A Comparison of Eigencones Under Certain Diagram Automorphisms.

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Abstract

BRANDYN LEE: A Comparison of Eigencones Under Certain Diagram Automorphisms.
(Under the direction of Shrawan Kumar)

In this work, we consider the eigencones (and the related saturated tensor cones) for simple complex algebraic groups of types G_2, D_4, F_4, and E_6. We compare the cones for two embeddings $G_2 \to D_4$ and $F_4 \to E_6$ arising from symmetries of Dynkin diagrams. For our comparison, we utilize the deformed product in cohomology of Belkale and Kumar which is calculated with the aid of a computer following results by Haibao Duan.

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CHAPTER 1

Introduction

Let G be a connected complex semisimple algebraic group. Choose a maximal compact subgroup K of G with Lie algebra $\mathfrak{k}$. There is a natural homeomorphism $c : \mathfrak{k}/K \to \mathfrak{h}_+$, where K acts on $\mathfrak{k}$ by the adjoint representation and $\mathfrak{h}_+$ is the dominant Weyl chamber. The inverse map c^{-1} takes any $h \in \mathfrak{h}_+$ to the K-conjugacy class of ih. The main aim of the *generalized eigenvalue problem* is to describe the *eigencone* $\hat{\Gamma}(G, K, s)$, which is given by:

$$\hat{\Gamma}(G, K, s) = \{(h_1, \dots, h_s) \in \mathfrak{h}_+^s : \exists (k_1, \dots, k_s) \in \mathfrak{k}^s \text{ with } \sum_{j=1}^{s} k_j = 0 \text{ and } c(k_j) = h_j\}.$$

For an algebraic group homomorphism $\tilde{G} \to G$ which takes $\tilde{K} \to K$ and $\tilde{\mathfrak{h}}_+ \to \mathfrak{h}_+$, where $\tilde{K}$ is a maximal compact subgroup for $\tilde{G}$ and $\tilde{\mathfrak{h}}_+$ is the dominant Weyl chamber of $\tilde{G}$, there is an induced map $\hat{\Gamma}(\tilde{G}, \tilde{K}, s) \to \hat{\Gamma}(G, K, s)$.

In this work, we compare the eigencones between a group G and a certain subgroup $\tilde{G}$ in two specific cases. In the first case, we consider the simply-connected simple complex algebraic group of type D_4. This group has an outer automorphism induced from the order three symmetries of its Dynkin diagram and the resulting fixed point subgroup is of type G_2. In the second case, we consider the simply-connected simple complex algebraic group of type E_6. Similarly, this group has an outer automorphism induced from its Dynkin diagram symmetry and the resulting fixed point subgroup is of type F_4. Under both of these embeddings, we can take dominant chambers so that the dominant Weyl chamber of the subgroup $\tilde{G}$ maps into the dominant Weyl chamber of the ambient group G.

1.1. Historical context

Determining the eigencone for the case when $s = 3$ and $G = SL(n)$ is equivalent to classical Hermitian eigenvalue problem which can be stated as follows: Given $n \times n$ Hermitian matrices A and B with (real) eigenvalues $\alpha = (\alpha_1 \geq \ldots \geq \alpha_n)$ and $\beta = (\beta_1 \geq \ldots \geq \beta_n)$ respectively, what are the possible eigenvalues γ of a Hermitian matrix $C = A + B$?

To see the equivalence, let K be the special unitary group $SU(n) \subset SL(n)$ which acts on $\mathfrak{k} = \mathfrak{su}(n)$, the Lie algebra of traceless skew-Hermitian matrices, by conjugation. The torus H is the subgroup of diagonal matrices with determinant one and $\mathfrak{h}_+$ is the set of traceless diagonal matrices with decreasing real entries along the diagonal. By the spectral theorem, any Hermitian matrix A is diagonalizable via conjugation by a unitary matrix. The resulting diagonal form will have real entries, it is given by $-c(iA)$, where c is the homeomorphism given above. It follows that possible triples of eigenvalues (α, β, γ) are given by the set $\hat{\Gamma}(SL(n), SU(n), 3)$. By replacing C with $-C$, we recover the classic problem.

We are concerned with the case where $\tilde{G}$ is of type G_2 (resp. F_4) and embedded in G which is of type D_4 (resp. E_6). Under this embedding, we can choose $\tilde{\mathfrak{h}}_+ \hookrightarrow \mathfrak{h}_+$. Therefore, we can compare the eigencones naturally.

The classical Hermitian eigenvalue problem was first considered by Hermann Weyl in 1912 [**24**] where he studied conditions on triples of eigenvalues (α, β, γ). However, it was not until 1962 that Alfred Horn [**11**] undertook a systematic study of the inequalities that α, β, γ must satisfy. He conjectured a system of inequalities that would give both necessary and sufficient conditions for such a triple (α, β, γ) to arise. An immediate and necessary condition is the trace condition:

$$\sum_i \gamma_i = \sum_i \alpha_i + \sum_i \beta_i.$$

In addition to exhibiting various necessary inequalities, he conjectured a list of sufficient inequalities all having the same form:

$$\sum_{k\in K}\gamma_k \le \sum_{i\in I}\alpha_i + \sum_{j\in J}\beta_j \tag{1}$$

for some triple of subsets $I, J, K \subset \{1, \dots, n\}$ of the same cardinality.

In 1998, Alexander Klyachko [**16**] made crucial connections between the Hermitian eigenvalue problem, representations of the general linear group, and the Schubert calculus of the Grassmannian using Geometric Invariant Theory. William Fulton produced a very nice summery of Klyachko's work and consequences in a survey paper [**10**].

1.1.1. Schubert calculus. Klyachko, combined with the work of Knutson and Tao on the 'Saturation Conjecture' [**17**], proved Horn's original conjecture in [**16**]. To describe the list, let V be an n dimensional complex vector space and fix some $1 \le r < n$. There is a bijection between subsets of $I \subset \{1, \dots, n\}$ of size r and Young diagrams contained in a rectangular box with r rows and $n-r$ columns. Given $I = \{i_1 < \cdots < i_r\}$, let Y_I denote the Young diagram with $n - r + j - i_j$ boxes in the j-th row. The diagram Y_I corresponds, in the usual way [**9**], to a Schubert cycle s_I in the cohomology ring (or Chow ring) of the Grassmannian

$$Gr(r, n) = \{W \subset V : W \text{ is a subspace of } V,\ \dim W = r\}.$$

The following theorem of Klyachko connects the Schubert calculus of the Grassmannian to our desired list of inequalities.

THEOREM 1 (Theorem 1.2 in [**16**]). *For any $1 \le r < n$, consider a triple of subsets $I, J, K \subset \{1, \dots, n\}$ of size r such that the Schubert cycle s_K is a component of $s_I \cdot s_J$. Then, inequality (1) holds and, in union with the trace identity, these inequalities form a complete set of restrictions on the eigenvalues α, β, γ of Hermitian matrices A, B, and $C = A + B$.*

To determine the eigencone for an arbitrary semisimple connected complex algebraic group G, the Grassmannian is replaced with the homogeneous space G/P, where P is a maximal parabolic subgroup. A necessary and sufficient list of inequalities for the general case will be given by the ring structure of the cohomology ring of G/P in an analogous fashion. The general case was proved by Berenstein and Sjamaar [**4**] with improvements by Kapovich, Leeb and Millson [**13**] and further improvements by Belkale and Kumar [**2**]; see the discussion in Chapter 5 and Theorem 22.

1.1.2. Representation theory. Klyachko's work marks the first appearance of the saturated tensor cone for $GL(n, \mathbb{C})$ which we will describe here. Let $\alpha = \{\alpha_1 \geq \cdots \geq \alpha_n\}$, where each $\alpha_i \in \mathbb{Z}$, and associate to α the following dominant character of $GL(n, \mathbb{C})$:

$$\hat{\alpha} : \mathrm{diag}(h_1, h_2, \ldots, h_n) \mapsto h_1^{\alpha_1} h_2^{\alpha_2} \cdots h_n^{\alpha_n}.$$

The irreducible finite diminensional representations of $GL(n, \mathbb{C})$ are parameterized by such dominant characters. Let $V(\hat{\alpha})$ denote the corresponding representation. Klyachko proved the following theorem:

THEOREM 2. *The irreducible representation $V(N\hat{\gamma})$ is a component of $V(N\hat{\alpha}) \otimes V(N\hat{\beta})$ for some positive integer $N \geq 1$ if and only if α, β and γ are eigenvalues of Hermitian operators A, B, and $C = A + B$.*

It is not clear whether one can always take $N = 1$. This remark is discussed later in the introduction and in Chapter 4. This theorem marks a deep connection between the Hermitian eigenvalue problem and the representation theory of $GL(n, \mathbb{C})$.

