	0	0	-27	-27	0	0
χ_{262}	-54	27	27	0	-54	-54	27	108	-27	0	0	27	27	0	0
χ_{263}	36	-18	-18	0	36	36	-18	-36	9	0	0	-9	-9	90	45
χ_{264}	-36	18	18	0	-36	-36	18	36	-9	0	0	9	9	-90	-45
χ_{265}	108	-54	-54	0	108	108	-54	-108	27	0	0	-27	-27	-54	-27
χ_{266}	-108	54	54	0	-108	-108	54	108	-27	0	0	27	27	54	27
χ_{267}	-126	63	63	0	-126	-126	63	72	-18	0	0	18	18	36	18
χ_{268}	126	-63	-63	0	126	126	-63	-72	18	0	0	-18	-18	-36	-18
χ_{269}	162	-81	-81	0	162	162	-81	0	0	0	0	0	0	0	0
χ_{270}	-162	81	81	0	-162	-162	81	0	0	0	0	0	0	0	0
χ_{271}	-54	27	27	0	-54	-54	27	-108	27	0	0	-27	-27	-54	-27
χ_{272}	54	-27	-27	0	54	54	-27	108	-27	0	0	27	27	54	27
χ_{273}	-144	72	72	0	-144	-144	72	-72	18	0	0	-18	-18	72	36
χ_{274}	144	-72	-72	0	144	144	-72	72	-18	0	0	18	18	-72	-36
χ_{275}	-144	72	72	0	-144	-144	72	-72	18	0	0	-18	-18	72	36
χ_{276}	144	-72	-72	0	144	144	-72	72	-18	0	0	18	18	-72	-36
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	108	-54	-54	0	108	108	-54	-108	27	0	0	-27	-27	-54	-27
χ_{279}	-108	54	54	0	-108	-108	54	108	-27	0	0	27	27	54	27
χ_{280}	-108	54	54	0	-108	-108	54	-108	27	0	0	-27	-27	0	0
χ_{281}	108	-54	-54	0	108	108	-54	108	-27	0	0	27	27	0	0
χ_{282}	108	-54	-54	0	108	108	-54	0	0	0	0	0	0	54	27
χ_{283}	-108	54	54	0	-108	-108	54	0	0	0	0	0	0	-54	-27
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{288}	-54	27	27	0	-54	-54	27	0	0	0	0	0	0	-108	-54
χ_{289}	54	-27	-27	0	54	54	-27	0	0	0	0	0	0	108	54
χ_{290}	-180	90	90	0	-180	-180	90	72	-18	0	0	18	18	-72	-36
χ_{291}	180	-90	-90	0	180	180	-90	-72	18	0	0	-18	-18	72	36

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	6Q			6R			6S						6T			
	6BM	6BN	18P	6BO	6BP	6BQ	6BR	6BS	6BT	6BU	6BV	6BW	6BX	6BY	6BZ	6CA
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	18	18	-9	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{239}	-18	-18	9	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{240}	10	28	-8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{241}	-10	-28	8	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	-9	0	0	15	6	-3	2	2	2	-1	-1	-1	2	-1	2	-1
χ_{244}	9	0	0	-15	-6	3	-2	-2	-2	1	1	1	-2	1	-2	1
χ_{245}	-18	0	0	-15	-6	3	-6	-6	-6	3	3	3	6	-3	6	-3
χ_{246}	18	0	0	15	6	-3	6	6	6	-3	-3	-3	-6	3	-6	3
χ_{247}	-27	0	0	30	12	-6	10	10	10	-5	-5	-5	4	-2	4	-2
χ_{248}	27	0	0	-30	-12	6	-10	-10	-10	5	5	5	-4	2	-4	2
χ_{249}	27	0	0	15	6	-3	0	0	0	0	0	0	-6	3	-6	3
χ_{250}	-27	0	0	-15	-6	3	0	0	0	0	0	0	6	-3	6	-3
χ_{251}	-45	0	0	45	18	-9	-4	-4	-4	2	2	2	-10	5	-10	5
χ_{252}	45	0	0	-45	-18	9	4	4	4	-2	-2	-2	10	-5	10	-5
χ_{253}	-9	0	0	0	0	0	6	6	6	-3	-3	-3	0	0	0	0
χ_{254}	9	0	0	0	0	0	-6	-6	-6	3	3	3	0	0	0	0
χ_{255}	0	0	0	-45	-18	9	14	14	14	-7	-7	-7	2	-1	2	-1
χ_{256}	0	0	0	45	18	-9	-14	-14	-14	7	7	7	-2	1	-2	1
χ_{257}	-27	0	0	45	18	-9	6	6	6	-3	-3	-3	6	-3	6	-3
χ_{258}	27	0	0	-45	-18	9	-6	-6	-6	3	3	3	-6	3	-6	3
χ_{259}	27	0	0	0	0	0	6	6	6	-3	-3	-3	0	0	0	0
χ_{260}	-27	0	0	0	0	0	-6	-6	-6	3	3	3	0	0	0	0
χ_{261}	0	0	0	-45	-18	9	6	6	6	-3	-3	-3	-6	3	-6	3
χ_{262}	0	0	0	45	18	-9	-6	-6	-6	3	3	3	6	-3	6	-3
χ_{263}	-45	0	0	15	6	-3	12	12	12	-6	-6	-6	-6	3	-6	3
χ_{264}	45	0	0	-15	-6	3	-12	-12	-12	6	6	6	6	-3	6	-3
χ_{265}	27	0	0	15	6	-3	4	4	4	-2	-2	-2	10	-5	10	-5
χ_{266}	-27	0	0	-15	-6	3	-4	-4	-4	2	2	2	-10	5	-10	5
χ_{267}	-18	0	0	-30	-12	6	-14	-14	-14	7	7	7	4	-2	4	-2
χ_{268}	18	0	0	30	12	-6	14	14	14	-7	-7	-7	-4	2	-4	2
χ_{269}	0	0	0	0	0	0	18	18	18	-9	-9	-9	0	0	0	0
χ_{270}	0	0	0	0	0	0	-18	-18	-18	9	9	9	0	0	0	0
χ_{271}	27	0	0	15	6	-3	-6	-6	-6	3	3	3	-6	3	-6	3
χ_{272}	-27	0	0	-15	-6	3	6	6	6	-3	-3	-3	6	-3	6	-3
χ_{273}	-36	0	0	0	0	0	-16	-16	-16	8	8	8	8	-4	8	-4
χ_{274}	36	0	0	0	0	0	16	16	16	-8	-8	-8	-8	4	-8	4
χ_{275}	-36	0	0	0	0	0	16	16	16	-8	-8	-8	-8	4	-8	4
χ_{276}	36	0	0	0	0	0	-16	-16	-16	8	8	8	8	-4	8	-4
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	27	0	0	45	18	-9	-12	-12	-12	6	6	6	6	-3	6	-3
χ_{279}	-27	0	0	-45	-18	9	12	12	12	-6	-6	-6	-6	3	-6	3
χ_{280}	0	0	0	45	18	-9	12	12	12	-6	-6	-6	6	-3	6	-3
χ_{281}	0	0	0	-45	-18	9	-12	-12	-12	6	6	6	-6	3	-6	3
χ_{282}	-27	0	0	0	0	0	-12	-12	-12	6	6	6	0	0	0	0
χ_{283}	27	0	0	0	0	0	12	12	12	-6	-6	-6	0	0	0	0
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{288}	54	0	0	30	12	-6	-6	-6	-6	3	3	3	-12	6	-12	6
χ_{289}	-54	0	0	-30	-12	6	6	6	6	-3	-3	-3	12	-6	12	-6
χ_{290}	36	0	0	0	0	0	20	20	20	-10	-10	-10	8	-4	8	-4
χ_{291}	-36	0	0	0	0	0	-20	-20	-20	10	10	10	-8	4	-8	4

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6U$		$6V$			$6W$				$6X$						$6Y$	
	$6CB$	$18Q$	$6CC$	$6CD$	$18R$	$6CE$	$6CF$	$6CG$	$6CH$	$18S$	$18T$	$6CI$	$18U$	$18V$	$18W$	$6CJ$	$18X$
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	12	-6	-6	-6	3	0	0	0	0	0	0	0	0	0	0	0	0
χ_{239}	-12	6	6	6	-3	0	0	0	0	0	0	0	0	0	0	0	0
χ_{240}	0	0	0	0	0	0	0	0	0	10	-8	10	1	1	-8	0	0
χ_{241}	0	0	0	0	0	0	0	0	0	-10	8	-10	-1	-1	8	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	0	0	6	-3	0	2	-1	2	-1	0	0	0	0	0	0	0	0
χ_{244}	0	0	-6	3	0	-2	1	-2	1	0	0	0	0	0	0	0	0
χ_{245}	0	0	12	-6	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{246}	0	0	-12	6	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{247}	0	0	-6	3	0	-2	1	-2	1	0	0	0	0	0	0	0	0
χ_{248}	0	0	6	-3	0	2	-1	2	-1	0	0	0	0	0	0	0	0
χ_{249}	0	0	6	-3	0	6	-3	6	-3	0	0	0	0	0	0	0	0
χ_{250}	0	0	-6	3	0	-6	3	-6	3	0	0	0	0	0	0	0	0
χ_{251}	0	0	-18	9	0	2	-1	2	-1	0	0	0	0	0	0	0	0
χ_{252}	0	0	18	-9	0	-2	1	-2	1	0	0	0	0	0	0	0	0
χ_{253}	0	0	-18	9	0	-6	3	-6	3	0	0	0	0	0	0	0	0
χ_{254}	0	0	18	-9	0	6	-3	6	-3	0	0	0	0	0	0	0	0
χ_{255}	0	0	0	0	0	8	-4	8	-4	0	0	0	0	0	0	0	0
χ_{256}	0	0	0	0	0	-8	4	-8	4	0	0	0	0	0	0	0	0
χ_{257}	0	0	18	-9	0	6	-3	6	-3	0	0	0	0	0	0	0	0
χ_{258}	0	0	-18	9	0	-6	3	-6	3	0	0	0	0	0	0	0	0
χ_{259}	0	0	-18	9	0	-6	3	-6	3	0	0	0	0	0	0	0	0
χ_{260}	0	0	18	-9	0	6	-3	6	-3	0	0	0	0	0	0	0	0
χ_{261}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{262}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{263}	0	0	6	-3	0	-6	3	-6	3	0	0	0	0	0	0	0	0
χ_{264}	0	0	-6	3	0	6	-3	6	-3	0	0	0	0	0	0	0	0
χ_{265}	0	0	6	-3	0	-2	1	-2	1	0	0	0	0	0	0	0	0
χ_{266}	0	0	-6	3	0	2	-1	2	-1	0	0	0	0	0	0	0	0
χ_{267}	0	0	-12	6	0	4	-2	4	-2	0	0	0	0	0	0	0	0
χ_{268}	0	0	12	-6	0	-4	2	-4	2	0	0	0	0	0	0	0	0
χ_{269}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{270}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{271}	0	0	6	-3	0	-6	3	-6	3	0	0	0	0	0	0	0	0
χ_{272}	0	0	-6	3	0	6	-3	6	-3	0	0	0	0	0	0	0	0
χ_{273}	0	0	0	0	0	-4	2	-4	2	0	0	0	0	0	0	0	0
χ_{274}	0	0	0	0	0	4	-2	4	-2	0	0	0	0	0	0	0	0
χ_{275}	0	0	0	0	0	4	-2	4	-2	0	0	0	0	0	0	0	0
χ_{276}	0	0	0	0	0	-4	2	-4	2	0	0	0	0	0	0	0	0
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	0	0	-18	9	0	6	-3	6	-3	0	0	0	0	0	0	0	0
χ_{279}	0	0	18	-9	0	-6	3	-6	3	0	0	0	0	0	0	0	0
χ_{280}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{281}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{282}	0	0	18	-9	0	-6	3	-6	3	0	0	0	0	0	0	0	0
χ_{283}	0	0	-18	9	0	6	-3	6	-3	0	0	0	0	0	0	0	0
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{288}	0	0	12	-6	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{289}	0	0	-12	6	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{290}	0	0	0	0	0	-4	2	-4	2	0	0	0	0	0	0	0	0
χ_{291}	0	0	0	0	0	4	-2	4	-2	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$6Z$				$8C$				$10C$	$10D$			$10E$				$12H$
	$18Y$	$18Z$	$18AA$	$6CK$	$8C$	$8D$	$24C$	$24D$	$10C$	$10D$	$30C$	$30D$	$10E$	$30E$	$30F$	$30G$	$12AE$
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{239}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{240}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{241}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	6	-3	0	0	0	4	1	-2	0	4	1	-2	2	-1	2	-1	0
χ_{244}	-6	3	0	0	0	-4	-1	2	0	-4	-1	2	-2	1	-2	1	0
χ_{245}	-6	3	0	0	0	0	0	0	0	-4	-1	2	2	-1	2	-1	0
χ_{246}	6	-3	0	0	0	0	0	0	0	4	1	-2	-2	1	-2	1	0
χ_{247}	-6	3	0	0	0	0	0	0	0	4	1	-2	-2	1	-2	1	0
χ_{248}	6	-3	0	0	0	0	0	0	0	-4	-1	2	2	-1	2	-1	0
χ_{249}	6	-3	0	0	0	-4	-1	2	0	-4	-1	2	-2	1	-2	1	0
χ_{250}	-6	3	0	0	0	4	1	-2	0	4	1	-2	2	-1	2	-1	0
χ_{251}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{252}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{253}	0	0	0	0	0	-4	-1	2	0	0	0	0	0	0	0	0	0
χ_{254}	0	0	0	0	0	4	1	-2	0	0	0	0	0	0	0	0	0
χ_{255}	0	0	0	0	0	-4	-1	2	0	0	0	0	0	0	0	0	0
χ_{256}	0	0	0	0	0	4	1	-2	0	0	0	0	0	0	0	0	0
χ_{257}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{258}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{259}	0	0	0	0	0	0	0	0	0	-4	-1	2	2	-1	2	-1	0
χ_{260}	0	0	0	0	0	0	0	0	0	4	1	-2	-2	1	-2	1	0
χ_{261}	0	0	0	0	0	0	0	0	0	4	1	-2	-2	1	-2	1	0
χ_{262}	0	0	0	0	0	0	0	0	0	-4	-1	2	2	-1	2	-1	0
χ_{263}	6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{264}	-6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{265}	6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{266}	-6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{267}	6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{268}	-6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{269}	0	0	0	0	0	4	1	-2	0	-4	-1	2	-2	1	-2	1	0
χ_{270}	0	0	0	0	0	-4	-1	2	0	4	1	-2	2	-1	2	-1	0
χ_{271}	6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{272}	-6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{273}	0	0	0	0	0	0	0	0	0	-4	-1	2	-2	1	-2	1	0
χ_{274}	0	0	0	0	0	0	0	0	0	4	1	-2	2	-1	2	-1	0
χ_{275}	0	0	0	0	0	0	0	0	0	-4	-1	2	2	-1	2	-1	0
χ_{276}	0	0	0	0	0	0	0	0	0	4	1	-2	-2	1	-2	1	0
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{279}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{280}	0	0	0	0	0	-4	-1	2	0	0	0	0	0	0	0	0	0
χ_{281}	0	0	0	0	0	4	1	-2	0	0	0	0	0	0	0	0	0
χ_{282}	0	0	0	0	0	-4	-1	2	0	0	0	0	0	0	0	0	0
χ_{283}	0	0	0	0	0	4	1	-2	0	0	0	0	0	0	0	0	0
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	0	0	0	-4	-1	2	0	4	1	-2	2	-1	2	-1	0
χ_{287}	0	0	0	0	0	4	1	-2	0	-4	-1	2	-2	1	-2	1	0
χ_{288}	-6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{289}	6	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{290}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{291}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$12I$	$12J$	$12K$	$12L$		$12M$			$12N$			$12O$		
	$12AF$	$12AG$	$12AH$	$12AI$	$12AJ$	$12AK$	$12AL$	$36E$	$12AM$	$12AN$	$36F$	$12AO$	$12AP$	$12AQ$
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	0	0	0	-8	1	-2	-2	1	4	4	-2	0	0	0
χ_{239}	0	0	0	8	-1	2	2	-1	-4	-4	2	0	0	0
χ_{240}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{241}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	0	0	0	0	0	0	0	0	6	-3	0	4	1	-2
χ_{244}	0	0	0	0	0	0	0	0	-6	3	0	-4	-1	2
χ_{245}	0	0	0	0	0	0	0	0	6	-3	0	0	0	0
χ_{246}	0	0	0	0	0	0	0	0	-6	3	0	0	0	0
χ_{247}	0	0	0	0	0	0	0	0	0	0	0	4	1	-2
χ_{248}	0	0	0	0	0	0	0	0	0	0	0	-4	-1	2
χ_{249}	0	0	0	0	0	0	0	0	6	-3	0	4	1	-2
χ_{250}	0	0	0	0	0	0	0	0	-6	3	0	-4	-1	2
χ_{251}	0	0	0	0	0	0	0	0	-6	3	0	4	1	-2
χ_{252}	0	0	0	0	0	0	0	0	6	-3	0	-4	-1	2
χ_{253}	0	0	0	0	0	0	0	0	0	0	0	-4	-1	2
χ_{254}	0	0	0	0	0	0	0	0	0	0	0	4	1	-2
χ_{255}	0	0	0	0	0	0	0	0	-6	3	0	0	0	0
χ_{256}	0	0	0	0	0	0	0	0	6	-3	0	0	0	0
χ_{257}	0	0	0	0	0	0	0	0	-6	3	0	-4	-1	2
χ_{258}	0	0	0	0	0	0	0	0	6	-3	0	4	1	-2
χ_{259}	0	0	0	0	0	0	0	0	0	0	0	4	1	-2
χ_{260}	0	0	0	0	0	0	0	0	0	0	0	-4	-1	2
χ_{261}	0	0	0	0	0	0	0	0	6	-3	0	0	0	0
χ_{262}	0	0	0	0	0	0	0	0	-6	3	0	0	0	0
χ_{263}	0	0	0	0	0	0	0	0	6	-3	0	-4	-1	2
χ_{264}	0	0	0	0	0	0	0	0	-6	3	0	4	1	-2
χ_{265}	0	0	0	0	0	0	0	0	-6	3	0	4	1	-2
χ_{266}	0	0	0	0	0	0	0	0	6	-3	0	-4	-1	2
χ_{267}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{268}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{269}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{270}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{271}	0	0	0	0	0	0	0	0	-6	3	0	-4	-1	2
χ_{272}	0	0	0	0	0	0	0	0	6	-3	0	4	1	-2
χ_{273}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{274}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{275}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{276}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	0	0	0	0	0	0	0	0	6	-3	0	-4	-1	2
χ_{279}	0	0	0	0	0	0	0	0	-6	3	0	4	1	-2
χ_{280}	0	0	0	0	0	0	0	0	6	-3	0	0	0	0
χ_{281}	0	0	0	0	0	0	0	0	-6	3	0	0	0	0
χ_{282}	0	0	0	0	0	0	0	0	0	0	0	4	1	-2
χ_{283}	0	0	0	0	0	0	0	0	0	0	0	-4	-1	2
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{288}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{289}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{290}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{291}	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