As mentioned earlier, determining the eigencone for a semisimple connected complex algebraic group G is the generalization of the classic Hermitian eigenvalue problem. To connect the eigencone to the representations of G in the general case, we recall some facts from representation theory and introduce two new cones: the *tensor cone* and the *saturated tensor cone*.

For any semisimple connected complex algebraic group G, the irreducible finite-dimensional representations of G are parameterized by the set $X(H)_+$ of dominant characters of H (or dominant integral weights of $\mathfrak{h}$), where H is a maximal torus of G. Let $V(\lambda)$ denote such a representation for $\lambda \in X(H)_+$. By the complete reducibility theorem, for any $\lambda, \mu \in X(H)_+$, we can decompose the tensor product

$$V(\lambda) \otimes V(\mu) = \bigoplus_{\nu \in X(H)_+} m^{\nu}_{\lambda,\mu} V(\nu)$$

where $m^{\nu}_{\lambda,\mu} \in \mathbb{Z}_{\geq 0}$ denotes the multiplicity of $V(\nu)$ in $V(\lambda) \otimes V(\mu)$. The *tensor product decomposition problem* is to determine the numbers $m^{\nu}_{\lambda,\mu}$. Of course, $m^{\nu}_{\lambda,\mu}$ is the dimension of the subspace of G-invariants in $V(\lambda) \otimes V(\mu) \otimes V(\nu^*)$, where $\nu^* = -w_0\nu$ so that $V(\nu^*)$ is the dual representation to $V(\nu)$, where $w_0 \in W$ denotes the longest element in the Weyl group W. The tensor product decomposition problem is a special case of classifying $(\lambda_1, \ldots, \lambda_s) \in (X(H)_+)^s$ such that $[V(\lambda_1) \otimes \cdots \otimes V(\lambda_s)]^G \neq 0$ and determining its dimension. Let $\Gamma_0(G, s)$ denote the *tensor cone* defined by

$$\Gamma_0(G, s) = \{(\lambda_1, \ldots, \lambda_s) \in (X(H)_+)^s : [V(\lambda_1) \otimes \cdots \otimes V(\lambda_s)]^G \neq 0\}.$$

A weaker problem (the *saturated tensor product decomposition problem*) is to determine if $V(N\lambda_1) \otimes \cdots \otimes V(N\lambda_s)$ has G-invariants for some $N \geq 1$. Let $\Gamma(G, s)$ denote the *saturated tensor cone* defined by

$$\Gamma(G, s) = \{(\lambda_1, \ldots, \lambda_s) \in (X(H)_+)^s : [V(N\lambda_1) \otimes \cdots \otimes V(N\lambda_s)]^G \neq 0 \text{ for some } N \geq 1\}.$$

By virtue of a convexity result in symplectic geometry, there exists a (unique) convex polyhedral cone $\Gamma \subset (X(H)_+ \otimes_{\mathbb{Z}} \mathbb{R})^s$ such that $\Gamma(G, s) = \Gamma \cap (X(H)_+)^s$, as shown by Sjamaar in [**23**].

The definition of the tensor cone and saturated tensor cone are still valid for $G = GL(n, \mathbb{C})$. Theorem 2 draws a deep connection between the eigencone of $GL(n, \mathbb{C})$ and the saturated tensor cone of $GL(n, \mathbb{C})$.

As mentioned above, it is not clear that one can take $N = 1$ in Theorem 2 which would relate the eigencone and the tensor cone. However, in 1999, A. Knutson and T. Tao [**17**] proved the saturation conjecture asserting that we can take $N = 1$.

THEOREM 3 (Saturation Theorem). *If $V(N\hat{\gamma})$ is a component of $V(N\hat{\alpha}) \otimes V(N\hat{\beta})$ for some $N \geq 1$, then $V(\hat{\gamma})$ is a component of $V(\hat{\alpha}) \otimes V(\hat{\beta})$; that is, $\Gamma(GL(n, \mathbb{C}), 3) = \Gamma_0(GL(n, \mathbb{C}), 3)$.*

In [**23**], Sjamaar gives an explicit connection between the saturated tensor cone and the eigencone when G is an arbitrary complex semisimple group, essentially proving that they are equivalent problems. In particular, upon identifying $\mathfrak{h}$ with $\mathfrak{h}^*$ via the Killing form,

$$X(H)_+^s \cap \hat{\Gamma}(G, K, s) = \Gamma(G, s).$$

Therefore, determining the eigencone and the saturated tensor cones are essentially equivalent problems.

1.1.3. Other work. The body of work mentioned above confirmed Horn's conjecture and resulted in a list of inequalities characterizing the saturated tensor cone and eigencone for arbitrary complex semisimple G. As mentioned above, this list of inequalities is parameterized by the the Schubert calculus of the generalized flag varieties G/P, where P is any maximal parabolic subgroup.

In general, this system is overdetermined. For the original Hermitian eigenvalue problem, P. Belkale found a simplified system of inequalities [**1**] which was subsequently proved to be irredundant by Knutson, Tao, and Woodward [**18**]. For an arbitrary complex semisimple G, Belkale and Kumar found a (much) smaller list of inequalities in [**2**] by introducing a new product in the cohomology of G/P in 2006. Theire list of inequalities was proved to be irredundant by Ressayre [**22**].

1.2. Results

Suppose that for a simple complex algebraic group G and a connected semisimple subgroup $\tilde{G} \hookrightarrow G$, we have the following:

$$\tilde{K} = K \cap \tilde{G} \quad \text{and} \quad \tilde{\mathfrak{h}}_+ \hookrightarrow \mathfrak{h}_+,$$

where $\tilde{K}$ is a maximal compact subgroup in $\tilde{G}$, K is a maximal compact subgroup of G, $\tilde{\mathfrak{h}}_+$ denotes the dominant chamber of $\tilde{G}$, and $\mathfrak{h}_+$ denotes the dominant chamber of G. By functorality of the eigencone, it follows that $\hat{\Gamma}(\tilde{G}, \tilde{K}, s) \subset \hat{\Gamma}(G, K, s)$. Conversely, is it the case that

$$\hat{\Gamma}(\tilde{G}, \tilde{K}, s) = \hat{\Gamma}(G, K, s) \cap \tilde{\mathfrak{h}}_+^s?$$

Recent work by Belkale and Kumar [**3**] confirmed this question for the group and subgroup pairs $Sp(2n) \subset SL(2n)$ and $SO(2n+1) \subset SL(2n+1)$. The subgroup $Sp(2n)$ (resp. $SO(2n+1)$) arises as a fixed point subgroup of an order two outer automorphism induced from the symmetry of the Dynkin diagram of $SL(2n)$ (resp. $SL(2n+1)$). The details of these embeddings are given in Chapter 3.

In general, they conjectured that this would be the case for any connected simply-connected semisimple complex algebraic group G with fixed point subgroup $\tilde{G} := G^\sigma$ where σ is a diagram automorphism.

We consider two cases. In the first case, we will consider the simply-connected simple complex algebraic group of type D_4. This group has an outer automorphism induced from the order three symmetries of its Dynkin diagram and the resulting fixed point subgroup is of type G_2. In the second case, we will consider the simple connected simple complex algebraic group of type E_6. Similarly, this group has an outer automorphism of order 2 induced from its Dynkin diagram symmetry and the resulting fixed point subgroup is of type F_4.

In the following theorem, $(\tilde{G}, G)$ are of type (G_2, D_4) or (F_4, E_6) as described above, with compatible maximal compact subgroups $(\tilde{K}, K)$ and dominant Weyl chambers $(\tilde{\mathfrak{h}}_+, \mathfrak{h}_+)$.

THEOREM 4. *Let* $h = (h_1, h_2, h_3) \in \tilde{\mathfrak{h}}_+^3$. *Then,*

$$h \in \hat{\Gamma}(\tilde{G}, \tilde{K}, 3) \text{ if and only if } h \in \hat{\Gamma}(G, K, 3).$$

Since the eigencone and the saturated tensor cones are identified under the Killing form, we have the following result:

THEOREM 5. *If* $(\lambda_1, \lambda_2, \lambda_3) \in \Gamma(G, 3)$, *then* $(\tilde{\lambda}_1, \tilde{\lambda}_2, \tilde{\lambda}_3) \in \Gamma(\tilde{G}, 3)$, *where* $\tilde{\lambda}_i = \lambda_i|_{\tilde{\mathfrak{h}}}$.