	$12P$						$12Q$	$18D$				$18E$		
	$12AR$	$12AS$	$12AT$	$12AU$	$12AV$	$12AW$	$12AX$	$18AB$	$18AC$	$18AD$	$18AE$	$18AF$	$18AG$	$18AH$
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{239}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{240}	0	0	0	0	0	0	0	-2	-2	4	-2	-2	-2	-2
χ_{241}	0	0	0	0	0	0	0	2	2	-4	2	2	2	2
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	2	2	2	-1	-1	-1	0	6	-3	0	0	0	0	0
χ_{244}	-2	-2	-2	1	1	1	0	-6	3	0	0	0	0	0
χ_{245}	2	2	2	-1	-1	-1	0	-6	3	0	0	0	0	0
χ_{246}	-2	-2	-2	1	1	1	0	6	-3	0	0	0	0	0
χ_{247}	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{248}	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{249}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{250}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{251}	0	0	0	0	0	0	0	-6	3	0	0	0	0	0
χ_{252}	0	0	0	0	0	0	0	6	-3	0	0	0	0	0
χ_{253}	2	2	2	-1	-1	-1	0	6	-3	0	0	0	0	0
χ_{254}	-2	-2	-2	1	1	1	0	-6	3	0	0	0	0	0
χ_{255}	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{256}	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{257}	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{258}	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{259}	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{260}	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{261}	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{262}	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{263}	0	0	0	0	0	0	0	-6	3	0	0	0	0	0
χ_{264}	0	0	0	0	0	0	0	6	-3	0	0	0	0	0
χ_{265}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{266}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{267}	2	2	2	-1	-1	-1	0	-6	3	0	0	0	0	0
χ_{268}	-2	-2	-2	1	1	1	0	6	-3	0	0	0	0	0
χ_{269}	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{270}	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{271}	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{272}	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{273}	0	0	0	0	0	0	0	6	-3	0	0	0	0	0
χ_{274}	0	0	0	0	0	0	0	-6	3	0	0	0	0	0
χ_{275}	0	0	0	0	0	0	0	6	-3	0	0	0	0	0
χ_{276}	0	0	0	0	0	0	0	-6	3	0	0	0	0	0
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{279}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{280}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{281}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{282}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{283}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{288}	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{289}	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{290}	0	0	0	0	0	0	0	-6	3	0	0	0	0	0
χ_{291}	0	0	0	0	0	0	0	6	-3	0	0	0	0	0

Table 9.8: The character table of $3^7{\cdot}(O_7(3){:}2)$ (continued)

		$18F$						$20B$	$24A$	$26A$		$28A$		$30A$	$26A$
	$18AI$	$18AJ$	$18AK$	$18AL$	$18AM$	$18AN$	$18AO$	$20B$	$24E$	$26A$	$26B$	$28A$	$28B$	$30H$	$36G$
χ_{236}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{237}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{238}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{239}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{240}	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{241}	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{242}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{243}	0	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{244}	0	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{245}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{246}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{247}	0	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{248}	0	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{249}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{250}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{251}	0	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{252}	0	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{253}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{254}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{255}	0	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{256}	0	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{257}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{258}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{259}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{260}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{261}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{262}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{263}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{264}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{265}	0	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{266}	0	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{267}	0	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{268}	0	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{269}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{270}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{271}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{272}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{273}	0	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{274}	0	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{275}	0	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0
χ_{276}	0	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{277}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{278}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{279}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{280}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{281}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{282}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{283}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{284}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{285}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{286}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{287}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{288}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{289}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{290}	0	2	2	2	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{291}	0	-2	-2	-2	1	1	1	0	0	0	0	0	0	0	0

$A = (-1+\sqrt{-13})/2$ $\quad \bar{A} = (-1-\sqrt{-13})/2$

$B = -1+\sqrt{-13}$ $\quad \bar{B} = -1-\sqrt{-13}$

$C = \sqrt{-7}$

9.5 The Fusion of $3^7{\cdot}(O_7(3){:}2)$ into Fi_{24}

Using GAP together with the results of Section 9.4 we compute the power maps of elements of $\bar{G}$ which are listed in Table 9.9.

Table 9.9: The power maps of the elements of $3^7{\cdot}(O_7(2){:}2)$

$[g]_{O_7(3):2}$	$[x]_{\bar{G}}$	2	3	5	7	13	$[g]_{O_7(2):2}$	$[x]_{\bar{G}}$	2	3	5	7	13
$1A$	$1A$						$2A$	$2A$	$1A$				
	$3A$		$1A$					$6A$	$3C$	$2A$			
	$3B$		$1A$										
	$3C$		$1A$										
$2B$	$2B$	$1A$					$2C$	$2C$	$1A$				
	$6B$	$3C$	$2B$					$6E$	$3C$	$2C$			
	$6C$	$3A$	$2B$					$6F$	$3B$	$2C$			
	$6D$	$3B$	$2B$					$6G$	$3A$	$2C$			
$3A$	$3D$		$1A$				$3B$	$3J$		$1A$			
	$3E$		$1A$					$3K$		$1A$			
	$3F$		$1A$					$3L$		$1A$			
	$3G$		$1A$					$9A$		$3B$			
	$3H$		$1A$										
	$3I$		$1A$										
$3C$	$3M$		$1A$				$3D$	$9C$		$3B$			
	$3N$		$1A$					$9D$		$3B$			
	$9B$		$3B$					$9E$		$3B$			
	$3O$		$1A$					$3Q$		$1A$			
	$3P$		$1A$										
$3E$	$3R$		$1A$				$3F$	$9H$		$3B$			
	$9F$		$3B$					$9I$		$3B$			
	$9G$		$3B$					$9J$		$3B$			
								$9K$		$3B$			
								$3S$		$1A$			
								$9L$		$3B$			
								$9M$		$3B$			
$4A$	$4A$	$2B$					$4B$	$4B$	$2C$				
	$12A$	$6C$						$12B$	$6E$	$4B$			
								$12C$	$6F$	$4B$			
								$12D$	$6B$	$4D$			
$4C$	$4C$	$2C$					$4D$	$4D$	$2B$				
	$12E$	$6E$	$4C$					$12F$	$6C$	$4D$			
								$12G$	$6D$	$4D$			
								$12H$	$6B$	$4D$			
$5A$	$5A$			$1A$			$6A$	$6H$	$3D$	$2A$			
	$15A$		$5A$	$3A$				$6I$	$3G$	$2A$			
	$15B$		$5A$	$3B$				$6J$	$3K$	$2A$			
	$15C$		$5A$	$3C$									
$6B$	$6K$	$3M$	$2A$				$6C$	$6M$	$3D$	$2B$			
	$6L$	$3P$	$2A$					$6N$	$3G$	$2B$			
								$6O$	$3F$	$2B$			
$6D$	$6P$	$3M$	$2C$				$6E$	$6Q$	$3M$	$2B$			
	$18A$	$9B$	$6F$					$6R$	$3O$	$2B$			
								$6S$	$3P$	$2B$			
								$18B$	$9B$	$6D$			

Table 9.9: The power maps of the elements of $3^7{\cdot}(O_7(2){:}2)$ (continued)

$[g]_{O_7(3):2}$	$[x]_{\bar{G}}$	2	3	5	7	13	$[g]_{O_7(2):2}$	$[x]_{\bar{G}}$	2	3	5	7	13
$6F$	$6T$	$3D$	$2C$				$6G$	$6Y$	$3K$	$2B$			
	$6U$	$3H$	$2C$					$6Z$	$3J$	$2B$			
	$6V$	$3I$	$2C$					$6AA$	$3K$	$2B$			
	$6W$	$3G$	$2C$					$6AB$	$3L$	$2B$			
	$6X$	$3E$	$2C$					$18C$	$9A$	$6D$			
$6H$	$6AC$	$3K$	$2C$				$6I$	$6AH$	$3M$	$2C$			
	$6AD$	$3L$	$2C$					$6AI$	$3P$	$2C$			
	$6AE$	$3J$	$2C$					$6AJ$	$3N$	$2C$			
	$6AF$	$3K$	$2C$					$6AK$	$3O$	$2C$			
	$6AG$	$3L$	$2C$					$6AL$	$3R$	$2A$			
$6J$	$18D$	$9C$	$6F$				$6K$	$6AN$	$3R$	$2C$			
	$6AM$	$3Q$	$2C$					$18F$	$9G$	$6F$			
	$18E$	$9E$	$6F$										
$6L$	$18G$	$9L$	$6F$				$7A$	$7A$				$1A$	
	$6AO$	$3S$	$2C$					$21A$		$7A$		$3C$	
	$18H$	$9H$	$6F$										
$8A$	$8A$	$4B$					$8B$	$8B$	$4C$				
	$24A$	$12D$	$8A$					$24B$	$12E$	$8B$			
$9A$	$9N$		$3G$				$9B$	$9Q$		$3G$			
	$9O$		$3G$					$9R$		$3G$			
	$9P$		$3D$					$9S$		$3G$			
								$9T$		$3H$			
								$9U$		$3G$			
								$9V$		$3G$			
								$9W$		$3G$			
$9C$	$27A$		$9D$				$10A$	$10A$	$5A$		$2B$		
	$27B$		$9D$					$30A$	$15A$	$10A$	$6C$		
	$27C$		$9C$										
$10B$	$10B$	$5A$		$2A$			$12A$	$12I$	$6P$	$4B$			
	$30B$	$15C$	$10B$	$6A$				$36A$	$18A$	$12C$			
$12B$	$12J$	$6T$	$4B$				$12C$	$12O$	$6Q$	$4A$			
	$12K$	$6U$	$4B$					$12P$	$6R$	$4A$			
	$12L$	$6V$	$4B$										
	$12M$	$6W$	$4B$										
	$12N$	$6X$	$4B$										
$12D$	$12Q$	$6Y$	$4A$				$12D$	$12S$	$6T$	$4C$			
	$12R$	$6Z$	$4A$					$12T$	$6W$	$4C$			
$12E$	$36B$	$18D$	$12C$				$12F$	$12V$	$6Y$	$4D$			
	$12U$	$6AM$	$4B$					$36D$	$18C$	$12G$			
	$36C$	$18E$	$12C$										
$13A$	$13A$					$1A$	$13B$	$13B$					$1A$
	$39A$		$13A$			$3A$		$39B$		$13B$			$3A$
$14A$	$14A$	$7A$			$2A$		$15A$	$15D$		$5A$	$3J$		
	$42A$	$21A$	$14A$		$6A$			$45A$		$15B$	$9A$		

Table 9.9: The power maps of the elements of $3^7{\cdot}(O_7(2){:}2)$ (continued)

$[g]_{O_7(3):2}$	$[x]_{\bar{G}}$	2	3	5	7	13	$[g]_{O_7(2):2}$	$[x]_{\bar{G}}$	2	3	5	7	13
18A	18I	9P	6H				18B	18J	9V	6I			
								18K	9Q	6I			
								18L	9U	6I			
18C	18M	9P	6M				20A	20A	10A		4A		
	18N	9N	6N					60A	30A	20A	12A		
2D	2D	1A					2E	2E	1A				
	6AP	3A	2D					6AS	3A	2E			
	6AQ	3C	2D					6AT	3C	2E			
	6AR	3B	2D					6AU	3B	2E			
2F	2F	1A					4G	4G	2B				
	6AV	3B	2F					12W	6C	4G			
	6AW	3A	2F					12X	6B	4G			
	6AX	3C	2F					12Y	6D	4G			
4E	4E	2B					4F	4F	2A				
4H	4H	2B					4I	4I	2C				
	12AZ	6C	4H					12AB	6G	4I			
	12AA	6B	4H					12AC	6E	4I			
								12AD	6F	4I			
6M	6AY	3G	2D				6N	6BF	3K	2D			
	6AZ	3E	2D					6BG	3L	2D			
	6BA	3I	2D					18O	9A	6AR			
	6BB	3F	2D					6BH	3K	2D			
	6BC	3D	2D					6BI	3L	2D			
	6BD	3G	2D					6BJ	3J	2D			
	6BE	3H	2D										
6O	6BK	3M	2D				6P	6BO	3J	2F			
	6BL	3O	2D					6BP	3K	2F			
	6BM	3N	2D					6BQ	3L	2F			
	6BN	3P	2D										
	18P	9B	6AR										
6Q	6BR	3G	2E				6R	6BX	3K	2E			
	6BS	3D	2E					6BY	3J	2E			
	6BT	3G	2E					6BZ	3K	2E			
	6BU	3H	2E					6BCA	3L	2E			
	6BV	3I	2E										
	6BW	3E	2E										
6T	6CB	3K	2F				6U	6CC	3M	2F			
	18Q	9A	6AV					6CD	3O	2F			
								18R	9B	6AV			
6V	6CE	3M	2E				6W	18S	9H	6AR			
	6CF	3O	2E					18T	9L	6AR			
	6CG	3P	2E					6CI	3S	2D			
	6CH	3N	2E					18U	9K	6AR			
								18V	9J	6AR			
								18W	9I	6AR			

Table 9.9: The power maps of the elements of $3^7{\cdot}(O_7(2){:}2)$ (continued)

$[g]_{O_7(3):2}$	$[x]_{\bar{G}}$	2	3	5	7	13	$[g]_{O_7(2):2}$	$[x]_{\bar{G}}$	2	3	5	7	13
6X	6CJ	3R	2F				6Y	18Y	9H	6AV			
	18X	9F	6AV					18Z	9M	6AV			
								18AA	9L	6AV			
								6CK	3S	2F			
8C	8C	4B					10C	10C	5A		2F		
	8D	4B											
	24C	12D	8C										
	24D	12B	8D										
10D	10D	5A		2D			10E	10E	5A		2E		
	30C	15A	10D	6AP				30E	15A	10E	6AS		
	30D	15C	10D	6AQ				30F	15C	10E	6AT		
								30G	15B	10E	6AU		
12B	12AE	6M	4E				12C	12AF	6Q	4E			
12D	12AG	6H	4F				12E	12AH	6Y	4E			
12F	12AI	6M	4G				12G	12AK	6Q	4G			
	12AJ	6O	4G					12AL	6S	4G			
								36E	18B	12Y			
12H	12AM	6Y	4G				12I	12AO	6Q	4H			
	12AN	6Z	4G					12AP	6R	4H			
	36F	18C	12Y					12AQ	6S	4H			
12J	12AR	6W	4I				12K	12AX	6AL	4F			
	12AS	6T	4I										
	12AT	6W	4I										
	12AU	6U	4I										
	12AV	6V	4I										
	12AW	6X	4I										
18D	18AB	9N	6AY				18E	18AF	9V	6AY			
	18AC	9O	6AY					18AG	9U	6AY			
	18AD	9P	6BC					18AH	9Q	6AY			
	18AE	9N	6BD					18AI	9T	6BE			
18F	18AJ	9Q	6BT				20B	20B	10A		4E		
	18AK	9V	6BT										
	18AL	9U	6BT										
	18AM	9W	6BT										
	18AN	9R	6BT										
	18AO	9S	6BT										
24A	24E	12I	8C				26A	26A	13B				2D
26B	26B	13A				2D	28A	28A	14A			4F	
28B	28B	14A			4F		30A	30H	15D	10C	6BO		
36A	36G	18M	12AE										

The power maps of elements of Fi_{24} are given in the ATLAS. The conjugacy classes of elements of elements of Fi_{24} can be divided into two categories, those which are in Fi'_{24} and those which are outside of Fi'_{24}. Since $3^7{\cdot}O_7(3) \leq \bar{G}$, we first obtain the fusion of

$3^7{\cdot}O_7(3)$ into $\bar{G}$. This will help to determine those classes of elements of $\bar{G}$ that fuse into Fi'_{24}. Those conjugacy classes of elements of $\bar{G}$ which contain classes of $3^7{\cdot}O_7(3)$ will fuse into Fi'_{24} and others will fuse into $Fi_{24} - Fi'_{24}$. We give the complete fusion of $3^7{\cdot}O_7(3)$ into $\bar{G}$ in Table 9.10.

The permutation character of Fi_{24} of degree 125168046080 is given in [12]. By using the information provided by the conjugacy classes of elements of $\bar{G}$ (Table 9.7) and Fi_{24}, the power maps of $\bar{G}$ (Table 9.9) and Fi_{24}, and the permutation character of Fi_{24} of degree 125168046080 we compute the fusion map of $\bar{G}$ into Fi_{24}. The complete fusion map of $\bar{G}$ into Fi_{24} is given in Table 9.11.

Table 9.10: The Fusion of $3^7{\cdot}O_7(3)$ into $3^7{\cdot}(O_7(3){:}2)$

$[g]_{O_7(3)}$	$[x]_{3^7\cdot O_7(3)}$	$\longrightarrow$	$[y]_{3^7\cdot(O_7(3):2)}$	$[g]_{O_7(3)}$	$[x]_{3^7\cdot O_7(3)}$	$\longrightarrow$	$[y]_{3^7\cdot(O_7(3):2)}$
1A	1A		1A	2A	2A		2A
	3A		3A		6A		6A
	3B		3B				
	3C		3C				
2B	2B		2B	2C	2C		2C
	6B		6B		6E		6E
	6C		6C		6F		6F
	6D		6D		6G		6G
3A	3D		3D	3B	3J		3J
	3E		3E		3K		3K
	3F		3F		3L		3L
	3G		3G		9A		9A
	3H		3H				
	3I		3I				
3C	3M		3M	3D	9C		9C
	3N		3N		9D		9D
	9B		9B		9E		9E
	3O		3O		3Q		3Q
	3P		3P				
3E	9F		9C	3F	3S		3R
	9G		9D		9I		9G
	9H		9E		9J		9G
	3R		3Q		9K		9F
3G	9L		9H	4A	4A		4A
	9M		9I		12A		12A
	9N		9J				
	9O		9K				
	3T		3S				
	9P		9L				
	9Q		9M				
4B	4B		4B	4C	4C		4C
	12B		12B		12E		12E
	12C		12C				
	12D		12D				

Table 9.10: The Fusion of $3^7{\cdot}O_7(3)$ into $3^7{\cdot}(O_7(3){:}2)$ (continued)

$[g]_{O_7(3)}$	$[x]_{3^7\cdot O_7(3)}$	$\longrightarrow$ $[y]_{3^7\cdot(O_7(3):2)}$	$[g]_{O_7(3)}$	$[x]_{3^7\cdot O_7(3)}$	$\longrightarrow$ $[y]_{3^7\cdot(O_7(3):2)}$
4D	4D	4D	5A	5A	5A
	12F	12F		15A	15A
	12G	12G		15B	15B
	12H	12H		15C	15C
6A	6H	6H	6B	6J	6J
	6I	6I			
6C	6K	6K	6D	6M	6M
	6L	6L		6N	6N
				6O	6O
6E	6P	6P	6F	6Q	6Q
	18A	18A		6R	6R
				6S	6S
				18B	18B
6G	6T	6T	6H	6Y	6Y
	6U	6V		6Z	6Z
	6V	6U		6AA	6AA
	6W	6W		6AB	6AB
	6X	6X		18C	18C
6I	6AC	6AC	6J	6AH	6AH
	6AD	6AE		6AI	6AI
	6AE	6AD		6AJ	6AJ
	6AF	6AF		6AK	6AK
	6AG	6AG			
6K	6AL	6AL	6L	18D	18D
				18E	18E
				6AM	6AM
				18F	18D
				18G	18E
				6AN	6AM
6M	6AO	6AN	6N	18J	18G
	18H	18F		18K	18H
	6AP	6AN		6AQ	6AO
	18I	18F			
7A	7A	7A	8A	8A	8A
	21A	21A		24A	24A
	21B	21A			
8B	8B	8B	9A	9R	9N
	24B	24B		9S	9O
	24C	24B		9T	9P
9B	9U	9Q	9C	27A	27A
	9V	9R		27B	27B
	9W	9S		27C	27C
	9X	9T			
	9Y	9U			
	9Z	9V			
	9AA	9W			

Table 9.10: The Fusion of $3^7{\cdot}O_7(3)$ into $3^7{\cdot}(O_7(3){:}2)$ (continued)

$[g]_{O_7(3)}$	$[x]_{3^7\cdot O_7(3)}$	$\longrightarrow$	$[y]_{3^7\cdot(O_7(3):2)}$	$[g]_{O_7(3)}$	$[x]_{3^7\cdot O_7(3)}$	$\longrightarrow$	$[y]_{3^7\cdot(O_7(3):2)}$
$9D$	$27D$		$27A$	$10A$	$10A$		$10A$
	$27E$		$27B$		$30A$		$30A$
	$27F$		$27C$				
$10B$	$10B$		$10B$	$12A$	$12I$		$12I$
	$30B$		$30B$		$36A$		$36A$
					$36B$		$36A$
$12B$	$12J$		$12J$	$12C$	$12O$		$12O$
	$12K$		$12L$		$12P$		$12P$
	$12L$		$12K$				
	$12M$		$12M$				
	$12N$		$12N$				
$12D$	$12Q$		$12Q$	$12E$	$12S$		$12S$
	$12R$		$12R$		$12T$		$12T$
$12F$	$36C$		$36B$	$12G$	$36E$		$36B$
	$36D$		$36C$		$36F$		$36C$
	$12U$		$12U$		$12V$		$12U$
$12H$	$12W$		$12V$	$13A$	$13A$		$13A$
	$36G$		$36D$		$39A$		$39A$
					$39B$		$39A$
$13B$	$13B$		$13B$	$14A$	$214A$		$14A$
	$39C$		$39B$		$42A$		$42A$
	$39D$		$39B$		$42B$		$42A$
$15A$	$15D$		$15D$	$18A$	$18L$		$18I$
	$45A$		$45A$				
	$45B$		$45A$				
$18B$	$18M$		$18I$	$18C$	$18N$		$18J$
					$18O$		$18K$
					$18P$		$18L$
$18D$	$18Q$		$18M$	$20A$	$20A$		$20A$
	$18R$		$18N$		$60A$		$60A$
					$60B$		$60A$

Table 9.11: The Fusion of $3^7{\cdot}(O_7(3){:}2)$ into Fi_{24}

$[g]_{O_7(3):2}$	$[x]_{3^7\cdot(O_7(3):2)}$	$\longrightarrow$	$[y]_{Fi_{24}}$	$[g]_{O_7(3):2}$	$[x]_{3^7\cdot(O_7(3):2)}$	$\longrightarrow$	$[y]_{Fi_{24}}$
1A	1A		1A	2A	2A		2B
	3A		3A		6A		6B
	3B		3B				
	3C		3C				
2B	2B		2A	2C	2C		2B
	6B		6F		6E		6I
	6C		6A		6F		6E
	6D		6C		6G		6D
3A	3D		3D	3B	3J		3B
	3E		3C		3K		3C
	3F		3D		3L		3D
	3G		3B		9A		9B
	3H		3D				
	3I		3A				
3C	3M		3A	3D	9C		9A
	3N		3D		9D		9D
	9B		9C		9E		9C
	3O		3C		3Q		3E
	3P		3D				
3E	3R		3E	3F	9H		9A
	9F		9D		9I		9C
	9G		9E		9J		9E
					9K		9B
					3S		3D
					9L		9E
					9M		9D
4A	4A		4B	4B	4B		4A
	12A		12D		12B		12E
					12C		12B
					12D		12A
4C	4C		4C	4D	4D		4B
	12E		12J		12F		12D
					12G		12G
					12H		12K
5A	5A		5A	6A	6H		6H
	15A		15A		6I		6E
	15B		15B		6J		6I
	15C		15C				
6B	6K		6D	6C	6M		6G
	6L		6J		6N		6C
					6O		6G
6D	6P		6D	6E	6Q		6A
	18A		18A		6R		6F
					6S		6G
					18B		18B

Table 9.11: The Fusion of $3^7{\cdot}(O_7(3){:}2)$ into Fi_{24} (continued)

$[g]_{O_7(3):2}$	$[x]_{3^7\cdot(O_7(3):2)}$	$\longrightarrow$	$[y]_{Fi_{24}}$	$[g]_{O_7(3):2}$	$[x]_{3^7\cdot(O_7(3):2)}$	$\longrightarrow$	$[y]_{Fi_{24}}$
$6F$	$6T$		$6J$	$6G$	$6Y$		$6F$
	$6U$		$6J$		$6Z$		$6C$
	$6V$		$6D$		$6AA$		$6F$
	$6W$		$6E$		$6AB$		$6G$
	$6X$		$6I$		$18C$		$18D$
$6H$	$6AC$		$6B$	$6I$	$6AH$		$6D$
	$6AD$		$6H$		$6AI$		$6H$
	$6AE$		$6E$		$6AJ$		$6J$
	$6AF$		$6I$		$6AK$		$6I$
	$6AG$		$6J$		$6AL$		$6K$
$6J$	$18D$		$18C$	$6K$	$6AN$		$6K$
	$6AM$		$6K$		$18F$		$18E$
	$18E$		$18A$				
$6L$	$18G$		$18E$	$7A$	$7A$		$7B$
	$6AO$		$6J$		$21A$		$21C$
	$18H$		$18C$				
$8A$	$8A$		$8A$	$8B$	$8B$		$8C$
	$24A$		$24A$		$24B$		$24E$
$9A$	$9N$		$9B$	$9B$	$9Q$		$9E$
	$9O$		$9E$		$9R$		$9C$
	$9P$		$9F$		$9S$		$9D$
					$9T$		$9F$
					$9U$		$9C$
					$9V$		$9A$
					$9W$		$9E$
$9C$	$27A$		$27B$	$10A$	$10A$		$10A$
	$27B$		$27B$		$30A$		$30A$
	$27C$		$27A$				
$10B$	$10B$		$10B$	$12A$	$12I$		$12C$
	$30B$		$30B$		$36A$		$36A$
$12B$	$12J$		$12F$	$12C$	$12O$		$12D$
	$12K$		$12F$		$12P$		$12K$
	$12L$		$12A$				
	$12M$		$12B$				
	$12N$		$12E$				
$12D$	$12Q$		$12K$	$12D$	$12S$		$12L$
	$12R$		$12G$		$12T$		$12H$
$12E$	$36B$		$36B$	$12F$	$12V$		$12K$
	$12U$		$12I$		$36D$		$36C$
	$36C$		$36A$				
$13A$	$13A$		$13A$	$13B$	$13B$		$13A$
	$39A$		$39A$		$39B$		$39B$
$14A$	$14A$		$14B$	$15A$	$15D$		$15B$
	$42A$		$42B$		$45A$		$45A$

Table 9.11: The Fusion of $3^7{\cdot}(O_7(3){:}2)$ into Fi_{24} (continued)

$[g]_{O_7(3):2}$	$[x]_{3^7\cdot(O_7(3):2)}$	$\longrightarrow$ $[y]_{Fi_{24}}$	$[g]_{O_7(3):2}$	$[x]_{3^7\cdot(O_7(3):2)}$	$\longrightarrow$ $[y]_{Fi_{24}}$
18A	18I	18G	18B	18J	18C
				18K	18E
				18L	18A
18C	18M	18F	20A	20A	20A
	18N	18D		60A	60A
2D	2D	2C	2E	2E	2D
	6AP	6L		6AS	6P
	6AQ	6O		6AT	6S
	6AR	6M		6AU	6N
2F	2F	2D	4G	4G	4D
	6AV	6Q		12W	12M
	6AW	6P		12X	12Q
	6AX	6T		12Y	12O
4E	4E	4E	4F	4F	4G
4H	4H	4E	4I	4I	4F
	12Z	12R		12AB	12S
	12AA	12W		12AC	12X
				12AD	12T
6M	6AY	6M	6N	6BF	6O
	6AZ	6O		6BG	6R
	6BA	6L		18O	18I
	6BB	6R		6BH	6O
	6BC	6R		6BI	6R
	6BD	6M		6BJ	6M
	6BE	6R			
6O	6BK	6L	6P	6BO	6N
	6BL	6O		6BP	6S
	6BM	6R		6BQ	6U
	6BN	6R			
	18P	18J			
6Q	6BR	6N	6R	6BX	6T
	6BS	6U		6BY	6Q
	6BT	6Q		6BZ	6S
	6BU	6U		6BCA	6U
	6BV	6P			
	6BW	6S			
6T	6CB	6T	6U	6CC	6P
	18Q	18M		6CD	6T
				18R	18N
6V	6CE	6P	6W	18S	18H
	6CF	6T		18T	18L
	6CG	6U		6CI	6R
	6CH	6U		18U	18I
				18V	18L
				18W	18J

Table 9.11: The Fusion of $3^7{\cdot}(O_7(3){:}2)$ into Fi_{24} (continued)