For the pair $(\tilde{G}, G)$ of type (G_2, D_4), we can strengthen Theorem 5 by replacing the saturated tensor cone with the tensor cone.

THEOREM 6. *Let* $(\tilde{G}, G)$ *be the pair* (G_2, D_4). *If* $(\lambda_1, \lambda_2, \lambda_3) \in \Gamma_0(G, 3)$, *then* $(\tilde{\lambda}_1, \tilde{\lambda}_2, \tilde{\lambda}_3) \in \Gamma_0(\tilde{G}, 3)$, *where* $\tilde{\lambda}_i = \lambda_i|_{\tilde{\mathfrak{h}}}$.

The proofs of the above results depend on Theorem 24, a combinatorial result on the cohomology of certain homogeneous spaces associated to $\tilde{G}$ and G. For now, we postpone stating this theorem (see Chapter 6). This theorem is proven via a computer program which was developed to do calculations in the Schubert calculus of G/P where G is simple of any type and P is any parabolic subgroup.

CHAPTER 2

Notation and Preliminaries

2.1. Algebraic groups and their Lie algebras

Let G be a connected semisimple complex algebraic group. A Borel subgroup B is any maximal connected, solvable subgroup; any two of which are conjugate to each other. A torus of G is any subgroup isomorphic to $(\mathbb{C}^*)^k$ for some $k > 0$. We will fix a Borel subgroup and a maximal torus H contained in B. If H is isomorphic to $(\mathbb{C}^*)^n$, we call n the rank of G. Let $W = W_G := N_G(H)/H$ be the associated Weyl group, where $N_G(H)$ is the normalizer of H in G. Also, let $X(H)$ denote the character group of H; that is, $X(H)$ is the group of all algebraic group homomorphisms $H \to \mathbb{C}^*$.

The Lie algebras of G, B, and H are denoted by $\mathfrak{g}$, $\mathfrak{b}$, and $\mathfrak{h}$. Let $R \subset \mathfrak{h}^*$ denote the set of roots of $\mathfrak{g}$ (with respect to $\mathfrak{h}$). That is, $\mathfrak{g}$ decompose as follows:

$$\mathfrak{g} = \mathfrak{h} \oplus \bigoplus_{\alpha \in R} \mathfrak{g}_\alpha,$$

where $\mathfrak{g}_\alpha := \{x \in \mathfrak{g} : [h, x] = \alpha(h)x \text{ for all } h \in \mathfrak{h}\}$. Our choice of B gives rise to R^+, the set of positive roots, such that

$$\mathfrak{b} = \mathfrak{h} \oplus \bigoplus_{\alpha \in R^+} \mathfrak{g}_\alpha.$$

We let $\Delta = \{\alpha_1, \ldots, \alpha_n\} \subset R^+$ be the (unique) set of simple roots determined by R^+. All other positive roots are nonnegative integral combinations of elements in Δ. The elements of Δ are linearly independent and form a basis of $\mathfrak{h}^*$.

Let $\exp : \mathfrak{g} \to G$ denote the exponential map. When G is a matrix group, exp is the usual matrix exponentiation. The adjoint representation $\mathrm{Ad} : G \to \mathrm{Aut}(\mathfrak{g})$ of G is given by conjugation and the exponential map:

$$\mathrm{Ad}(g)(X) = \frac{d}{dt} g \exp(tX) g^{-1}|_{t=0}.$$

When G is a matrix group then $\mathrm{Ad}(g)$ is just conjugation by g. The derivative of the adjoint representation is denoted $\mathrm{ad} : \mathfrak{g} \to \mathrm{End}(\mathfrak{g})$ and given by the Lie algebra bracket $\mathrm{ad}(X)(Y) = [X, Y]$.

The Killing form $\kappa : \mathfrak{g} \times \mathfrak{g} \to \mathbb{C}$ defined by $\kappa(X, Y) = \mathrm{Tr}(\mathrm{ad}\, X \circ \mathrm{ad}\, Y)$ is a symmetric bilinear form on $\mathfrak{g}$ which is invariant in the sense that $\kappa([X, Y], Z) + \kappa(X, [Y, Z]) = 0$ for all $X, Y, Z \in \mathfrak{g}$. One criteria for G being semisimple is that κ is nondegenerate. When G is simple, κ is unique up to a scalar. Furthermore, the restriction of κ to $\mathfrak{h}$ remains nondegenerate and provides a natural identification of $\mathfrak{h}$ and $\mathfrak{h}^*$.

Since H is abelian, W acts on H by conjugation in a natural way. Via the adjoint representation of G on $\mathfrak{g}$, the action of W on H extends to an action on $\mathfrak{h}$. Choose any nondegenerate W-invariant symmetric form $\langle , \rangle$ on $\mathfrak{h}$ (e.g., the Killing form). Such a form gives an identification of $\mathfrak{h}$ with $\mathfrak{h}^*$. For any element $\alpha \in \mathfrak{h}^*$, let $\alpha^\vee$ denote the element of $\mathfrak{h}$ such that $2\alpha^\vee / \langle \alpha^\vee, \alpha^\vee \rangle$ is identified with α. When α is a root, we call $\alpha^\vee$ the corresponding coroot and let $\Delta^\vee = \{\alpha_1^\vee, \ldots, \alpha_n^\vee\} \subset \mathfrak{h}$ denote the set of simple coroots. The elements of $\Delta^\vee$ form a basis of $\mathfrak{h}$. Also, we let $R^\vee$ denote the set of coroots.

For any $1 \leq j \leq n$, define the element $x_j \in \mathfrak{h}$ by

$$\alpha_i(x_j) = \delta_{ij}, \text{ for any } 1 \leq i \leq n,$$

and define $\omega_j \in \mathfrak{h}^*$ by

$$\omega_j(\alpha_i^\vee) = \delta_{ij}, \text{ for any } 1 \leq i \leq n.$$

The set $\{\omega_1, \ldots, \omega_n\}$ is the set of *fundamental weights*. Let $\mathfrak{h}_+ \subset \mathfrak{h}$ be the dominant chamber defined by

$$\mathfrak{h}_+ = \{h \in \mathfrak{h} : \alpha_i(h) \in \mathbb{R}_{\geq 0} \,\forall\, \alpha_i\} = \bigoplus_i \mathbb{R}_{\geq 0}\, x_i.$$

Likewise, let $D \subset \mathfrak{h}^*$ be the set of dominant weights defined by

$$D = \{\lambda \in \mathfrak{h}^* : \lambda(\alpha_i^\vee) \in \mathbb{R}_{\geq 0} \, \forall \, \alpha_i^\vee\} = \bigoplus_i \mathbb{R}_{\geq 0} \, \omega_i.$$

Let $X(H)_+$ denote the set of dominant characters of H. Taking derivatives, we get an embedding $X(H)_+ \to D$. When G is simply-connected, $X(H)_+$ can be identified with

$$D_{\mathbb{Z}} = \{\lambda \in \mathfrak{h}^* : \lambda(\alpha_i^\vee) \in \mathbb{Z}_{\geq 0} \, \forall \, \alpha_i^\vee\}.$$

2.2. Weyl group

A concrete description of W can be given in terms of the simple roots and simple coroots as a subgroup of the permutations of R or $R^\vee$. For each root $\alpha \in R$, let $s_\alpha : \mathfrak{h}^* \to \mathfrak{h}^*$ denote the reflection given by

$$s_\alpha(\beta) = \beta - \beta(\alpha^\vee)\alpha.$$

One can show s_α stabilizes R. Dual to this map is $s_{\alpha^\vee} = s_\alpha^* : \mathfrak{h} \to \mathfrak{h}$ given by

$$s_{\alpha^\vee}(h) = h - \alpha(h)\alpha^\vee.$$

For each $1 \leq i \leq n$, let s_i denote the map $s_i := s_{\alpha_i^\vee}$. The set $S = \{s_1, \ldots, s_n\}$ is called the set of simple reflections (since these reflections correspond to simple roots). It is well known that these simple reflections generate the Weyl group, when W is identified with its action on $\mathfrak{h}$. When clear from the context, for each $1 \leq i \leq n$, we will also use s_i to denote s_{α_i}.