$[g]_{O_7(3):2}$	$[x]_{3^7\cdot(O_7(3):2)}$	$\longrightarrow$	$[y]_{Fi_{24}}$	$[g]_{O_7(3):2}$	$[x]_{3^7\cdot(O_7(3):2)}$	$\longrightarrow$	$[y]_{Fi_{24}}$
$6X$	$6CJ$		$6V$	$6Y$	$18Y$		$18K$
	$18X$		$18O$		$18Z$		$18O$
					$18AA$		$18P$
					$6CK$		$6U$
$8C$	$8C$		$8D$	$10C$	$10C$		$10D$
	$8D$		$8E$				
	$24C$		$24F$				
	$24D$		$24H$				
$10D$	$10D$		$10C$	$10E$	$10E$		$10D$
	$30C$		$30C$		$30E$		$30D$
	$30D$		$30E$		$30F$		$30F$
					$30G$		$30G$
$12B$	$12AE$		$12V$	$12C$	$12AF$		$12R$
$12D$	$12AG$		$12Y$	$12E$	$12AH$		$12W$
$12F$	$12AI$		$12U$	$12G$	$12AK$		$12N$
	$12AJ$		$12U$		$12AL$		$12U$
					$36E$		$36D$
$12H$	$12AM$		$12Q$	$12I$	$12AO$		$12R$
	$12AN$		$12O$		$12AP$		$12W$
	$36F$		$36E$		$12AQ$		$12V$
$12J$	$12AR$		$12T$	$12K$	$12AX$		$12AA$
	$12AS$		$12Z$				
	$12AT$		$12P$				
	$12AU$		$12Z$				
	$12AV$		$12S$				
	$12AW$		$12X$				
$18D$	$18AB$		$18I$	$18E$	$18AF$		$18H$
	$18AC$		$18L$		$18AG$		$18J$
	$18AD$		$18Q$		$18AH$		$18L$
	$18AE$		$18I$		$18AI$		$18Q$
$18F$	$18AJ$		$18P$	$20B$	$20B$		$20D$
	$18AK$		$18K$				
	$18AL$		$18N$				
	$18AM$		$18P$				
	$18AN$		$18N$				
	$18AO$		$18O$				
$24A$	$24E$		$24G$	$26A$	$26A$		$26B$
$26B$	$26B$		$26C$	$28A$	$28A$		$28C$
$28B$	$28B$		$28D$	$30A$	$30H$		$30G$
$36A$	$36G$		$36G$				

Appendix A

Programmes

A.1 Programme A for $2^7{:}Sp_6(2)$

```
V := VectorSpace(FiniteField(2), 7);
gens := [ ];
gens[1] := [1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1,
0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1];
gens[2] := [1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 0, 1, 1, 1, 0, 0, 0, 1,
0, 1, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1];
gens[3] := [1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1,
0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1];
gens[4] := [1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1,
1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1];
gens[5] := [1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 1, 1, 0, 0, 0, 1,
0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1];
gens[6] := [1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1,
0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1];
gens[7] := [1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1,
1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0];
gens[8] := [1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 1,
1, 1, 1, 0, 0, 0, 0, 1, 0, 0, 0, 1, 1, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 0];
gens[9] := [1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 0, 1, 1, 1, 0, 0, 1, 0, 0, 0, 1,
0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 1, 1];
S<g1, g2, g3, g4, g5, g6, g7, g8, g9> := MatrixGroup<7, FiniteField(2)|gens>;
gens := [ ];
gens[1] := g1, gens[2] := [g2]; gens[3] := g3; gens[4] := g4; gens[5] := g5;
gens[6] := g6; gens[7] := g7; gens[8] := g8; gens[9] := g9;
c := Classes(S);
```

```
O1 := Orbit(S, elt<V | 0,0,0,0,0,0,0>);
O2 := Orbit(S, elt<V | 1,1,1,1,1,1,1>);
O3 := Orbit(S, elt<V | 0,0,0,0,0,0,1>);
O4 := Orbit(S, elt<V | 1,0,0,0,0,0,0>);
O := O1 join O2 join O3 join O4;
for i := 1 to 30 do
print c[i, 1];
w := elt<V | 0,0,0,0,0,0,0>;
e := { };
while(O diff e) ne { } do
d := { }
for x in O do;
y := {x + w + (x * c[i, 3])};
d := d join y;
end for;
print d;
e := d join e;
if(O diff e) ne { } then
w = Representative( O diff e );
end if;
end while;
r := { };
u := elt < V | 0,0,0,0,0,0,0 >;
while(O diff r) ne { } do;
m := { };
for g in Centralizer(S, c[i, 3]) do
l := {u * g};
m = m join l;
end for;
print 'A block for the vectors under the action of centralizer :';
print m;
r := m join r;
if (O diff r) ne { } then
u := Representative(O diff r);
end if;
end while;
print '********************************';
end for;
```

A.2 Programme A for $2^8{:}Sp_6(2)$

```
V := VectorSpace(FiniteField(2), 7);
gens := [ ];
gens[1] := [0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 1, 1, 1, 0, 0,
0, 0, 1, 0, 0, 0, 0, 0, 1, 1, 1, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0];
gens[2] := [0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0,
0, 0, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 0, 1, 0, 0, 1, 1, 1, 1, 1];
S<g1, g2> := MatrixGroup<7, FiniteField(2)|gens>;
gens := [ ];
gens[1] := g1;
gens[2] := g2;
c := Classes(S);
O1 := Orbit(S, elt<V | 0, 0, 0, 0, 0, 0, 0, 0>);
O2 := Orbit(S, elt<V | 1, 1, 1, 1, 1, 1, 1, 1>);
O3 := Orbit(S, elt<V | 1, 1, 1, 1, 1, 0, 0, 0>);
O := O1 join O2 join O3
for i := 1 to 30 do
print c[i, 1];
w := elt<V | 0, 0, 0, 0, 0, 0, 0, 0>;
e := { };
while(O diff e) ne { } do
d := { }
for x in O do;
y := {x + w + (x * c[i, 3])};
d := d join y;
end for;
print d;
e := d join e;
if(O diff e) ne { } then
w = Representative( O diff e );
end if;
end while;
r := { };
u := elt<V | 0, 0, 0, 0, 0, 0, 0, 0>;
while(O diff r) ne { } do;
m := { };
for g in Centralizer(S, c[i, 3]) do
l := {u * g};
```

```
m = m join l;
end for;
print 'A block for the vectors under the action of centralizer :';
print m;
r := m join r;
if (O diff r) ne { } then
u := Representative(O diff r);
end if;
end while;
print '*******************************';
end for;
```

Appendix B

Tables

Table 1: Character Table of $3^5{:}U_4(2){:}2$

	$1A$	$3A$	$3B$	$3C$	$2A$	$12A$	$12B$	$12C$	$4A$	$12D$	$4B$	$2B$	$6A$	$6B$	$6C$	$6D$	$6E$	$2C$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	1	1	-1	-1	-1	-1	-1	1	1	-1	-1	-1	1	1	1	1
χ_3	5	5	5	5	-5	1	1	1	1	-1	-1	-1	-1	-1	1	1	1	1
χ_4	5	5	5	5	-5	1	1	1	1	-1	-1	-1	-1	-1	1	1	1	1
χ_5	5	5	5	5	5	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1
χ_6	5	5	5	5	5	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1
χ_7	6	6	6	6	-6	0	0	0	0	0	0	-2	-2	-2	2	2	2	2
χ_8	6	6	6	6	6	0	0	0	0	0	0	2	2	2	2	2	2	2
χ_9	10	10	10	10	10	0	0	0	0	0	0	-2	-2	-2	-2	-2	-2	-2
χ_{10}	10	10	10	10	-10	0	0	0	0	0	0	2	2	2	-2	-2	-2	-2
χ_{11}	10	10	10	10	10	0	0	0	0	0	0	-2	-2	-2	-2	-2	-2	-2
χ_{12}	10	10	10	10	-10	0	0	0	0	0	0	2	2	2	-2	-2	-2	-2
χ_{13}	15	15	15	15	-15	-1	-1	-1	-1	1	1	-3	-3	-3	3	3	3	3
χ_{14}	15	15	15	15	15	1	1	1	1	1	1	3	3	3	3	3	3	3
χ_{15}	15	15	15	15	15	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_{16}	15	15	15	15	-15	1	1	1	1	-1	-1	1	1	1	-1	-1	-1	-1
χ_{17}	20	20	20	20	20	0	0	0	0	0	0	4	4	4	4	4	4	4
χ_{18}	20	20	20	20	-20	0	0	0	0	0	0	-4	-4	-4	4	4	4	4
χ_{19}	24	24	24	24	-24	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{20}	24	24	24	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{21}	30	30	30	30	-30	0	0	0	0	0	0	-2	-2	-2	2	2	2	2
χ_{22}	30	30	30	30	30	0	0	0	0	0	0	2	2	2	2	2	2	2
χ_{23}	30	30	30	30	30	0	0	0	0	0	0	2	2	2	2	2	2	2
χ_{24}	30	30	30	30	-30	0	0	0	0	0	0	-2	-2	-2	2	2	2	2
χ_{25}	30	30	30	30	30	0	0	0	0	0	0	2	2	2	2	2	2	2
χ_{26}	30	30	30	30	-30	0	0	0	0	0	0	-2	-2	-2	2	2	2	2
χ_{27}	40	40	40	40	-40	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{28}	40	40	40	40	-40	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{29}	40	40	40	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{30}	40	40	40	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{31}	45	45	45	45	45	1	1	1	1	1	1	-3	-3	-3	-3	-3	-3	-3
χ_{32}	45	45	45	45	-45	-1	-1	-1	-1	1	1	3	3	3	-3	-3	-3	-3
χ_{33}	45	45	45	45	45	1	1	1	1	1	1	-3	-3	-3	-3	-3	-3	-3
χ_{34}	45	45	45	45	-45	-1	-1	-1	-1	1	1	3	3	3	-3	-3	-3	-3
χ_{35}	60	60	60	60	60	0	0	0	0	0	0	4	4	4	4	4	4	4
χ_{36}	60	60	60	60	-60	0	0	0	0	0	0	-4	-4	-4	4	4	4	4
χ_{37}	64	64	64	64	-64	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{38}	64	64	64	64	64	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{39}	72	0	9	-9	0	-2	1	1	-2	-1	2	-4	-1	2	0	3	-3	12
χ_{40}	72	0	9	-9	0	2	-1	-1	2	-1	2	4	1	-2	0	3	-3	12
χ_{41}	80	8	-10	-1	0	-2	1	-2	4	0	0	0	0	0	-4	-1	2	8
χ_{42}	80	8	-10	-1	0	2	-1	2	-4	0	0	0	0	0	-4	-1	2	8
χ_{43}	81	81	81	81	-81	1	1	1	1	-1	-1	3	3	3	-3	-3	-3	-3
χ_{44}	81	81	81	81	81	-1	-1	-1	-1	-1	-1	-3	-3	-3	-3	-3	-3	-3
χ_{45}	90	-9	0	9	0	-1	-1	2	2	0	0	4	-2	1	3	-3	0	6
χ_{46}	90	-9	0	9	0	1	1	-2	-2	0	0	-4	2	-1	3	-3	0	6

Table 1: Character Table of $3^5{:}U_4(2){:}2$ (continued)

	$12E$	$4C$	$4D$	$6F$	$6G$	$6H$	$2D$	$2E$	$6I$	$6J$	$6K$	$6L$	$6M$	$6N$	$6O$	$6P$	$6Q$	$6R$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	-1	-1	-1	-1	-1	1	1	-1	-1	1	1	1	1	-1	-1	-1
χ_3	1	1	-1	3	3	3	3	-3	-3	A	A	$-A$	$-A$	$-\bar{A}$	$-\bar{A}$	$\bar{A}$	$\bar{A}$	$-\bar{B}$
χ_4	1	1	-1	3	3	3	3	-3	-3	$\bar{A}$	$\bar{A}$	$-\bar{A}$	$-\bar{A}$	$-A$	$-A$	A	A	$-B$
χ_5	1	1	1	-3	-3	-3	-3	-3	-3	$-\bar{A}$	$-\bar{A}$	$-\bar{A}$	$-\bar{A}$	$-A$	$-A$	$-A$	$-A$	B
χ_6	1	1	1	-3	-3	-3	-3	-3	-3	$-A$	$-A$	$-A$	$-A$	$-\bar{A}$	$-\bar{A}$	$-\bar{A}$	$-\bar{A}$	$\bar{B}$
χ_7	2	2	-2	2	2	2	2	-2	-2	-1	-1	1	1	1	1	-1	-1	3
χ_8	2	2	2	-2	-2	-2	-2	-2	-2	1	1	1	1	1	1	1	1	-3
χ_9	2	2	2	2	2	2	2	2	2	B	B	B	B	$\bar{B}$	$\bar{B}$	$\bar{B}$	$\bar{B}$	K
χ_{10}	2	2	-2	-2	-2	-2	-2	2	2	$-B$	$-B$	B	B	$\bar{B}$	$\bar{B}$	$-\bar{B}$	$-\bar{B}$	$-K$
χ_{11}	2	2	2	2	2	2	2	2	2	$\bar{B}$	$\bar{B}$	$\bar{B}$	$\bar{B}$	B	B	B	B	$\bar{K}$
χ_{12}	2	2	-2	-2	-2	-2	-2	2	2	$-\bar{B}$	$-\bar{B}$	$\bar{B}$	$\bar{B}$	B	B	$-B$	$-B$	$-\bar{K}$
χ_{13}	-1	-1	1	-7	-7	-7	-7	7	7	-1	-1	1	1	1	1	-1	-1	3
χ_{14}	-1	-1	-1	7	7	7	7	7	7	1	1	1	1	1	1	1	1	-3
χ_{15}	3	3	3	-1	-1	-1	-1	-1	-1	2	2	2	2	2	2	2	2	6
χ_{16}	3	3	-3	1	1	1	1	-1	-1	-2	-2	2	2	2	2	-2	-2	-6
χ_{17}	0	0	0	4	4	4	4	4	4	-2	-2	-2	-2	-2	-2	-2	-2	2
χ_{18}	0	0	0	-4	-4	-4	-4	4	4	2	2	-2	-2	-2	-2	2	2	-2
χ_{19}	0	0	0	-8	-8	-8	-8	8	8	-2	-2	2	2	2	2	-2	-2	-6
χ_{20}	0	0	0	8	8	8	8	8	8	2	2	2	2	2	2	2	2	6
χ_{21}	-2	-2	2	10	10	10	10	-10	-10	1	1	-1	-1	-1	-1	1	1	-3
χ_{22}	-2	-2	-2	-10	-10	-10	-10	-10	-10	-1	-1	-1	-1	-1	-1	-1	-1	3
χ_{23}	2	2	2	6	6	6	6	6	6	$-A$	$-A$	$-A$	$-A$	$-\bar{A}$	$-\bar{A}$	$-\bar{A}$	$-\bar{A}$	L
χ_{24}	2	2	-2	-6	-6	-6	-6	6	6	A	A	$-A$	$-A$	$-\bar{A}$	$-\bar{A}$	$\bar{A}$	$\bar{A}$	$-L$
χ_{25}	2	2	2	6	6	6	6	6	6	$-\bar{A}$	$-\bar{A}$	$-\bar{A}$	$-\bar{A}$	$-A$	$-A$	$-A$	$-A$	$\bar{L}$
χ_{26}	2	2	-2	-6	-6	-6	-6	6	6	$\bar{A}$	$\bar{A}$	$-\bar{A}$	$-\bar{A}$	$-A$	$-A$	A	A	$-\bar{L}$
χ_{27}	0	0	0	8	8	8	8	-8	-8	C	C	$-C$	$-C$	$-\bar{C}$	$-\bar{C}$	$\bar{C}$	$\bar{C}$	M
χ_{28}	0	0	0	8	8	8	8	-8	-8	$\bar{C}$	$\bar{C}$	$-\bar{C}$	$-\bar{C}$	$-C$	$-C$	C	C	$\bar{M}$
χ_{29}	0	0	0	-8	-8	-8	-8	-8	-8	$\bar{C}$	$\bar{C}$	$-\bar{C}$	$-\bar{C}$	$-C$	$-C$	C	C	$\bar{M}$
χ_{30}	0	0	0	-8	-8	-8	-8	-8	-8	$-\bar{C}$	$-\bar{C}$	$-\bar{C}$	$-\bar{C}$	$-C$	$-C$	$-C$	$-C$	$-\bar{M}$
χ_{31}	1	1	1	-3	-3	-3	-3	-3	-3	$-C$	$-C$	$-C$	$-C$	$-\bar{C}$	$-\bar{C}$	$-\bar{C}$	$-\bar{C}$	$-M$
χ_{32}	1	1	-1	3	3	3	3	-3	-3	D	D	D	D	$\bar{D}$	$\bar{D}$	$\bar{D}$	$\bar{D}$	N
χ_{33}	1	1	1	-3	-3	-3	-3	-3	-3	$-D$	$-D$	D	D	$\bar{D}$	$\bar{D}$	$-\bar{D}$	$-\bar{D}$	$-N$
χ_{34}	1	1	-1	3	3	3	3	-3	-3	$\bar{D}$	$\bar{D}$	$\bar{D}$	$\bar{D}$	D	D	D	D	$\bar{N}$
χ_{35}	0	0	0	-4	-4	-4	-4	-4	-4	2	2	2	2	2	2	2	2	6
χ_{36}	0	0	0	4	4	4	4	-4	-4	-2	-2	2	2	2	2	-2	-2	-6
χ_{37}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
χ_{38}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8
χ_{39}	0	0	0	-6	3	3	-24	0	0	0	0	0	0	0	0	0	0	0
χ_{40}	0	0	0	6	-3	-3	24	0	0	0	0	0	0	0	0	0	0	0
χ_{41}	0	0	0	-4	-4	5	32	0	0	-1	8	0	0	0	0	-1	8	0
χ_{42}	0	0	0	4	4	-5	-32	0	0	1	-8	0	0	0	0	1	-8	0
χ_{43}	-3	-3	3	-9	-9	-9	-9	9	9	0	0	0	0	0	0	0	0	0
χ_{44}	-3	-3	-3	9	9	9	9	9	9	0	0	0	0	0	0	0	0	0
χ_{45}	-1	2	0	-3	6	-3	24	2	-1	0	0	2	-1	-1	2	0	0	0
χ_{46}	-1	2	0	3	-6	3	-24	2	-1	0	0	2	-1	-1	2	0	0	0

Table 1: Character Table of $3^5{:}U_4(2){:}2$ (continued)

	$3D$	$3E$	$3F$	$3G$	$3H$	$3I$	$6S$	$18A$	$6T$	$6U$	$6V$	$6W$	$3J$	$9A$	$3K$	$3L$	$3M$	$6X$	$6Y$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	1	1	1	1	-1	-1	-1	-1	1	1	1	1	1	1	1	-1	-1
χ_3	$\bar{B}$	$\bar{B}$	$\bar{B}$	B	B	B	$-B$	0	0	0	0	0	2	2	2	2	2	-2	1
χ_4	B	B	B	$\bar{B}$	$\bar{B}$	$\bar{B}$	$-\bar{B}$	0	0	0	0	0	2	2	2	2	2	-2	1
χ_5	B	B	B	$\bar{B}$	$\bar{B}$	$\bar{B}$	$\bar{B}$	0	0	0	0	0	2	2	2	2	2	2	-1
χ_6	$\bar{B}$	$\bar{B}$	$\bar{B}$	B	B	B	B	0	0	0	0	0	2	2	2	2	2	2	-1
χ_7	-3	-3	-3	-3	-3	-3	3	2	2	2	-2	-2	0	0	0	0	0	0	-3
χ_8	-3	-3	-3	-3	-3	-3	-3	-2	-2	-2	-2	-2	0	0	0	0	0	0	3
χ_9	K	K	K	$\bar{K}$	$\bar{K}$	$\bar{K}$	$\bar{K}$	-1	-1	-1	-1	-1	1	1	1	1	1	1	1
χ_{10}	K	K	K	$\bar{K}$	$\bar{K}$	$\bar{K}$	$-\bar{K}$	1	1	1	-1	-1	1	1	1	1	1	-1	-1
χ_{11}	$\bar{K}$	$\bar{K}$	$\bar{K}$	K	K	K	K	-1	-1	-1	-1	-1	1	1	1	1	1	1	1
χ_{12}	$\bar{K}$	$\bar{K}$	$\bar{K}$	K	K	K	$-K$	1	1	1	-1	-1	1	1	1	1	1	-1	-1
χ_{13}	-3	-3	-3	-3	-3	-3	3	-1	-1	-1	1	1	3	3	3	3	3	-3	0
χ_{14}	-3	-3	-3	-3	-3	-3	-3	1	1	1	1	1	3	3	3	3	3	3	0
χ_{15}	6	6	6	6	6	6	6	2	2	2	2	2	0	0	0	0	0	0	3
χ_{16}	6	6	6	6	6	6	-6	-2	-2	-2	2	2	0	0	0	0	0	0	-3
χ_{17}	2	2	2	2	2	2	2	1	1	1	1	1	-1	-1	-1	-1	-1	-1	5
χ_{18}	2	2	2	2	2	2	-2	-1	-1	-1	1	1	-1	-1	-1	-1	-1	1	-5
χ_{19}	6	6	6	6	6	6	-6	1	1	1	-1	-1	3	3	3	3	3	-3	0
χ_{20}	6	6	6	6	6	6	6	-1	-1	-1	-1	-1	3	3	3	3	3	3	0
χ_{21}	3	3	3	3	3	3	-3	1	1	1	-1	-1	3	3	3	3	3	-3	-3
χ_{22}	3	3	3	3	3	3	3	-1	-1	-1	-1	-1	3	3	3	3	3	3	3
χ_{23}	L	L	L	$\bar{L}$	$\bar{L}$	$\bar{L}$	$\bar{L}$	0	0	0	0	0	0	0	0	0	0	0	-3
χ_{24}	L	L	L	$\bar{L}$	$\bar{L}$	$\bar{L}$	$-\bar{L}$	0	0	0	0	0	0	0	0	0	0	0	3
χ_{25}	$\bar{L}$	$\bar{L}$	$\bar{L}$	L	L	L	L	0	0	0	0	0	0	0	0	0	0	0	-3
χ_{26}	$\bar{L}$	$\bar{L}$	$\bar{L}$	L	L	L	$-L$	0	0	0	0	0	0	0	0	0	0	0	3
χ_{27}	$-M$	$-M$	$-M$	$-\bar{M}$	$-\bar{M}$	$-\bar{M}$	$\bar{M}$	-1	-1	-1	1	1	1	1	1	1	1	-1	2
χ_{28}	$-\bar{M}$	$-\bar{M}$	$\bar{M}$	$-M$	$-M$	$-M$	M	-1	-1	-1	1	1	1	1	1	1	1	-1	2
χ_{29}	$-\bar{M}$	$-\bar{M}$	$\bar{M}$	$-M$	$-M$	$-M$	$-M$	1	1	1	1	1	1	1	1	1	1	1	-2
χ_{30}	$-M$	$-M$	$-M$	$-\bar{M}$	$-\bar{M}$	$-\bar{M}$	$-\bar{M}$	1	1	1	1	1	1	1	1	1	1	1	-2
χ_{31}	N	N	N	$\bar{N}$	$\bar{N}$	$\bar{N}$	$\bar{N}$	0	0	0	0	0	0	0	0	0	0	0	0
χ_{32}	N	N	N	$\bar{N}$	$\bar{N}$	$\bar{N}$	$-\bar{N}$	0	0	0	0	0	0	0	0	0	0	0	0
χ_{33}	$\bar{N}$	$\bar{N}$	$\bar{N}$	N	N	N	N	0	0	0	0	0	0	0	0	0	0	0	0
χ_{34}	$\bar{N}$	$\bar{N}$	$\bar{N}$	N	N	N	$-N$	0	0	0	0	0	0	0	0	0	0	0	0
χ_{35}	6	6	6	6	6	6	6	-1	-1	-1	-1	-1	-3	-3	-3	-3	-3	-3	-3
χ_{36}	6	6	6	6	6	6	-6	1	1	1	-1	-1	-3	-3	-3	-3	-3	3	3
χ_{37}	-8	-8	-8	-8	-8	-8	8	0	0	0	0	0	-2	-2	-2	-2	-2	2	-4
χ_{38}	-8	-8	-8	-8	-8	-8	-8	0	0	0	0	0	-2	-2	-2	-2	-2	-2	4
χ_{39}	0	0	0	0	0	0	0	0	3	-6	0	0	6	0	-3	-3	6	0	0
χ_{40}	0	0	0	0	0	0	0	0	-3	6	0	0	6	0	-3	-3	6	0	0
χ_{41}	-1	8	8	-1	8	8	0	-1	2	2	0	0	14	-1	5	-4	-4	0	0
χ_{42}	-1	8	8	-1	8	8	0	1	-2	-2	0	0	14	-1	5	-4	-4	0	0
χ_{43}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{44}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{45}	0	-9	18	0	-9	18	0	0	0	0	-1	2	6	0	-3	6	-3	0	0
χ_{46}	0	-9	18	0	-9	18	0	0	0	0	-1	2	6	0	-3	6	-3	0	0

Table 1: Character Table of 3^5:$U_4(2)$:2 (continued)

	$9B$	$3N$	$3O$	$3P$	$3Q$	$12F$	$12G$	$12H$	$12I$	$12J$	$12K$	$18B$	$9C$	$9D$	$18C$	$9E$	$9F$	$6Z$	$6AA$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	1	1	1	-1	1	1	-1	1	1	-1	1	1	-1	1	1	-1	-1
χ_3	-1	-1	-1	-1	-1	$-E$	E	E	$-\bar{E}$	$\bar{E}$	$\bar{E}$	$\bar{E}$	$-\bar{E}$	$-\bar{E}$	E	$-E$	$-E$	-1	-1
χ_4	-1	-1	-1	-1	-1	$-\bar{E}$	$\bar{E}$	$\bar{E}$	$-E$	E	E	E	$-E$	E	$\bar{E}$	$-\bar{E}$	$-\bar{E}$	-1	-1
χ_5	-1	-1	-1	-1	-1	$\bar{E}$	$\bar{E}$	$\bar{E}$	E	E	E	$-E$	$-E$	$-E$	$-\bar{E}$	$-\bar{E}$	$-\bar{E}$	1	1
χ_6	-1	-1	-1	-1	-1	E	E	E	$\bar{E}$	$\bar{E}$	$\bar{E}$	$-\bar{E}$	$-\bar{E}$	$-\bar{E}$	$-E$	$-E$	$-E$	1	1
χ_7	3	3	3	3	3	1	-1	-1	1	-1	-1	0	0	0	0	0	0	1	1
χ_8	3	3	3	3	3	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	-1	-1
χ_9	1	1	1	1	1	$-E$	$-E$	$-E$	$-\bar{E}$	$-\bar{E}$	$-\bar{E}$	E	E	E	$\bar{E}$	$\bar{E}$	$\bar{E}$	1	1
χ_{10}	1	1	1	1	1	E	$-E$	$-E$	$\bar{E}$	$-\bar{E}$	$-\bar{E}$	$-E$	E	E	$-\bar{E}$	$\bar{E}$	$\bar{E}$	-1	-1
χ_{11}	1	1	1	1	1	$-\bar{E}$	$-\bar{E}$	$-\bar{E}$	$-E$	$-E$	$-E$	$\bar{E}$	$\bar{E}$	$\bar{E}$	E	E	E	1	1
χ_{12}	1	1	1	1	1	$\bar{E}$	$-\bar{E}$	$-\bar{E}$	E	$-E$	$-E$	$-\bar{E}$	$\bar{E}$	$\bar{E}$	$-E$	E	E	-1	-1
χ_{13}	0	0	0	0	0	1	-1	-1	1	-1	-1	0	0	0	0	0	0	0	0
χ_{14}	0	0	0	0	0	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0
χ_{15}	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1
χ_{16}	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{17}	5	5	5	5	5	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	1	1
χ_{18}	5	5	5	5	5	0	0	0	0	0	0	1	-1	-1	1	-1	-1	-1	-1
χ_{19}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{20}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{21}	3	3	3	3	3	-1	1	1	-1	1	1	0	0	0	0	0	0	1	1
χ_{22}	3	3	3	3	3	1	1	1	1	1	1	0	0	0	0	0	0	-1	-1
χ_{23}	-3	-3	-3	-3	-3	$-E$	$-E$	$-E$	$-\bar{E}$	$-\bar{E}$	$-\bar{E}$	0	0	0	0	0	0	-1	-1
χ_{24}	-3	-3	-3	-3	-3	E	$-E$	$-E$	$\bar{E}$	$-\bar{E}$	$-\bar{E}$	0	0	0	0	0	0	1	1
χ_{25}	-3	-3	-3	-3	-3	$-\bar{E}$	$-\bar{E}$	$-\bar{E}$	E	$-E$	$-E$	0	0	0	0	0	0	-1	-1
χ_{26}	-3	-3	-3	-3	-3	$\bar{E}$	$-\bar{E}$	$-\bar{E}$	E	$-E$	$-E$	0	0	0	0	0	0	1	1
χ_{27}	-2	-2	-2	-2	-2	0	0	0	0	0	0	$-E$	E	E	$-\bar{E}$	$\bar{E}$	$\bar{E}$	0	0
χ_{28}	-2	-2	-2	-2	-2	0	0	0	0	0	0	$-\bar{E}$	$\bar{E}$	$\bar{E}$	$-E$	E	E	0	0
χ_{29}	-2	-2	-2	-2	-2	0	0	0	0	0	0	$\bar{E}$	$\bar{E}$	$\bar{E}$	E	E	E	0	0
χ_{30}	-2	-2	-2	-2	-2	0	0	0	0	0	0	E	E	E	$\bar{E}$	$\bar{E}$	$\bar{E}$	0	0
χ_{31}	0	0	0	0	0	$\bar{E}$	$\bar{E}$	$\bar{E}$	E	E	E	0	0	0	0	0	0	0	0
χ_{32}	0	0	0	0	0	$-\bar{E}$	$\bar{E}$	$\bar{E}$	$-E$	E	E	0	0	0	0	0	0	0	0
χ_{33}	0	0	0	0	0	E	E	E	$\bar{E}$	$\bar{E}$	$\bar{E}$	0	0	0	0	0	0	0	0
χ_{34}	0	0	0	0	0	$-E$	E	E	$-\bar{E}$	$\bar{E}$	$\bar{E}$	0	0	0	0	0	0	0	0
χ_{35}	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0	1	1
χ_{36}	-3	-3	-3	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1
χ_{37}	4	4	4	4	4	0	0	0	0	0	0	-1	1	1	-1	1	1	0	0
χ_{38}	4	4	4	4	4	0	0	0	0	0	0	1	1	1	1	1	1	0	0
χ_{39}	0	-6	3	-6	12	0	0	0	0	0	0	0	0	0	0	0	0	-1	2
χ_{40}	0	-6	3	-6	12	0	0	0	0	0	0	0	0	0	0	0	0	1	-2
χ_{41}	-1	2	2	2	2	0	0	0	0	0	0	0	-1	2	0	-1	2	0	0
χ_{42}	-1	2	2	2	2	0	0	0	0	0	0	0	-1	2	0	-1	2	0	0
χ_{43}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{44}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{45}	0	3	-6	3	12	0	-1	2	0	-1	2	0	0	0	0	0	0	-2	1
χ_{46}	0	3	-6	3	12	0	-1	2	0	-1	2	0	0	0	0	0	0	2	-1

Table 1: Character Table of $3^5{:}U_4(2){:}2$ (continued)