Using the fact that $W = \langle s_1, \ldots, s_n \rangle$, we define a *length function* on W, denoted $\ell : W \to \mathbb{Z}_{\geq 0}$. For any $w \in W$, $\ell(w)$ is defined to be the minimal $k \in \mathbb{Z}_{\geq 0}$ such that $w = s_{i_1} s_{i_2} \cdots s_{i_k}$ with each $s_{i_j} \in S$. A decomposition $w = s_{i_1} s_{i_2} \cdots s_{i_k}$ is called a *reduced decomposition* if $\ell(w) = k$. The unique element of greatest length is denoted $w_0 \in W$.

We also have the *Bruhat-Chevalley ordering* on W: $v \leq w$ if v can be obtained by deleting some simple reflections from a reduced decomposition of w.

Lastly, we have the Bruhat decomposition:

$$G = \bigsqcup_{w \in W} BwB.$$

Although, w denotes a coset of $N_G(H)/H$, the expression BwB is well defined since $H \subset B$.

2.3. Parabolic subgroups

Any subgroup of G containing a Borel subgroup is called a *parabolic subgroup.* For a fixed Borel subgroup $B \subset G$, any subgroup P containing B is called a *standard parabolic subgroup.* The set of standard parabolic subgroups are in one-to-one correspondence with subsets of the set $[n] = \{1, 2, \ldots, n\}$.

Specifically, suppose $I \subset [n]$. Define W_I to be the subgroup of W generated by $\{s_i : i \in I\}$. Then,

$$P_I := \bigsqcup_{w \in W_I} BwB$$

contains B and is a subgroup (hence it is a standard parabolic subgroup). Conversely, if P is a standard parabolic subgroup, let

$$\begin{aligned} I = \{i \in [n] \quad : \quad & w \in P, \text{ where the coset } w \in W \text{ is regarded} \\ & \text{as an element of } N_G(H), \text{ and } w \text{ acts as } s_i \text{ on } \mathfrak{h}\}. \end{aligned}$$

Then, it can be shown that $P = P_I$. For a standard parabolic subgroup $P = P_I$, we will denote W_I by W_P. See [**19**, Section 6.1] for more details.

From the above, when $I = [n]$ it follows that $P_I = G$ and when $I = \varnothing$, then $P_I = B$. When $P = P_I$ with I obtained from $[n]$ by deleting a single element $i \in [n]$, i.e., $I = \{1, \ldots, \widehat{i}, \ldots, n\}$, P is called a *maximal parabolic subgroup* and denoted by P_i.

To each standard parabolic subgroup $P = P_I$, there is a unique *Levi subgroup* L of P such that $H \subset L$, which is the maximal reductive subgroup of P containing H. Let $\mathfrak{p}$ and $\mathfrak{l}$ denote the Lie algebras of P and L, respectively. Let $R_{\mathfrak{l}}$ denote the set of roots of

$\mathfrak{l}$ so that

$$\mathfrak{l} = \mathfrak{h} \oplus \bigoplus_{\alpha \in R_{\mathfrak{l}}} \mathfrak{g}_\alpha.$$

Then, $R_{\mathfrak{l}} \subset R$ contains precisely those roots spanned by $\Delta(P) := \{\alpha_i : i \in I\}$. Let $R_{\mathfrak{l}}^+ = R^+ \cap R_{\mathfrak{l}}$ denote the positive roots of $\mathfrak{l}$ with respect to the Borel subgroup $B_L := B \cap L \subset L$. Then,

$$\mathfrak{p} = \mathfrak{h} \oplus \bigoplus_{\alpha \in R^+} \mathfrak{g}_\alpha \oplus \bigoplus_{\alpha \in R_{\mathfrak{l}}^+} \mathfrak{g}_{-\alpha}.$$

Furthermore, the Weyl group of L, $W_L = N_L(H)/H$ embeds in W as the subgroup W_P. The unique element of greatest length in W_P is denoted $w_{0,P}$.

We will also be interested in the cosets W/W_P. In each coset there is a unique representative of minimal length. Let W^P denote the set of minimal length coset representatives. If follows from the Bruhat-decompositon that

$$G = \bigsqcup_{w \in W^P} BwP.$$

2.4. Generalized flag manifolds and intersection theory

For any parabolic $P \subset G$, G/P is a smooth projective variety which admits a cellular decomposition. For any $w \in W^P$, we have the Bruhat (or Schubert) cell

$$\Lambda_w^P = BwP/P \subset G/P.$$

This is a locally closed subset of the flag variety G/P isomorphic to affine space $\mathbb{C}^{\ell(w)}$. Its closure is denoted by $X_w^P = \overline{\Lambda_w^P}$, which is an irreducible projective variety of dimension $\ell(w)$. The closure of Λ_w^P is also B-stable. Therefore, it is a disjoint union of Bruhat cells and those occurring in the closure are given by the Bruhat-Chevalley ordering:

$$X_w^P = \bigsqcup_{v \leq w} \Lambda_v^P = \bigsqcup_{v \leq w} BvP/P.$$

We denote by $[X_w^P] \in H_*(G/P)$ the fundamental integral homology class of X_w^P. It is well-known that $H_*(G/P)$ is a free $\mathbb{Z}$-module with basis $\{[X_w^P] : w \in W^P\}$.

We will use $\sigma_w^P \in H^*(G/P)$ to denote cycle class of $[X_w^P]$ in the integral singular cohomology of G/P. That is, σ_w^P is the cohomology class associated to $[X_w^P]$ by Poincaré duality. Let $\{\epsilon_w^P : w \in W^P\}$ denote the dual basis of $H^*(G/P)$ to $\{[X_w^P] : w \in W^P\}$. That is, under the Kronecker pairing, we have for w, $u \in W^P$,

$$\langle \epsilon_w^P, X_u^P \rangle = \delta_{w,u}.$$

One should note that $\sigma_w^P = \epsilon_{w_0 w w_{0,P}}^P$, where w_0 is the longest word in W and $w_{0,P}$ is the longest word in W_P (see Lemma 2.9 in [**20**]).

Before addressing the usual multiplication in the ring $H^*(G/P)$, we make an observation. Let $\pi_P : G/B \to G/P$ be the projection. Then the induced map $\pi_P^* : H^*(G/P) \to H^*(G/B)$ is injective with image precisely equal to the W_P-invariants of $H^*(G/B)$. Moreover, for $w \in W^P$, $\pi_P^*(\epsilon_w^P) = \epsilon_w$, where we are abbreviating ϵ_w^B by ϵ_w, and $\pi_P^*(\sigma_w^P) = \sigma_{w w_{0,P}}$ similarly. Therefore, it suffices to address the multiplicative structure of $H^*(G/B)$.

Since $\{\sigma_w := \sigma_w^B : w \in W\}$ is a $\mathbb{Z}$-basis of $H^*(G/B)$, understanding the cup product in $H^*(G/B)$ reduces to determining the structure coefficients $d_{u,v}^w \in \mathbb{Z}$, $u, v, w \in W$, called the *Littlewood-Richardson coefficients*, given by the equations:

$$\sigma_u \cdot \sigma_v = \sum_{w \in W} d_{u,v}^w \, \sigma_w.$$

A later section of this document will be dedicated to calculating these coefficients quickly with the aid of a computer.

In the meantime, we have a geometric interpretation of these numbers. Let $w^\vee = w_0 w$ for each $w \in W$. Fix some $u, v, w \in W$ such that

$$\text{codim}(\Lambda_u^B) + \text{codim}(\Lambda_v^B) + \text{codim}(\Lambda_{w^\vee}^B) = \dim G/B, \tag{1}$$

which implies $\ell(u) + \ell(v) = \ell(w)$. Recall the following useful theorem of Kleiman:

Theorem 7 (Kleiman's Transversality Theorem, [**15**]). *Let a connected algebraic group act transitively on a smooth variety X and let $X_1, \ldots, X_s$ be irreducible locally* *closed subvarieties of X. Then, there exists a non empty open subset $U \subset G^s$ such that for $(g_1, \ldots, g_s) \in U$, the intersection $\bigcap_{j=1}^s g_j X_j$ is proper (possibly empty) and dense in $\bigcap_{j=1}^s g_j \overline{X_j}$.*

Moreover, if X_j, $j = 1, \ldots, s$, are smooth varieties, we can find such a U with the additional property that for $(g_1, \ldots, g_s) \in U$, $\bigcap_{j=1}^s g_j X_j$ is transverse at each point of intersection.