	$6AB$	$6AC$	$18D$	$6AD$	$6AE$	$6AF$	$18E$	$6AG$	$6AH$	$6AI$	$6AJ$	$18F$	$6AK$	$6AL$	$15A$	$5A$	$10A$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	-1	-1	1	1	1	1	-1	-1	-1	1	1	-1	-1	-1	1	1	-1
χ_3	-1	-1	1	1	F	F	$-F$	$-F$	$-F$	$-F$	$-F$	F	F	F	0	0	0
χ_4	-1	-1	1	1	$-F$	$-F$	F	F	F	F	F	$-F$	$-F$	$-F$	0	0	0
χ_5	1	1	1	1	$-F$	$-F$	$-F$	$-F$	$-F$	F	F	F	F	F	0	0	0
χ_6	1	1	1	1	F	F	F	F	F	$-F$	$-F$	$-F$	$-F$	$-F$	0	0	0
χ_7	1	1	-1	-1	1	1	-1	-1	-1	1	1	-1	-1	-1	1	1	-1
χ_8	-1	-1	-1	-1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_9	1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0
χ_{10}	-1	-1	1	1	-1	-1	1	1	1	-1	-1	1	1	1	0	0	0
χ_{11}	1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0
χ_{12}	-1	-1	1	1	-1	-1	1	1	1	-1	-1	1	1	1	0	0	0
χ_{13}	0	0	0	0	-2	-2	2	2	2	-2	-2	2	2	2	0	0	0
χ_{14}	0	0	0	0	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	0	0	0
χ_{15}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0
χ_{16}	1	1	-1	-1	-1	-1	1	1	1	-1	-1	1	1	1	0	0	0
χ_{17}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
χ_{18}	-1	-1	1	1	1	1	-1	-1	-1	1	1	-1	-1	-1	0	0	0
χ_{19}	0	0	0	0	2	2	-2	-2	-2	2	2	-2	-2	-2	-1	-1	1
χ_{20}	0	0	0	0	2	2	2	2	2	2	2	2	2	2	-1	-1	-1
χ_{21}	1	1	-1	-1	-1	-1	1	1	1	-1	-1	1	1	1	0	0	0
χ_{22}	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0
χ_{23}	-1	-1	-1	-1	F	F	F	F	F	$-F$	$-F$	$-F$	$-F$	$-F$	0	0	0
χ_{24}	1	1	-1	-1	F	F	$-F$	$-F$	$-F$	$-F$	$-F$	F	F	F	0	0	0
χ_{25}	-1	-1	-1	-1	$-F$	$-F$	$-F$	$-F$	$-F$	F	F	F	F	F	0	0	0
χ_{26}	1	1	-1	-1	$-F$	$-F$	F	F	F	F	F	$-F$	$-F$	$-F$	0	0	0
χ_{27}	0	0	0	0	$-C$	$-C$	C	C	C	$-\bar{C}$	$-\bar{C}$	$\bar{C}$	$\bar{C}$	$\bar{C}$	0	0	0
χ_{28}	0	0	0	0	$-\bar{C}$	$-\bar{C}$	$\bar{C}$	$\bar{C}$	$\bar{C}$	$-C$	$-C$	C	C	C	0	0	0
χ_{29}	0	0	0	0	$-\bar{C}$	$-\bar{C}$	$-\bar{C}$	$-\bar{C}$	$-\bar{C}$	$-C$	$-C$	$-C$	$-C$	$-C$	0	0	0
χ_{30}	0	0	0	0	$-C$	$-C$	$-C$	$-C$	$-C$	$-\bar{C}$	$-\bar{C}$	$-\bar{C}$	$-\bar{C}$	$-\bar{C}$	0	0	0
χ_{31}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{32}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{33}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{34}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{35}	1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0
χ_{36}	-1	-1	1	1	-1	-1	1	1	1	-1	-1	1	1	1	0	0	0
χ_{37}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	1
χ_{38}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1
χ_{39}	2	-4	0	0	0	0	0	0	0	0	0	0	0	0	-1	2	0
χ_{40}	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	-1	2	0
χ_{41}	0	0	-1	2	0	0	-1	2	2	0	0	-1	2	2	0	0	0
χ_{42}	0	0	-1	2	0	0	1	-2	-2	0	0	1	-2	-2	0	0	0
χ_{43}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	-1
χ_{44}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
χ_{45}	1	4	0	0	-1	2	0	-3	6	2	-1	0	6	-3	0	0	0
χ_{46}	-1	-4	0	0	-1	2	0	3	-6	2	-1	0	-6	3	0	0	0

Table 1: Character Table of $3^5{:}U_4(2){:}2$ (continued)

	$1A$	$3A$	$3B$	$3C$	$2A$	$12A$	$12B$	$12C$	$4A$	$12D$	$4B$	$2B$	$6A$	$6B$	$6C$	$6D$	$6E$	$2C$
χ_{47}	90	-9	0	9	0	-1	-1	2	2	0	0	4	-2	1	3	-3	0	6
χ_{48}	90	-9	0	9	0	-1	-1	2	2	0	0	4	-2	1	3	-3	0	6
χ_{48}	90	-9	0	9	0	1	1	-2	-2	0	0	-4	2	-1	3	-3	0	6
χ_{50}	90	-9	0	9	0	1	1	-2	-2	0	0	-4	2	-1	3	-3	0	6
χ_{51}	160	16	-20	-2	0	0	0	0	0	0	0	0	0	0	-8	-2	4	16
χ_{52}	180	-18	0	18	0	0	0	0	0	0	0	0	0	0	6	-6	0	12
χ_{53}	180	-18	0	18	0	0	0	0	0	0	0	0	0	0	6	-6	0	12
χ_{54}	180	-18	0	18	0	0	0	0	0	0	0	0	0	0	6	-6	0	12
χ_{55}	240	24	-30	-3	0	-2	1	-2	4	0	0	0	0	0	4	1	-2	-8
χ_{56}	240	24	-30	-3	0	2	-1	2	-4	0	0	0	0	0	4	1	-2	-8
χ_{57}	320	32	-40	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{58}	320	32	-40	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{59}	320	32	-40	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{60}	320	32	-40	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{61}	360	0	45	-45	0	2	-1	-1	2	1	-2	-4	-1	2	0	3	-3	12
χ_{62}	360	0	45	-45	0	-2	1	1	-2	1	-2	4	1	-2	0	3	-3	12
χ_{63}	360	0	45	-45	0	-2	1	1	-2	1	-2	-12	-3	6	0	3	-3	12
χ_{64}	360	0	45	-45	0	2	-1	-1	2	1	-2	12	3	-6	0	3	-3	12
χ_{65}	360	-36	0	36	0	0	0	0	0	0	0	-8	4	-2	0	0	0	0
χ_{66}	360	-36	0	36	0	0	0	0	0	0	0	8	-4	2	0	0	0	0
χ_{67}	360	-36	0	36	0	0	0	0	0	0	0	-8	4	-2	0	0	0	0
χ_{68}	360	-36	0	36	0	0	0	0	0	0	0	-8	4	-2	0	0	0	0
χ_{69}	360	-36	0	36	0	0	0	0	0	0	0	8	-4	2	0	0	0	0
χ_{70}	360	-36	0	36	0	0	0	0	0	0	0	8	-4	2	0	0	0	0
χ_{71}	480	48	-60	-6	0	0	0	0	0	0	0	0	0	0	-8	-2	4	16
χ_{72}	480	48	-60	-6	0	0	0	0	0	0	0	0	0	0	-8	-2	4	16
χ_{73}	480	48	-60	-6	0	0	0	0	0	0	0	0	0	0	8	2	-4	-16
χ_{74}	480	48	-60	-6	0	0	0	0	0	0	0	0	0	0	8	2	-4	-16
χ_{75}	540	-54	0	54	0	0	0	0	0	0	0	0	0	0	-6	6	0	-12
χ_{76}	540	-54	0	54	0	0	0	0	0	0	0	0	0	0	-6	6	0	-12
χ_{77}	540	-54	0	54	0	0	0	0	0	0	0	0	0	0	-6	6	0	-12
χ_{78}	640	64	-80	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{79}	640	64	-80	-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{80}	648	0	81	-81	0	-2	1	1	-2	-1	2	12	3	-6	0	3	-3	12
χ_{81}	648	0	81	-81	0	2	-1	-1	2	-1	2	-12	-3	6	0	3	-3	12
χ_{82}	720	0	90	-90	0	0	0	0	0	0	0	-8	-2	4	0	-6	6	-24
χ_{83}	720	0	90	-90	0	0	0	0	0	0	0	8	2	-4	0	-6	6	-24
χ_{84}	720	-72	0	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	720	-72	0	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{86}	720	-72	0	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{87}	810	-81	0	81	0	-1	-1	2	2	0	0	-12	6	-3	3	-3	0	6
χ_{88}	810	-81	0	81	0	1	1	-2	-2	0	0	12	-6	3	3	-3	0	6
χ_{89}	960	96	-120	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	960	96	-120	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{91}	1152	0	144	-144	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1: Character Table of $3^5{:}U_4(2){:}2$ (continued)

	$12E$	$4C$	$4D$	$6F$	$6G$	$6H$	$2D$	$2E$	$6I$	$6J$	$6K$	$6L$	$6M$	$6N$	$6O$	$6P$	$6Q$	$6R$
χ_{47}	-1	2	0	-3	6	-3	24	2	-1	0	0	C	$-E$	$-\bar{E}$	$\bar{C}$	0	0	0
χ_{48}	-1	2	0	-3	6	-3	24	2	-1	0	0	$\bar{C}$	$-\bar{E}$	$-E$	C	0	0	0
χ_{49}	-1	2	0	3	-6	3	-24	2	-1	0	0	C	$-E$	$-\bar{E}$	$\bar{C}$	0	0	0
χ_{50}	-1	2	0	3	-6	3	-24	2	-1	0	0	$\bar{C}$	$-\bar{E}$	$-E$	C	0	0	0
χ_{51}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{52}	-2	4	0	0	0	0	0	4	-2	0	0	-2	1	1	-2	0	0	0
χ_{53}	-2	4	0	0	0	0	0	4	-2	0	0	$\bar{C}$	$\bar{E}$	E	$-C$	0	0	0
χ_{54}	-2	4	0	0	0	0	0	4	-2	0	0	$-C$	E	$\bar{E}$	$-\bar{C}$	0	0	0
χ_{55}	0	0	0	4	4	-5	-32	0	0	1	-8	0	0	0	0	1	-8	0
χ_{56}	0	0	0	-4	-4	5	32	0	0	-1	8	0	0	0	0	-1	8	0
χ_{57}	0	0	0	-8	-8	10	64	0	0	E	G	0	0	0	0	$\bar{E}$	$\bar{G}$	0
χ_{58}	0	0	0	-8	-8	10	64	0	0	$\bar{E}$	$\bar{G}$	0	0	0	0	E	G	0
χ_{59}	0	0	0	8	8	-10	-64	0	0	$-\bar{E}$	$-\bar{G}$	0	0	0	0	$-E$	$-G$	0
χ_{60}	0	0	0	8	8	-10	-64	0	0	$-E$	$-G$	0	0	0	0	$-\bar{E}$	$-\bar{G}$	0
χ_{61}	0	0	0	18	-9	-9	72	0	0	0	0	0	0	0	0	0	0	0
χ_{62}	0	0	0	-18	9	9	-72	0	0	0	0	0	0	0	0	0	0	0
χ_{63}	0	0	0	6	-3	-3	24	0	0	0	0	0	0	0	0	0	0	0
χ_{64}	0	0	0	-6	3	3	-24	0	0	0	0	0	0	0	0	0	0	0
χ_{65}	0	0	0	-6	12	-6	48	-8	4	0	0	4	-2	-2	4	0	0	0
χ_{66}	0	0	0	6	-12	6	-48	-8	4	0	0	4	-2	-2	4	0	0	0
χ_{67}	0	0	0	-6	12	-6	48	-8	4	0	0	I	$-C$	$-\bar{C}$	$\bar{I}$	0	0	0
χ_{68}	0	0	0	-6	12	-6	48	-8	4	0	0	$\bar{I}$	$-\bar{C}$	$-C$	I	0	0	0
χ_{69}	0	0	0	6	-12	6	-48	-8	4	0	0	I	$-C$	$-\bar{C}$	$\bar{I}$	0	0	0
χ_{70}	0	0	0	6	-12	6	-48	-8	4	0	0	$\bar{I}$	$-\bar{C}$	$-C$	I	0	0	0
χ_{71}	0	0	0	-8	-8	10	64	0	0	1	-8	0	0	0	0	1	-8	0
χ_{72}	0	0	0	8	8	-10	-64	0	0	-1	8	0	0	0	0	-1	8	0
χ_{73}	0	0	0	0	0	0	0	0	0	F	H	0	0	0	0	$-F$	$-H$	0
χ_{74}	0	0	0	0	0	0	0	0	0	$-F$	$-H$	0	0	0	0	F	H	0
χ_{75}	-2	4	0	0	0	0	0	12	-6	0	0	6	-3	-3	6	0	0	0
χ_{76}	-2	4	0	0	0	0	0	12	-6	0	0	J	$-\bar{D}$	$-D$	$\bar{J}$	0	0	0
χ_{77}	-2	4	0	0	0	0	0	12	-6	0	0	$\bar{J}$	$-D$	$-\bar{D}$	J	0	0	0
χ_{78}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{79}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{80}	0	0	0	18	-9	-9	72	0	0	0	0	0	0	0	0	0	0	0
χ_{81}	0	0	0	-18	9	9	-72	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	12	-6	-6	48	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	0	0	0	-12	6	6	-48	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	0	0	0	0	0	0	0	-16	8	0	0	-4	2	2	-4	0	0	0
χ_{85}	0	0	0	0	0	0	0	-16	8	0	0	$-I$	C	$\bar{C}$	$-\bar{I}$	0	0	0
χ_{86}	0	0	0	0	0	0	0	-16	8	0	0	$-\bar{I}$	$\bar{C}$	C	$-I$	0	0	0
χ_{87}	3	-6	0	9	-18	9	-72	18	-9	0	0	0	0	0	0	0	0	0
χ_{88}	3	-6	0	-9	18	-9	72	18	-9	0	0	0	0	0	0	0	0	0
χ_{89}	0	0	0	8	8	-10	-64	0	0	-1	8	0	0	0	0	-1	8	0
χ_{90}	0	0	0	-8	-8	10	64	0	0	1	-8	0	0	0	0	1	-8	0
χ_{91}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1: Character Table of $3^5{:}U_4(2){:}2$ (continued)

	$3D$	$3E$	$3F$	$3G$	$3H$	$3I$	$6S$	$18A$	$6T$	$6U$	$6V$	$6W$	$3J$	$9A$	$3K$	$3L$	$3M$	$6X$	$6Y$
χ_{47}	0	$\bar{N}$	Q	0	N	$\bar{Q}$	0	0	0	0	-1	2	6	0	-3	6	-3	0	0
χ_{48}	0	N	$\bar{Q}$	0	$\bar{N}$	Q	0	0	0	0	-1	2	6	0	-3	6	-3	0	0
χ_{49}	0	$\bar{N}$	Q	0	N	$\bar{Q}$	0	0	0	0	-1	2	6	0	-3	6	-3	0	0
χ_{50}	0	N	$\bar{Q}$	0	$\bar{N}$	Q	0	0	0	0	-1	2	6	0	-3	6	-3	0	0
χ_{51}	-2	16	16	-2	16	16	0	0	0	0	0	0	-8	-2	1	10	10	0	0
χ_{52}	0	9	-18	0	9	-18	0	0	0	0	1	-2	-6	0	3	-6	3	0	0
χ_{53}	0	$-N$	$-\bar{Q}$	0	$-\bar{N}$	$-Q$	0	0	0	0	1	-2	-6	0	3	-6	3	0	0
χ_{54}	0	$-\bar{N}$	$-Q$	0	$-N$	$-\bar{Q}$	0	0	0	0	1	-2	-6	0	3	-6	3	0	0
χ_{55}	-3	24	24	-3	24	24	0	1	-2	-2	0	0	6	-3	6	6	6	0	0
χ_{56}	-3	24	24	-3	24	24	0	-1	2	2	0	0	6	-3	6	6	6	0	0
χ_{57}	$\bar{B}$	P	P	B	$\bar{P}$	$\bar{P}$	0	1	-2	-2	0	0	14	-1	5	-4	-4	0	0
χ_{58}	B	$\bar{P}$	$\bar{P}$	$\bar{B}$	P	P	0	1	-2	-2	0	0	14	-1	5	-4	-4	0	0
χ_{59}	B	$\bar{P}$	$\bar{P}$	$\bar{B}$	P	P	0	-1	2	2	0	0	14	-1	5	-4	-4	0	0
χ_{60}	$\bar{B}$	P	P	B	$\bar{P}$	$\bar{P}$	0	-1	2	2	0	0	14	-1	5	-4	-4	0	0
χ_{61}	0	0	0	0	0	0	0	0	0	0	0	0	12	0	-6	-6	12	0	0
χ_{62}	0	0	0	0	0	0	0	0	0	0	0	0	12	0	-6	-6	12	0	0
χ_{63}	0	0	0	0	0	0	0	0	-3	6	0	0	-6	0	3	3	-6	0	0
χ_{64}	0	0	0	0	0	0	0	0	3	-6	0	0	-6	0	3	3	-6	0	0
χ_{65}	0	18	-36	0	18	-36	0	0	0	0	1	-2	6	0	-3	6	-3	0	0
χ_{66}	0	18	-36	0	18	-36	0	0	0	0	1	-2	6	0	-3	6	-3	0	0
χ_{67}	0	Q	T	0	$\bar{Q}$	$\bar{T}$	0	0	0	0	1	-2	6	0	-3	6	-3	0	0
χ_{68}	0	$\bar{Q}$	$\bar{T}$	0	Q	T	0	0	0	0	1	-2	6	0	-3	6	-3	0	0
χ_{69}	0	Q	T	0	$\bar{Q}$	$\bar{T}$	0	0	0	0	1	-2	6	0	-3	6	-3	0	0
χ_{70}	0	$\bar{Q}$	$\bar{T}$	0	Q	T	0	0	0	0	1	-2	6	0	-3	6	-3	0	0
χ_{71}	3	-24	-24	3	-24	-24	0	-2	4	4	0	0	0	0	0	0	0	0	0
χ_{72}	3	-24	-24	3	-24	-24	0	2	-4	-4	0	0	0	0	0	0	0	0	0
χ_{73}	3	-24	-24	3	-24	-24	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{74}	3	-24	-24	3	-24	-24	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	0	-27	54	0	-27	54	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{76}	0	R	U	0	$\bar{R}$	$\bar{T}$	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{77}	0	$\bar{R}$	$\bar{U}$	0	R	U	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{78}	O	S	S	$\bar{O}$	$\bar{S}$	$\bar{S}$	0	0	0	0	0	0	-8	-2	1	10	10	0	0
χ_{79}	$\bar{O}$	$\bar{S}$	$\bar{S}$	O	S	S	0	0	0	0	0	0	-8	-2	1	10	10	0	0
χ_{80}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	0	0	0	0	0	0	0	3	-6	0	0	6	0	-3	-3	6	0	0
χ_{83}	0	0	0	0	0	0	0	0	-3	6	0	0	6	0	-3	-3	6	0	0
χ_{84}	0	-18	36	0	-18	36	0	0	0	0	-1	2	-6	0	3	-6	3	0	0
χ_{85}	0	$-Q$	$-T$	0	$-\bar{Q}$	$-\bar{T}$	0	0	0	0	-1	2	-6	0	3	-6	3	0	0
χ_{86}	0	$-\bar{Q}$	$-\bar{T}$	0	$-Q$	$-T$	0	0	0	0	-1	2	-6	0	3	-6	3	0	0
χ_{87}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{88}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{89}	-3	24	24	-3	24	24	0	-1	2	2	0	0	-6	3	-6	-6	-6	0	0
χ_{90}	-3	24	24	-3	24	24	0	1	-2	-2	0	0	-6	3	-6	-6	-6	0	0
χ_{91}	0	0	0	0	0	0	0	0	0	0	0	0	-12	0	6	6	-12	0	0

Table 1: Character Table of 3^5:$U_4(2)$:2 (continued)

	$9B$	$3N$	$3O$	$3P$	$3Q$	$12F$	$12G$	$12H$	$12I$	$12J$	$12K$	$18B$	$9C$	$9D$	$18C$	$9E$	$9F$	$6Z$	$6AA$
χ_{47}	0	L	3	$\bar{L}$	-6	0	$-E$	C	0	$-\bar{E}$	$\bar{C}$	0	0	0	0	0	0	1	$-B$
χ_{48}	0	$\bar{L}$	3	L	-6	0	$-\bar{E}$	$\bar{C}$	0	$-E$	C	0	0	0	0	0	0	1	$-\bar{B}$
χ_{49}	0	L	3	$\bar{L}$	-6	0	$-E$	C	0	$-\bar{E}$	$\bar{C}$	0	0	0	0	0	0	-1	B
χ_{50}	0	$\bar{L}$	3	L	-6	0	$-\bar{E}$	$\bar{C}$	0	$-E$	C	0	0	0	0	0	0	-1	$\bar{B}$
χ_{51}	-2	4	4	4	4	0	0	0	0	0	0	0	1	-2	0	1	-2	0	0
χ_{52}	0	6	-12	6	24	0	1	-2	0	1	-2	0	0	0	0	0	0	0	0
χ_{53}	0	V	6	$\bar{V}$	-12	0	$\bar{E}$	$-\bar{C}$	0	E	$-C$	0	0	0	0	0	0	0	0
χ_{54}	0	$\bar{V}$	6	V	-12	0	E	$-C$	0	$\bar{E}$	$-\bar{C}$	0	0	0	0	0	0	0	0
χ_{55}	-3	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{56}	-3	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{57}	2	-4	-4	-4	-4	0	0	0	0	0	0	0	$-\bar{E}$	$\bar{C}$	0	$-E$	C	0	0
χ_{58}	2	-4	-4	-4	-4	0	0	0	0	0	0	0	$-E$	C	0	$-\bar{E}$	$\bar{C}$	0	0
χ_{59}	2	-4	-4	-4	-4	0	0	0	0	0	0	0	$-E$	C	0	$-\bar{E}$	$\bar{C}$	0	0
χ_{60}	2	-4	-4	-4	-4	0	0	0	0	0	0	0	$-\bar{E}$	$\bar{C}$	0	$-E$	C	0	0
χ_{61}	0	6	-3	6	-12	0	0	0	0	0	0	0	0	0	0	0	0	-1	2
χ_{62}	0	6	-3	6	-12	0	0	0	0	0	0	0	0	0	0	0	0	1	-2
χ_{63}	0	-12	6	-12	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{64}	0	-12	6	-12	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{65}	0	3	-6	3	12	0	0	0	0	0	0	0	0	0	0	0	0	-2	1
χ_{66}	0	3	-6	3	12	0	0	0	0	0	0	0	0	0	0	0	0	2	-1
χ_{67}	0	L	3	$\bar{L}$	-6	0	0	0	0	0	0	0	0	0	0	0	0	1	$-B$
χ_{68}	0	$\bar{L}$	3	L	-6	0	0	0	0	0	0	0	0	0	0	0	0	1	$-\bar{B}$
χ_{69}	0	L	3	$\bar{L}$	-6	0	0	0	0	0	0	0	0	0	0	0	0	-1	B
χ_{70}	0	$\bar{L}$	3	L	-6	0	0	0	0	0	0	0	0	0	0	0	0	-1	$\bar{B}$
χ_{71}	-3	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{72}	-3	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{73}	-3	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{74}	-3	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{75}	0	0	0	0	0	0	1	-2	0	1	-2	0	0	0	0	0	0	0	0
χ_{76}	0	0	0	0	0	0	E	$-C$	0	$\bar{E}$	$-\bar{C}$	0	0	0	0	0	0	0	0
χ_{77}	0	0	0	0	0	0	$\bar{E}$	$-\bar{C}$	0	E	$-C$	0	0	0	0	0	0	0	0
χ_{78}	4	-8	-8	-8	-8	0	0	0	0	0	0	0	E	$-C$	0	$\bar{E}$	$-\bar{C}$	0	0
χ_{79}	4	-8	-8	-8	-8	0	0	0	0	0	0	0	$\bar{E}$	$-\bar{C}$	0	E	$-C$	0	0
χ_{80}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{82}	0	-6	3	-6	12	0	0	0	0	0	0	0	0	0	0	0	0	1	-2
χ_{83}	0	-6	3	-6	12	0	0	0	0	0	0	0	0	0	0	0	0	-1	2
χ_{84}	0	6	-12	6	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{85}	0	$\bar{V}$	6	V	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{86}	0	V	6	$\bar{V}$	-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{87}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{88}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{89}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{90}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{91}	0	12	-6	12	-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1: Character Table of $3^5{:}U_4(2){:}2$ (continued)

	$6AB$	$6AC$	$18D$	$6AD$	$6AE$	$6AF$	$18E$	$6AG$	$6AH$	$6AI$	$6AJ$	$18F$	$6AK$	$6AL$	$15A$	$5A$	$10A$
χ_{47}	$-\bar{B}$	-2	0	0	$-E$	C	0	$-D$	$\bar{J}$	$\bar{C}$	$-\bar{E}$	0	J	$-\bar{D}$	0	0	0
χ_{48}	$-B$	-2	0	0	$-\bar{E}$	$\bar{C}$	0	$-\bar{D}$	J	C	$-E$	0	$\bar{J}$	$-D$	0	0	0
χ_{49}	$\bar{B}$	2	0	0	$-E$	C	0	D	$-\bar{J}$	$\bar{C}$	$-\bar{E}$	0	$-J$	$\bar{D}$	0	0	0
χ_{50}	B	2	0	0	$-\bar{E}$	$\bar{C}$	0	$\bar{D}$	$-J$	C	$-E$	0	$-\bar{J}$	D	0	0	0
χ_{51}	0	0	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{52}	0	0	0	0	-2	4	0	0	0	4	-2	0	0	0	0	0	0
χ_{53}	0	0	0	0	$-\bar{C}$	$\bar{I}$	0	0	0	I	$-C$	0	0	0	0	0	0
χ_{54}	0	0	0	0	$-C$	I	0	0	0	$\bar{I}$	$-\bar{C}$	0	0	0	0	0	0
χ_{55}	0	0	1	-2	0	0	1	-2	-2	0	0	1	-2	-2	0	0	0
χ_{56}	0	0	1	-2	0	0	-1	2	2	0	0	-1	2	2	0	0	0
χ_{57}	0	0	0	0	0	0	$-C$	I	I	0	0	$-\bar{C}$	$\bar{I}$	$\bar{I}$	0	0	0
χ_{58}	0	0	0	0	0	0	$-\bar{C}$	$\bar{I}$	$\bar{I}$	0	0	$-C$	I	I	0	0	0
χ_{59}	0	0	0	0	0	0	$\bar{C}$	$-\bar{I}$	$-\bar{I}$	0	0	C	$-I$	$-I$	0	0	0
χ_{60}	0	0	0	0	0	0	C	$-I$	$-I$	0	0	$\bar{C}$	$-\bar{I}$	$-\bar{I}$	0	0	0
χ_{61}	2	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{62}	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{63}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{64}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{65}	1	4	0	0	1	-2	0	3	-6	-2	1	0	-6	3	0	0	0
χ_{66}	-1	-4	0	0	1	-2	0	-3	6	-2	1	0	6	-3	0	0	0
χ_{67}	$-\bar{B}$	-2	0	0	E	$-C$	0	D	$-\bar{J}$	$-\bar{C}$	$\bar{E}$	0	$-J$	$\bar{D}$	0	0	0
χ_{68}	$-B$	-2	0	0	$\bar{E}$	$-\bar{C}$	0	$\bar{D}$	$-J$	$-C$	E	0	$-\bar{J}$	D	0	0	0
χ_{69}	$\bar{B}$	2	0	0	E	$-C$	0	$-D$	$\bar{J}$	$-\bar{C}$	$\bar{E}$	0	J	$-\bar{D}$	0	0	0
χ_{70}	B	2	0	0	$\bar{E}$	$-\bar{C}$	0	$-\bar{D}$	J	$-C$	E	0	$\bar{J}$	$-D$	0	0	0
χ_{71}	0	0	1	-2	0	0	1	-2	-2	0	0	1	-2	-2	0	0	0
χ_{72}	0	0	1	-2	0	0	-1	2	2	0	0	-1	2	2	0	0	0
χ_{73}	0	0	-1	2	0	0	F	W	W	0	0	$-F$	$-W$	$-W$	0	0	0
χ_{74}	0	0	-1	2	0	0	$-F$	$-W$	$-W$	0	0	F	W	W	0	0	0
χ_{75}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{76}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{77}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{78}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{79}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{80}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-2	0
χ_{81}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-2	0
χ_{82}	-2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{83}	2	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{84}	0	0	0	0	2	-4	0	0	0	-4	2	0	0	0	0	0	0
χ_{85}	0	0	0	0	C	$-I$	0	0	0	$-\bar{I}$	$\bar{C}$	0	0	0	0	0	0
χ_{86}	0	0	0	0	$\bar{C}$	$-\bar{I}$	0	0	0	$-I$	C	0	0	0	0	0	0
χ_{87}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{88}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{89}	0	0	0	0	0	0	2	-4	-4	0	0	2	-4	-4	0	0	0
χ_{90}	0	0	0	0	0	0	-2	4	4	0	0	-2	4	4	0	0	0
χ_{91}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	2	0

$A = (3 - \sqrt{-3}\,)/2$, $\bar{A} = (3 + \sqrt{-3}\,)/2$, $B = (1 - 3\sqrt{-3}\,)/2$, $\bar{B} = (1 + 3\sqrt{-3}\,)/2$,
$C = -1 - \sqrt{-3}$, $\bar{C} = -1 + \sqrt{-3}$, $D = (-3 + 3\sqrt{-3}\,)/2$, $\bar{D} = (-3 - 3\sqrt{-3}\,)/2$,
$E = (-1 - \sqrt{-3}\,)/2$, $\bar{E} = (-1 + \sqrt{-3}\,)/2$, $F = -\sqrt{-3}$, $G = 4 + 4\sqrt{-3}$,
$\bar{G} = 4 - 4\sqrt{-3}$, $H = 8\sqrt{-3}$, $I = -2 - 2\sqrt{-3}$, $\bar{I} = -2 + 2\sqrt{-3}$,
$J = -3 - 3\sqrt{-3}$, $\bar{J} = -3 - 3\sqrt{-3}$, $K = (-7 + 3\sqrt{-3}\,)/2$, $\bar{K} = (-7 - 3\sqrt{-3}\,)/2$,
$L = (-3 - 9\sqrt{-3}\,)/2$, $\bar{L} = (-3 + 9\sqrt{-3}\,)/2$, $M = 5 + 3\sqrt{-3}$, $\bar{M} = (5 - 3\sqrt{-3}$,
$N = (9 + 9\sqrt{-3}\,)/2$, $\bar{N} = (9 - 9\sqrt{-3}\,)/2$, $O = 1 - 3\sqrt{-3}$, $\bar{O} = 1 + 3\sqrt{-3}$,
$P = -4 - 12\sqrt{-3}$, $\bar{P} = -4 + 12\sqrt{-3}$, $Q = -9 + 9\sqrt{-3}$, $\bar{Q} = -9 - 9\sqrt{-3}$,
$R = (27 - 27\sqrt{-3}\,)/2$, $\bar{R} = (27 + 27\sqrt{-3}\,)/2$, $S = -8 + 24\sqrt{-3}$, $\bar{S} = -8 - 24\sqrt{-3}$,
$T = 18 - 18\sqrt{-3}$, $\bar{T} = 18 + 18\sqrt{-3}$, $U = -27 + 27\sqrt{-3}$, $\bar{U} = -27 - 27\sqrt{-3}$,
$V = -3 + 9\sqrt{-3}$, $\bar{V} = -3 - 9\sqrt{-3}$, $W = 2\sqrt{-3}$.