Applying this theorem to the case when G acts on G/B, it follows that for generic $(g_1, g_2, g_3) \in G^3$, the intersection

$$g_1 \Lambda_u^B \cap g_2 \Lambda_v^B \cap g_3 \Lambda_{w^\vee}^B$$

is transverse at each point of intersection and dense in $g_1 X_u^B \cap g_2 X_v^B \cap g_3 X_{w^\vee}^B$. It follows from equation (1) that the former intersection is a finite number of points and the density statement implies the latter intersection is also a finite collection of points (of the same number). Via Poincaré duality and the identification of cohomology with the Chow ring,

$$\sigma_u \cdot \sigma_v \cdot \sigma_{w^\vee} = d_{u,v}^w \, \sigma_e \in H^{2 \dim G/B}(G/B, \mathbb{Z}),$$

and $d_{u,v}^w$ is precisely the number of points in the intersections given above.

CHAPTER 3

Details on specific groups

In this section, we will review details on specific complex algebraic groups. We will also give explicit embeddings of some groups as subgroups of others arising as the fixed point subgroup of an outer automorphism induced by a Dynkin diagram symmetry.

We are interested in σ which arise from symmetries in the Dynkin diagrams of simple complex algebraic groups. For example, the diagrams of type A_n, D_n (specifically D_4) and E_6 have symmetries. Recall that the nodes of the Dynkin diagrams correspond to simple roots (or coroots). Therefore, a symmetry in the Dynkin diagram induces an automorphism $\sigma : \Delta^\vee \to \Delta^\vee$. The set of simple coroots forms a basis of $\mathfrak{h}$, so we get an automorphism of $\mathfrak{h}$

Of course, σ also induces a dual transformation on $\mathfrak{h}^*$. There is a unique extension $\sigma : \mathfrak{h} \to \mathfrak{h}$ to a Lie algebra homomorphism $\sigma : \mathfrak{g} \to \mathfrak{g}$ using a suitable choice of a Chevalley basis. In particular, for each $\alpha \in R$, where R denotes the root system, there are elements X_α, Y_α, and $\alpha^\vee$ which span $\mathfrak{sl}_2(\alpha) := \mathfrak{g}_\alpha \oplus \mathfrak{g}_{-\alpha} \oplus \mathbb{C}\alpha^\vee$, which is isomorphic to $\mathfrak{sl}_2$ (see the next subsection for information on $\mathfrak{sl}_2$). Then, $\sigma(X_\alpha) := X_{\sigma(\alpha)}$, $\sigma(Y_\alpha) := Y_{\sigma(\alpha)}$, and $\alpha^\vee$ should be mapped accordingly by σ. Furthermore, σ can be lifted to an algebraic group automorphism $G \to G$ when G is taken to be simply-connected.

Henceforth, $\tilde{G} := G^\sigma$ will denote the fixed point subgroup as described above. We maintain the notational convention that if any symbol or structure is associated to $\tilde{G}$ in a natural way, in the same way that a symbol or structure is associated to G, then it will be denoted with a $\sim$. For example, Δ will denote the simple roots of $\mathfrak{g} := Lie(G)$, but $\tilde{\Delta}$ will denote the simple roots of $\tilde{\mathfrak{g}} := Lie(\tilde{G})$.

3.1. Special linear group $SL(n+1)$

Our discussion of the special linear group will follow Belkale and Kumar's in [**3**]. If V is a complex vector space of dimension $n+1$, then $GL(V)$ denotes the set of invertible $\mathbb{C}$-linear operators $V \to V$. If we choose a basis, we can identify V with $\mathbb{C}^{n+1}$ and $GL(V)$ with $GL(n+1)$, where $GL(n+1)$ denotes the group of nonsingular $(n+1) \times (n+1)$ complex matrices. The complex special linear group $SL(n+1) \subset GL(n+1)$ consists of those matrices of determine one. Our preferred Borel subgroup $B \subset SL(n+1)$ will be the subgroup of upper triangular matrices with determinant one. Similarly, we fix a maximal torus H consisting of diagonal matrices with determinant one.

The Lie algebra of $SL(n+1)$ is denoted $\mathfrak{sl}_{n+1}$ and consists of $(n+1)\times(n+1)$ traceless matrices. The Dynkin diagram A_n corresponding to this complex simple Lie algebra is given in Figure 1.

Our choice of torus gives the Cartan subalgebra

$$\mathfrak{h} = \{\mathrm{diag}(h_1, \ldots, h_{n+1}) : \sum_i h_i = 0\}$$

and

$$\mathfrak{h}_+ = \{h \in \mathfrak{h} : h_i \in \mathbb{R} \text{ and } h_1 \geq \cdots \geq h_{n+1}\}.$$

For any $1 \leq i \leq n$ and $h \in \mathfrak{h}$,

$$\begin{aligned}
\alpha_i(h) &= h_i - h_{i+1} \\
\alpha_i^\vee &= \mathrm{diag}(0, \ldots, 0, 1, -1, 0, \ldots, 0), \text{where the 1 is in the } i\text{-th position,} \\
\omega_i(h) &= h_1 + \cdots + h_i, \text{ and} \\
x_i &= \mathrm{diag}\left(\frac{n+1-i}{n+1}, \ldots, \frac{n+1-i}{n+1}, -\frac{i}{n+1}, \ldots, -\frac{i}{n+1}\right), \\
&\qquad \text{where the first } i \text{ terms are } \frac{n+1-i}{n+1}.
\end{aligned}$$

The Weyl group W can be identified with the symmetric group S_{n+1} which acts via the permutation of the coordinates of $h \in \mathfrak{h}$. The simple reflections $\{s_1, \ldots, s_n\}$ act as

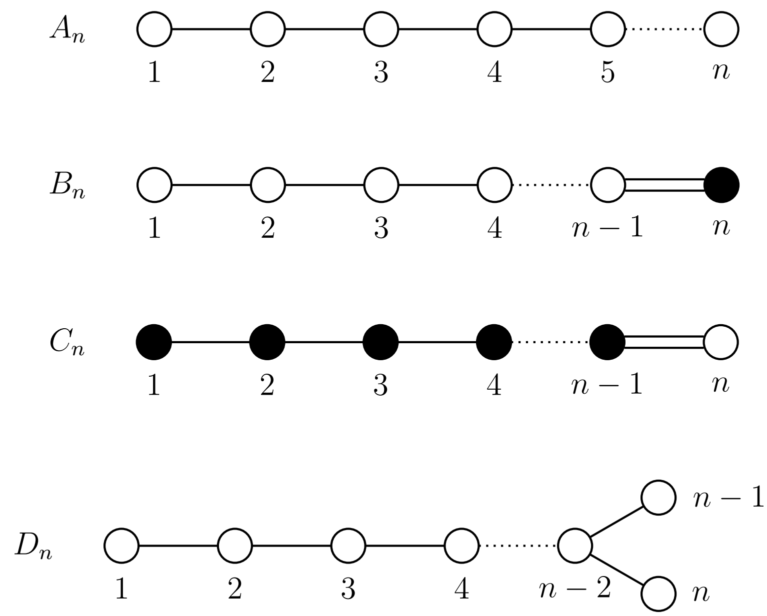

FIGURE 1. Dynkin diagram of classical types

transpositions:

$$s_i(\mathrm{diag}(h_1, \ldots, h_{n+1})) = \mathrm{diag}(h_1, \ldots, h_{i+1}, h_i, \ldots, h_{n+1}).$$

3.2. Symplectic group $Sp(2n)$

Our discussion of the symplectic group group will follow Belkale and Kumar's in [**3**]. Let $V = \mathbb{C}^{2n}$ be equipped with the nondegenerate symplectic form $\langle , \rangle$ so that its matrix $E = (\langle v_i, v_j \rangle)_{1 \leq i,j \leq 2n}$ in the standard basis $\{v_1, \ldots, v_{2n}\}$ is given by

$$E = \begin{pmatrix} 0 & J \\ -J & 0 \end{pmatrix},$$

where J is the $n \times n$ matrix with 1 along the anti-diagnal. Let G denote $SL(2n)$ and $\tilde{G}$ denote the associated symplectic group

$$\tilde{G} = Sp(2n) = \{g \in SL(2n) : \langle gv, gw \rangle = \langle v, w \rangle \text{ for all } v, w \in V\}.$$

Clearly, $Sp(2n)$ can be realized as the fixed point subgroup $\tilde{G} = G^\sigma$ under the involution $\sigma : G \to G$ defined by $\sigma(g) = E(g^t)^{-1}E^{-1}$. This outer automorphism is induced from symmetry of the A_{2n-1} diagram given by reversing the nodes. The involution stabilizes both B and H, where B and H are as in the $SL(2n)$ case. Moreover, $\tilde{B} := B^\sigma$ (respectively, $\tilde{H} := H^\sigma$) is a Borel subgroup (respectively, a maximal torus) of $Sp(2n)$.