Table 2: Character Table of $L_4(3)$:2

	$1A$	$2A$	$2B$	$3A$	$3B$	$3C$	$3D$	$4A$	$4B$	$4C$	$5A$	$6A$	$6B$	$6C$	$6D$	$6E$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_3	26	6	2	-1	-1	8	-1	4	2	0	1	3	0	-1	-1	2
χ_4	26	6	2	-1	-1	8	-1	4	2	0	1	3	0	-1	-1	2
χ_5	26	6	2	-1	8	-1	-1	4	2	0	1	0	3	-1	2	-1
χ_6	26	6	2	-1	8	-1	-1	4	2	0	1	0	3	-1	2	-1
χ_7	39	-1	7	12	3	3	3	-1	3	-1	-1	-1	-1	4	1	1
χ_8	39	-1	7	12	3	3	3	-1	3	-1	-1	-1	-1	4	1	1
χ_9	52	8	-4	-2	7	7	-2	-10	0	2	2	-1	-1	2	-1	-1
χ_{10}	52	8	-4	-2	7	7	-2	-10	0	2	2	-1	-1	2	-1	-1
χ_{11}	65	5	-7	11	2	11	2	-5	1	-1	0	2	-1	-1	2	-1
χ_{12}	65	5	-7	11	2	11	2	-5	1	-1	0	2	-1	-1	2	-1
χ_{13}	65	5	-7	11	11	2	2	-5	1	-1	0	-1	2	-1	-1	2
χ_{14}	65	5	-7	11	11	2	2	-5	1	-1	0	-1	2	-1	-1	2
χ_{15}	90	10	10	9	9	9	0	10	-2	2	0	1	1	1	1	1
χ_{16}	90	10	10	9	9	9	0	10	-2	2	0	1	1	1	1	1
χ_{17}	234	14	2	-9	18	-9	0	-4	2	0	-1	2	-1	-1	2	-1
χ_{18}	234	14	2	-9	18	-9	0	-4	2	0	-1	2	-1	-1	2	-1
χ_{19}	234	14	2	-9	-9	18	0	-4	2	0	-1	-1	2	-1	-1	2
χ_{20}	234	14	2	-9	-9	18	0	-4	2	0	-1	-1	2	-1	-1	2
χ_{21}	260	0	-4	-10	17	-1	-1	10	0	-2	0	-3	3	2	-1	-1
χ_{22}	260	0	-4	-10	17	-1	-1	10	0	-2	0	-3	3	2	-1	-1
χ_{23}	260	0	-4	-10	-1	17	-1	10	0	-2	0	3	-3	2	-1	-1
χ_{24}	260	0	-4	-10	-1	17	-1	10	0	-2	0	3	-3	2	-1	-1
χ_{25}	260	20	4	17	-10	-10	-1	0	4	0	0	2	2	1	-2	-2
χ_{26}	260	20	4	17	-10	-10	-1	0	4	0	0	2	2	1	-2	-2
χ_{27}	351	-9	15	27	0	0	0	-9	-1	-1	1	0	0	3	0	0
χ_{28}	351	-9	15	27	0	0	0	-9	-1	-1	1	0	0	3	0	0
χ_{29}	390	-10	-10	39	3	3	3	10	2	2	0	-1	-1	-1	-1	-1
χ_{30}	390	-10	-10	39	3	3	3	10	2	2	0	-1	-1	-1	-1	-1
χ_{31}	416	16	0	-16	2	2	2	16	0	0	1	-2	-2	0	0	0
χ_{32}	416	16	0	-16	2	2	2	16	0	0	1	-2	-2	0	0	0
χ_{33}	416	16	0	-16	2	2	2	-16	0	0	1	-2	-2	0	0	0
χ_{34}	416	16	0	-16	2	2	2	-16	0	0	1	-2	-2	0	0	0
χ_{35}	832	-32	0	-32	4	4	4	0	0	0	2	4	4	0	0	0
χ_{36}	468	-8	-4	-18	9	9	0	-10	0	2	-2	1	1	2	-1	-1
χ_{37}	468	-8	-4	-18	9	9	0	-10	0	2	-2	1	1	2	-1	-1
χ_{38}	585	5	1	18	-9	18	0	-5	-3	-1	0	-1	2	-2	1	-2
χ_{39}	585	5	1	18	-9	18	0	-5	-3	-1	0	-1	2	-2	1	-2
χ_{40}	585	5	1	18	18	-9	0	-5	-3	-1	0	2	-1	-2	-2	1
χ_{41}	585	5	1	18	18	-9	0	-5	-3	-1	0	2	-1	-2	-2	1
χ_{42}	1280	0	0	-16	-16	-16	2	0	0	0	0	0	0	0	0	0
χ_{43}	1280	0	0	-16	-16	-16	2	0	0	0	0	0	0	0	0	0
χ_{44}	729	9	9	0	0	0	0	9	-3	1	-1	0	0	0	0	0
χ_{45}	729	9	9	0	0	0	0	9	-3	1	-1	0	0	0	0	0
χ_{46}	780	-20	12	-3	6	6	-3	0	4	0	0	-2	-2	-3	0	0
χ_{47}	780	-20	12	-3	6	6	-3	0	4	0	0	-2	-2	-3	0	0
χ_{48}	1040	0	-16	14	-4	-4	-4	0	0	0	0	0	0	2	2	2
χ_{49}	1040	0	-16	14	-4	-4	-4	0	0	0	0	0	0	2	2	2

Table 2: Character Table of $L_4(3){:}2$ (continued)

	$8A$	$9A$	$9B$	$10A$	$12A$	$12B$	$12C$	$13A$	$13B$	$20A$	$2C$	$2D$	$2E$	$4D$	$4E$	$4F$	$6F$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	1	1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	-1
χ_3	0	2	-1	1	1	-2	-1	0	0	-1	14	6	2	-2	4	0	5
χ_4	0	2	-1	1	1	-2	-1	0	0	-1	-14	-6	-2	2	-4	0	-5
χ_5	0	-1	2	1	-2	1	-1	0	0	-1	6	14	2	-2	0	4	-3
χ_6	0	-1	2	1	-2	1	-1	0	0	-1	-6	-14	-2	2	0	-4	3
χ_7	1	0	0	-1	-1	-1	0	0	0	-1	9	9	1	-3	1	1	0
χ_8	1	0	0	-1	-1	-1	0	0	0	-1	-9	-9	-1	3	-1	-1	0
χ_9	0	1	1	-2	-1	-1	0	0	0	0	20	-20	0	0	2	-2	2
χ_{10}	0	1	1	-2	-1	-1	0	0	0	0	-20	20	0	0	-2	2	-2
χ_{11}	-1	2	-1	0	-2	1	1	0	0	0	25	-15	-3	1	3	-1	7
χ_{12}	-1	2	-1	0	-2	1	1	0	0	0	-25	15	3	-1	-3	1	-7
χ_{13}	-1	-1	2	0	1	-2	1	0	0	0	-15	25	-3	1	-1	3	3
χ_{14}	-1	-1	2	0	1	-2	1	0	0	0	15	-25	3	-1	1	-3	-3
χ_{15}	0	0	0	0	1	1	1	-1	-1	0	30	30	6	2	2	2	3
χ_{16}	0	0	0	0	1	1	1	-1	-1	0	-30	-30	-6	-2	-2	-2	-3
χ_{17}	0	0	0	-1	2	-1	-1	0	0	1	-6	66	6	2	0	4	3
χ_{18}	0	0	0	-1	2	-1	-1	0	0	1	6	-66	-6	-2	0	-4	-3
χ_{19}	0	0	0	-1	-1	2	-1	0	0	1	66	-6	6	2	4	0	3
χ_{20}	0	0	0	-1	-1	2	-1	0	0	1	-66	6	-6	-2	-4	0	-3
χ_{21}	0	2	-1	0	1	1	0	0	0	0	20	60	-8	0	-2	2	2
χ_{22}	0	2	-1	0	1	1	0	0	0	0	-20	-60	8	0	2	-2	-2
χ_{23}	0	-1	2	0	1	1	0	0	0	0	60	20	-8	0	2	-2	6
χ_{24}	0	-1	2	0	1	1	0	0	0	0	-60	-20	8	0	-2	2	-6
χ_{25}	0	-1	-1	0	0	0	1	0	0	0	20	20	4	4	0	0	-7
χ_{26}	0	-1	-1	0	0	0	1	0	0	0	-20	-20	-4	-4	0	0	7
χ_{27}	-1	0	0	1	0	0	-1	0	0	1	9	9	9	1	-3	-3	9
χ_{28}	-1	0	0	1	0	0	-1	0	0	1	-9	-9	-9	-1	3	3	-9
χ_{29}	0	0	0	0	1	1	-1	0	0	0	-30	-30	10	-2	2	2	-3
χ_{30}	0	0	0	0	1	1	-1	0	0	0	30	30	-10	2	-2	-2	3
χ_{31}	0	-1	-1	1	-2	-2	0	0	0	1	64	64	0	0	0	0	-8
χ_{32}	0	-1	-1	1	-2	-2	0	0	0	1	-64	-64	0	0	0	0	8
χ_{33}	0	-1	-1	1	2	2	0	0	0	-1	64	-64	0	0	0	0	-8
χ_{34}	0	-1	-1	1	2	2	0	0	0	-1	-64	64	0	0	0	0	8
χ_{35}	0	-2	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{36}	0	0	0	2	-1	-1	0	0	0	0	60	-60	0	0	-2	2	6
χ_{37}	0	0	0	2	-1	-1	0	0	0	0	-60	60	0	0	2	-2	-6
χ_{38}	1	0	0	0	1	-2	0	0	0	0	-105	15	3	3	1	-3	-6
χ_{39}	1	0	0	0	1	-2	0	0	0	0	105	-15	-3	-3	-1	3	6
χ_{40}	1	0	0	0	-2	1	0	0	0	0	15	-105	3	3	-3	1	6
χ_{41}	1	0	0	0	-2	1	0	0	0	0	-15	105	-3	-3	3	-1	-6
χ_{42}	0	2	2	0	0	0	0	A	$\bar{A}$	0	0	0	0	0	0	0	0
χ_{43}	0	2	2	0	0	0	0	$\bar{A}$	A	0	0	0	0	0	0	0	0
χ_{44}	-1	0	0	-1	0	0	0	1	1	-1	81	81	9	-3	-3	-3	0
χ_{45}	-1	0	0	-1	0	0	0	1	1	-1	-81	-81	-9	3	3	3	0
χ_{46}	0	0	0	0	0	0	1	0	0	0	60	60	-4	4	0	0	-3
χ_{47}	0	0	0	0	0	0	1	0	0	0	-60	-60	4	-4	0	0	3
χ_{48}	0	-1	-1	0	0	0	0	0	0	0	80	-80	0	0	0	0	-10
χ_{49}	0	-1	-1	0	0	0	0	0	0	0	-80	80	0	0	0	0	10

Table 2: Character Table of $L_4(3)$:2 (continued)

	$6G$	$6H$	$6I$	$6J$	$6K$	$6L$	$6M$	$6N$	$8B$	$10B$	$10C$	$12D$	$12E$	$12F$	$18A$	$18B$
χ_1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
χ_2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_3	-3	2	3	-1	0	-1	2	-1	0	-1	1	1	1	0	-1	0
χ_4	3	-2	-3	1	0	1	-2	1	0	1	-1	-1	-1	0	1	0
χ_5	5	3	2	0	-1	2	-1	-1	0	1	-1	1	0	1	0	-1
χ_6	-5	-3	-2	0	1	-2	1	1	0	-1	1	-1	0	-1	0	1
χ_7	0	-3	-3	3	3	1	1	1	-1	-1	-1	0	1	1	0	0
χ_8	0	3	3	-3	-3	-1	-1	-1	1	1	1	0	-1	-1	0	0
χ_9	-2	5	-5	-1	1	3	-3	0	0	0	0	0	-1	1	-1	1
χ_{10}	2	-5	5	1	-1	-3	3	0	0	0	0	0	1	-1	1	-1
χ_{11}	3	1	0	4	-3	0	-3	0	-1	0	0	1	0	-1	1	0
χ_{12}	-3	-1	0	-4	3	0	3	0	1	0	0	-1	0	1	-1	0
χ_{13}	7	0	1	-3	4	-3	0	0	-1	0	0	1	-1	0	0	1
χ_{14}	-7	0	-1	3	-4	3	0	0	1	0	0	-1	1	0	0	-1
χ_{15}	3	3	3	3	3	3	3	0	0	0	0	-1	-1	-1	0	0
χ_{16}	-3	-3	-3	-3	-3	-3	-3	0	0	0	0	1	1	1	0	0
χ_{17}	3	-3	0	0	-3	0	-3	0	0	-1	1	-1	0	1	0	0
χ_{18}	-3	3	0	0	3	0	3	0	0	1	-1	1	0	-1	0	0
χ_{19}	3	0	-3	-3	0	-3	0	0	0	1	-1	-1	1	0	0	0
χ_{20}	-3	0	3	3	0	3	0	0	0	-1	1	1	-1	0	0	0
χ_{21}	6	5	-3	-1	-3	1	1	1	0	0	0	0	1	-1	-1	0
χ_{22}	-6	-5	3	1	3	-1	-1	-1	0	0	0	0	-1	1	1	0
χ_{23}	2	-3	5	-3	-1	1	1	1	0	0	0	0	-1	1	0	-1
χ_{24}	-2	3	-5	3	1	-1	-1	-1	0	0	0	0	1	-1	0	1
χ_{25}	-7	2	2	2	2	-2	-2	1	0	0	0	1	0	0	-1	-1
χ_{26}	7	-2	-2	-2	-2	2	2	-1	0	0	0	-1	0	0	1	1
χ_{27}	9	0	0	0	0	0	0	0	1	-1	-1	1	0	0	0	0
χ_{28}	-9	0	0	0	0	0	0	0	-1	1	1	-1	0	0	0	0
χ_{29}	-3	-3	-3	-3	-3	1	1	1	0	0	0	1	-1	-1	0	0
χ_{30}	3	3	3	3	3	-1	-1	-1	0	0	0	-1	1	1	0	0
χ_{31}	-8	4	4	-2	-2	0	0	0	0	-1	-1	0	0	0	1	1
χ_{32}	8	-4	-4	2	2	0	0	0	0	1	1	0	0	0	-1	-1
χ_{33}	8	4	-4	-2	2	0	0	0	0	-1	1	0	0	0	1	-1
χ_{34}	-8	-4	4	2	-2	0	0	0	0	1	-1	0	0	0	-1	1
χ_{35}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{36}	-6	-3	3	-3	3	3	-3	0	0	0	0	0	1	-1	0	0
χ_{37}	6	3	-3	3	-3	-3	3	0	0	0	0	0	-1	1	0	0
χ_{38}	6	0	3	-3	0	3	0	0	-1	0	0	0	1	0	0	0
χ_{39}	-6	0	-3	3	0	-3	0	0	1	0	0	0	-1	0	0	0
χ_{40}	-6	3	0	0	-3	0	3	0	-1	0	0	0	0	1	0	0
χ_{41}	6	-3	0	0	3	0	-3	0	1	0	0	0	0	-1	0	0
χ_{42}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{43}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
χ_{44}	0	0	0	0	0	0	0	0	-1	1	1	0	0	0	0	0
χ_{45}	0	0	0	0	0	0	0	0	1	-1	-1	0	0	0	0	0
χ_{46}	-3	-6	-6	0	0	2	2	-1	0	0	0	1	0	0	0	0
χ_{47}	3	6	6	0	0	-2	-2	1	0	0	0	-1	0	0	0	0
χ_{48}	10	-4	4	2	-2	0	0	0	0	0	0	0	0	0	-1	1
χ_{49}	-10	4	-4	-2	2	0	0	0	0	0	0	0	0	0	1	-1

$A = (-1 + \sqrt{13}\,)/2\,, \quad \bar{A} = (-1 - \sqrt{13}\,)/2$

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