Let $\tilde{\mathfrak{g}}$ denote the Lie algebra $\tilde{\mathfrak{g}} := \mathfrak{g}^\sigma$ of $Sp(2n)$, which is simple and whose Dynkin diagram C_n is given in Figure 1. The Lie algebra of $\tilde{H}$ is

$$\tilde{\mathfrak{h}} = \{\mathrm{diag}(h_1, \ldots, h_n, -h_n, \ldots, -h_1) : h_i \in \mathbb{C}\}.$$

Let $\tilde{\Delta} = \{\tilde{\alpha}_1, \ldots, \tilde{\alpha}_n\}$. Then, for any $1 \leq i \leq n$, $\tilde{\alpha}_i = \alpha_i|_{\tilde{\mathfrak{h}}}$ where $\{\alpha_1, \ldots, \alpha_{2n-1}\}$ are the simple roots of $SL(2n)$. The corresponding (simple) coroots $\tilde{\Delta}^\vee = \{\tilde{\alpha}_1^\vee, \ldots, \tilde{\alpha}_n^\vee\}$ are given by

$$\tilde{\alpha}_i^\vee = \alpha_i^\vee + \alpha_{2n-i}^\vee, \quad \text{for } 1 \leq i < n$$

and $\tilde{\alpha}_n^\vee = \alpha_n^\vee$. Thus,

$$\tilde{h}_+ = \{\mathrm{diag}(h_1, \ldots, h_n, -h_n, \ldots, -h_1) : h_i \in \mathbb{R} \text{ and } h_1 \geq \cdots \geq h_n \geq 0\}.$$

Moreover, $\mathfrak{h}_+$ is σ-stable and $\mathfrak{h}_+^\sigma = \tilde{\mathfrak{h}}_+$.

We also have that

$$\tilde{x}_i = x_i + x_{2n-i}, \quad \text{for } 1 \leq i < n,$$

and $\tilde{x}_i = x_n$. The fundamental weights are given by, for $h \in \tilde{\mathfrak{h}}$:

$$\tilde{\omega}_i(h) = h_1 + \cdots + h_i.$$

Note, $\omega_i|_{\tilde{\mathfrak{h}}} = \tilde{\omega}_i$.

Let $\{\tilde{s}_1, \ldots, \tilde{s}_n\}$ be the simple reflections in the Weyl group $\tilde{W}$ of $\tilde{G}$. Since H is σ-stable, it follows $N_G(H)$ is σ-stable and there is an induced action of σ on the Weyl group $W = S_{2n}$ of $G = SL(2n)$. The Weyl group $\tilde{W}$ can be identified with the subgroup of σ-invariants, $\tilde{W} = W^\sigma$. Under the inclusion $\tilde{W} \subset W$, we have

$$\tilde{s}_i = s_i s_{2n-i}, \quad \text{if } 1 \leq i < n,$$

and $\tilde{s}_n = s_n$.

3.3. Special orthogonal group $SO(2n+1)$

Our discussion of the odd special orthogonal group will follow Belkale and Kumar's in [**3**]. Let $V = \mathbb{C}^{2n+1}$ be equipped with the non degenerate symmetric form $\langle , \rangle$ so that its matrix $E = (\langle v_i, v_j \rangle)_{1 \leq i,j \leq 2n+1}$ in the standard basis $\{v_1, \ldots, v_{2n}\}$ is given by the $(2n+1) \times (2n+1)$ anti-diagonal matrix whose entries are 1 along the anti-diagonal except in the $(n+1) \times (n+1)$ position, which has a 2. Let G denote $SL(2n+1)$ and $\tilde{G}$ denote the associated special orthogonal group

$$\tilde{G} = SO(2n+1) := \{g \in SL(2n+1) : \langle gv, gw \rangle = \langle v, w \rangle \text{ for all } v, w \in V\}.$$

Clearly, $SO(2n+1)$ can be realized as the fixed point subgroup $\tilde{G} = G^\sigma$ under the involution $\sigma : G \to G$ defined by $\sigma(g) = E^{-1}(g^t)^{-1}E$. This outer automorphism is induced from symmetry of the A_{2n} diagram given by reversing the nodes. The involution stabilizes both B and H, where B and H are as in the $SL(2n+1)$ case. Moreover, $\tilde{B} := B^\sigma$ (respectively, $\tilde{H} := H^\sigma$) is a Borel subgroup (respectively, a maximal torus) of $SO(2n+1)$.

Let $\tilde{\mathfrak{g}}$ denote the Lie algebra $\tilde{\mathfrak{g}} := \mathfrak{g}^\sigma$ of $SO(2n+1)$, which is simple and whose Dynkin diagram B_n is given in Figure 1. The Lie algebra of $\tilde{H}$ is

$$\tilde{\mathfrak{h}} = \{\mathrm{diag}(h_1, \ldots, h_n, 0, -h_n, \ldots, -h_1) : h_i \in \mathbb{C}\}.$$

Let $\tilde{\Delta} = \{\tilde{\alpha}_1, \ldots, \tilde{\alpha}_n\}$. Then, for any $1 \leq i \leq n$, $\tilde{\alpha}_i = \alpha_i|_{\tilde{\mathfrak{h}}}$ where $\{\alpha_1, \ldots, \alpha_{2n}\}$ are the simple roots of $SL(2n+1)$. The corresponding (simple) $\tilde{\Delta}^\vee = \{\tilde{\alpha}_1^\vee, \ldots, \tilde{\alpha}_n^\vee\}$ are given by

$$\tilde{\alpha}_i^\vee = \alpha_i^\vee + \alpha_{2n+1-i}^\vee, \quad \text{for } 1 \leq i < n$$

and $\tilde{\alpha}_n^\vee = 2\alpha_n^\vee + 2\alpha_{n+1}^\vee$. Thus,

$$\tilde{h}_+ = \{\mathrm{diag}(h_1, \ldots, h_n, 0, -h_n, \ldots, -h_1) : h_i \in \mathbb{R} \text{ and } h_1 \geq \cdots \geq h_n \geq 0\}.$$

Moreover, $\mathfrak{h}_+$ is σ-stable and $\mathfrak{h}_+^\sigma = \tilde{\mathfrak{h}}_+$.

We also have that

$$\tilde{x}_i = x_i + x_{2n+1-i}, \quad \text{for } 1 \leq i \leq n.$$

The fundamental weights are given by, for $h \in \tilde{\mathfrak{h}}$:

$$\begin{aligned} \tilde{\omega}_i(h) &= h_1 + \cdots + h_i, \quad \text{for } i < n \quad \text{and} \\ \tilde{\omega}_n(h) &= \frac{1}{2}(h_1 + \cdots + h_n). \end{aligned}$$

Note, $\omega_i|_{\tilde{\mathfrak{h}}} = \tilde{\omega}_i$ for $i < n$ and $\frac{1}{2}\omega_n|_{\tilde{\mathfrak{h}}} = \tilde{\omega}_n$.

Let $\{\tilde{s}_1, \ldots, \tilde{s}_n\}$ be the simple reflections in the Weyl group $\tilde{W}$ of $\tilde{G}$. Since H is σ-stable, it follows $N_G(H)$ is σ-stable and there is an induced action of σ on the Weyl group $W = S_{2n}$ of $G = SL(2n)$. The Weyl group $\tilde{W}$ can be identified with the subgroup of σ-invariants, $\tilde{W} = W^\sigma$. Under the inclusion $\tilde{W} \subset W$, we have

$$\tilde{s}_i = s_i s_{2n+1-i}, \quad \text{if } 1 \leq i < n,$$

and $\tilde{s}_n = s_n s_{n+1} s_n$.

3.4. Special orthogonal group $SO(2n)$

Let $V = \mathbb{C}^{2n}$ be equipped with the nondegenerate symmetric form $\langle\, , \rangle$ so that the matrix $J = (\langle v_i, v_j \rangle)_{1 \leq i,j \leq 2n}$ in the standard basis $\{v_1, \ldots, v_{2n}\}$ is the $2n \times 2n$ matrix with 1's along the anti-diagonal. The associated quadratic form on V is given by

$$Q(\sum_{i=1}^{2n} t_i v_i) = \sum_{i=1}^{n} t_i t_{2n+1-i}.$$

Let

$$G = SO(2n) = \{g \in SL(2n) : g \text{ leaves the quadratic form } Q \text{ invariant}\}$$

be the associated special orthogonal group. Clearly, $SO(2n)$ can be realized as the fixed point subgroup $SL(2n)^\sigma$ under the involution $\sigma : SL(2n) \to SL(2n)$ defined by $\sigma(A) = J^{-1}(A^t)^{-1}J$. However, this involution does *not* arise from any symmetry of the

Dynkin diagram. The involution still keeps both the Borel subgroup of $SL(2n)$ (the upper triangular matrices) and the maximal torus of $SL(2n)$ (the diagonal matrices) stable. Moreover, the fixed points of these groups form a Borel subgroup and a maximal torus for $SO(2n)$, respectively.

Let $\mathfrak{g}$ denote the Lie algebra of $SO(2n)$. Note that $SO(2n)$ is not the semisimple simply-connected complex algebraic group of type D_n, which is $Spin(2n)$ but details on $Spin(2n)$ will not be needed. We only need information on the Lie algebra $\mathfrak{g} = Lie(SO(2n))$, which consists of $2n \times 2n$ matrices which satisfy the relation $X^t J + JX = 0$. This Lie algebra is simple and its Dynkin diagram D_n is given in Figure 1.

The Lie algebra of H is

$$\mathfrak{h} = \{\mathrm{diag}(h_1, \ldots, h_n, -h_n, \ldots, -h_1) : h_i \in \mathbb{C}\}.$$

For $1 \leq i \leq n$, let e_i denote the diagonal matrix with all zeroes except for a 1 in the i-th entry and a -1 in the $(2n+1-i)$-th entry. Then, in the basis $\{e_i\}$, an element of $\mathfrak{h}$ has coordinates $(h_1, \ldots, h_n)$.

The simple coroots $\Delta^\vee = \{\alpha_1^\vee, \ldots, \alpha_n^\vee\} \subset \mathfrak{h}$ are given by

$$\alpha_i^\vee = e_i - e_{i+1}, \text{ for } 1 \leq i < n, \text{ and } \alpha_n^\vee = e_{n-1} + e_n.$$

Similarly, the simple roots $\Delta = \{\alpha_1, \ldots, \alpha_n\} \subset \mathfrak{h}^*$ are given by

$$\alpha_i = e_i^* - e_{i+1}^*, \text{ for } 1 \leq i < n, \text{ and } \alpha_n = e_{n-1}^* + e_n^*.$$

The fundamental weights $\{\omega_1, \ldots, \omega_n\} \subset \mathfrak{h}^*$ are given by

$$\begin{aligned}
\omega_i &= e_1^* + \cdots + e_i^*, \text{ for } 1 \leq i < n-1, \\
\omega_{n-1} &= \frac{1}{2}(e_1^* + \cdots + e_{n-1}^* - e_n^*), \text{ and} \\
\omega_n &= \frac{1}{2}(e_1^* + \cdots + e_{n-1}^* + e_n^*).
\end{aligned}$$

Likewise, the vectors $\{x_1, \ldots, x_n\} \subset \mathfrak{h}$ are given by

$$\begin{aligned}
x_i &= e_1 + \cdots + e_i, \text{ for } 1 \leq i < n-1, \\
x_{n-1} &= \frac{1}{2}(e_1 + \cdots + e_{n-1} - e_n), \text{ and} \\
x_n &= \frac{1}{2}(e_1 + \cdots + e_{n-1} + e_n).
\end{aligned}$$

The dominant chamber $\mathfrak{h}_+$ is given by elements $(h_1, \ldots, h_n) \in \mathfrak{h}$ satisfying:

$$h_1 \geq \cdots \geq h_{n-1} \geq |h_n|.$$

Let $\{s_1, \ldots, s_n\}$ be the simple reflections in the Weyl group W of $\mathfrak{g}$ corresponding to the simple roots $\{\alpha_1, \ldots, \alpha_n\}$. The actions of the simple reflections can be described on the coordinates $(h_1, \ldots, h_n)$ of $h \in \mathfrak{h}$ (as above) by the following:

$$\begin{aligned}
s_i(h_1, \ldots, h_n) &= (h_1, \ldots, h_{i+1}, h_i, \ldots, h_n), \text{ for } 1 \leq i < n, \text{ and} \\
s_n(h_1, \ldots, h_n) &= (h_1, \ldots, h_{n-2}, -h_n, -h_{n-1}).
\end{aligned}$$

3.5. Type G_2

In this section, we will describe the complex simple Lie algebra of type G_2, denoted by $\tilde{\mathfrak{g}}$, as a subalgebra of the complex simple Lie algebra of type D_4, denoted by $\mathfrak{g}$, as in the previous section.

Consider the diagram automorphism σ of the Dynkin diagram of type D_4 which corresponds to a $120°$ rotation. Then, σ induces a permutation on the simple roots as follows:

$$\alpha_1 \mapsto \alpha_3 \mapsto \alpha_4 \mapsto \alpha_1, \quad \text{and} \quad \alpha_2 \mapsto \alpha_2,$$

and similarly on the simple coroots. Therefore, σ gives a linear transformation on both $\mathfrak{h}^*$ and $\mathfrak{h}$. We can extend $\sigma : \mathfrak{h} \to \mathfrak{h}$ to a Lie algebra homomorphism $\sigma : \mathfrak{g} \to \mathfrak{g}$ using the Chevalley basis.

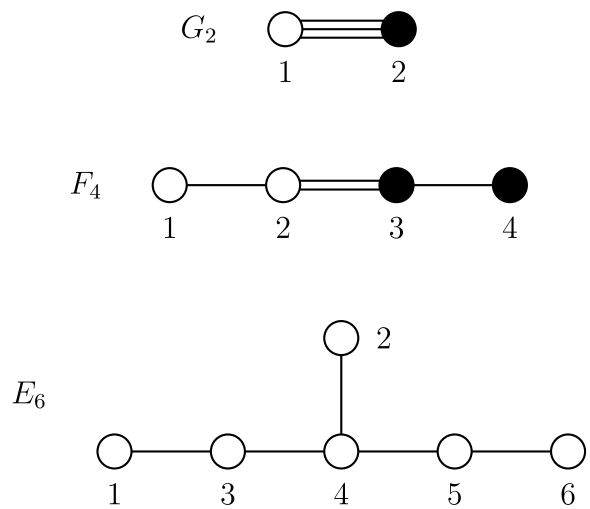

FIGURE 2. Dynkin diagrams of exceptional types

It should be noted that this automorphism can be extended to an order three automorphism $\sigma : Spin(8) \to Spin(8)$, which is the universal cover of $SO(8)$. However, both $Spin(8)$ and $SO(8)$ have the same Lie algebras. The fixed point subalgebra of this automorphism, $\tilde{\mathfrak{g}} := \mathfrak{g}^{\sigma}$, is an isomorphic copy of the Lie algebra of type G_2, which is simple and whose Dynkin diagram is given in Figure 2. A typical element of $\mathfrak{g} = \mathfrak{so}(8)$ has the following form:

$$\begin{pmatrix} a_{1,1} & a_{1,2} & a_{1,3} & a_{1,4} & a_{1,5} & a_{1,6} & a_{1,7} & 0 \\ a_{2,1} & a_{2,2} & a_{2,3} & a_{2,4} & a_{2,5} & a_{2,6} & 0 & -a_{1,7} \\ a_{3,1} & a_{3,2} & a_{3,3} & a_{3,4} & a_{3,5} & 0 & -a_{2,6} & -a_{1,6} \\ a_{4,1} & a_{4,2} & a_{4,3} & a_{4,4} & 0 & -a_{3,5} & -a_{2,5} & -a_{1,5} \\ a_{5,1} & a_{5,2} & a_{5,3} & 0 & -a_{4,4} & -a_{3,4} & -a_{2,4} & -a_{1,4} \\ a_{6,1} & a_{6,2} & 0 & -a_{5,3} & -a_{4,3} & -a_{3,3} & -a_{2,3} & -a_{1,3} \\ a_{7,1} & 0 & -a_{6,2} & -a_{5,2} & -a_{4,2} & -a_{3,2} & -a_{2,2} & -a_{1,2} \\ 0 & -a_{7,1} & -a_{6,1} & -a_{5,1} & -a_{4,1} & -a_{3,1} & -a_{2,1} & -a_{1,1} \end{pmatrix}.$$

It can be shown that a typical element of $\tilde{\mathfrak{g}}$ will have the form:

$$\begin{pmatrix} h_1 & a & c & d & d & e & f & 0 \\ a' & h_2 & b & c & c & d & 0 & -f \\ c' & b' & h_1 - h_2 & a & a & 0 & -d & -e \\ d' & c' & a' & 0 & 0 & -a & -c & -d \\ d' & c' & a' & 0 & 0 & -a & -c & -d \\ e' & d' & 0 & -a' & -a' & -h_1 + h_2 & -b & -c \\ f' & 0 & -d' & -c' & -c' & -b' & -h_2 & -a \\ 0 & -f' & -e' & -d' & -d' & -c' & -a' & -h_1 \end{pmatrix}.$$

The Cartan subalgebra $\tilde{\mathfrak{h}} := \mathfrak{h}^\sigma$ is given by diagonal matrices of the above form. Let $\tilde{\Delta} = \{\tilde{\alpha}_1, \tilde{\alpha}_2\}$ denote the simple roots of $\tilde{\mathfrak{g}}$. Then,

$$\tilde{\alpha}_1 = \frac{1}{3}(\alpha_1 + \alpha_3 + \alpha_4)|_{\tilde{\mathfrak{h}}} \quad \text{and} \quad \tilde{\alpha}_2 = \alpha_2|_{\tilde{\mathfrak{h}}}.$$

The corresponding simple coroots are given by

$$\tilde{\alpha}_1^\vee = \alpha_1^\vee + \alpha_3^\vee + \alpha_4^\vee \quad \text{and} \quad \tilde{\alpha}_2^\vee = \alpha_2^\vee.$$

Thus,

$$\tilde{\mathfrak{h}}_+ = \{\mathrm{diag}(h_1, h_2, h_1 - h_2, 0, 0, h_2 - h_1, -h_2, -h_1) : h_1 \geq h_2 \geq h_1 - h_2\}.$$

Moreover, $\mathfrak{h}_+$ is σ–stable and $\mathfrak{h}_+^\sigma = \tilde{\mathfrak{h}}_+$.

Furthermore, if $\{\tilde{\omega}_1, \tilde{\omega}_2\}$ denote the fundamental weights for $\tilde{\mathfrak{g}}$, then we have the following relations on the restrictions of the fundamental weights of $\mathfrak{g}$:

$$\tilde{\omega}_1 = \omega_1|_{\tilde{\mathfrak{h}}} = \omega_3|_{\tilde{\mathfrak{h}}} = \omega_4|_{\tilde{\mathfrak{h}}} \quad \text{and} \quad \tilde{\omega}_2 = \omega_2|_{\tilde{\mathfrak{h}}}.$$

Let $\{\tilde{s}_1, \tilde{s}_2\}$ be the simple reflections in the Weyl group $\tilde{W}$ of $\tilde{\mathfrak{g}}$ corresponding to the simple roots $\{\tilde{\alpha}_1, \tilde{\alpha}_2\}$, respectively. Under the inclusion, $\tilde{W} \subset W$, we have

$$\tilde{s}_1 = s_1 s_3 s_4 \quad \text{and} \quad \tilde{s}_2 = s_2.$$

3.6. Type E_6

In this subsection, let $\mathfrak{g}$ denote the Lie algebra of type E_6, which is simple and whose Dynking diagram is given in Figure 2.

Let $\{e_1, \ldots, e_8\}$ be the standard basis for $\mathbb{C}^8$. The root system of type E_6 can be described via the simple roots, Δ:

$$\begin{aligned}
\alpha_1 &= \frac{e_1^*}{2} - \frac{e_2^*}{2} - \frac{e_3^*}{2} - \frac{e_4^*}{2} - \frac{e_5^*}{2} - \frac{e_6^*}{2} - \frac{e_7^*}{2} + \frac{e_8^*}{2} \\
\alpha_2 &= e_1^* + e_2^* \\
\alpha_3 &= -e_1^* + e_2^* \\
\alpha_4 &= -e_2^* + e_3^* \\
\alpha_5 &= -e_3^* + e_4^* \\
\alpha_6 &= -e_4^* + e_5^*.
\end{aligned}$$

The corresponding coroots are:

$$\begin{aligned}
\alpha_1^\vee &= \frac{e_1}{2} - \frac{e_2}{2} - \frac{e_3}{2} - \frac{e_4}{2} - \frac{e_5}{2} - \frac{e_6}{2} - \frac{e_7}{2} + \frac{e_8}{2} \\
\alpha_2^\vee &= e_1 + e_2 \\
\alpha_3^\vee &= -e_1 + e_2 \\
\alpha_4^\vee &= -e_2 + e_3 \\
\alpha_5^\vee &= -e_3 + e_4 \\
\alpha_6^\vee &= -e_4 + e_5.
\end{aligned}$$

We identify the Cartan subalgebra $\mathfrak{h}$ of the Lie algebra of type E_6 with the span of the coroots. This subspace in $\mathbb{C}^8$ is perpendicular to $e_6 + e_8$ and $e_7 + e_8$.

The fundamental weights are given by:

$$
\begin{aligned}
\omega_1 &= -\frac{2e_6^*}{3} - \frac{2e_7^*}{3} + \frac{2e_8^*}{3} \\
\omega_2 &= \frac{e_1^*}{2} + \frac{e_2^*}{2} + \frac{e_3^*}{2} + \frac{e_4^*}{2} + \frac{e_5^*}{2} - \frac{e_6^*}{2} - \frac{e_7^*}{2} + \frac{e_8^*}{2} \\
\omega_3 &= -\frac{e_1^*}{2} + \frac{e_2^*}{2} + \frac{e_3^*}{2} + \frac{e_4^*}{2} + \frac{e_5^*}{2} - \frac{5e_6^*}{6} - \frac{5e_7^*}{6} + \frac{5e_8^*}{6} \\
\omega_4 &= e_3^* + e_4^* + e_5^* - e_6^* - e_7^* + e_8^* \\
\omega_5 &= e_4^* + e_5^* - \frac{2e_6^*}{3} - \frac{2e_7^*}{3} + \frac{2e_8^*}{3} \\
\omega_6 &= e_5^* - \frac{e_6^*}{3} - \frac{e_7^*}{3} + \frac{e_8^*}{3}.
\end{aligned}
$$

The dominant chamber is given by:

$$
\begin{aligned}
\mathfrak{h}_+ = \{h = \mathrm{diag}(h_1, h_2, \ldots, h_8) \quad : \quad & h_5 \geq h_4 \geq h_3 \geq h_2 \geq |h_1|, \\
& h_1 + h_8 \geq h_2 + h_3 + h_4 + h_5 + h_6 + h_7, \\
& h_6 + h_8 = 0, \text{ and} \\
& h_7 + h_8 = 0.\}.
\end{aligned}
$$

Let $\{s_1, s_2, s_3, s_4, s_5, s_6\}$ denote the simple reflections corresponding to the simple reflections $\{\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6\}$. Then, s_1 can be described via the following matrix (acting on the column vector $(h_1, \ldots, h_8)$):

$$
\frac{1}{4}\begin{pmatrix}
3 & 1 & 1 & 1 & 1 & 1 & 1 & -1 \\
1 & 3 & -1 & -1 & -1 & -1 & -1 & 1 \\
1 & -1 & 3 & -1 & -1 & -1 & -1 & 1 \\
1 & -1 & -1 & 3 & -1 & -1 & -1 & 1 \\
1 & -1 & -1 & -1 & 3 & -1 & -1 & 1 \\
1 & -1 & -1 & -1 & -1 & 3 & -1 & 1 \\
1 & -1 & -1 & -1 & -1 & -1 & 3 & 1 \\
-1 & 1 & 1 & 1 & 1 & 1 & 1 & 3
\end{pmatrix}.
$$

The other simple reflections have easier descriptions:

$$\begin{aligned}
s_2(h_1,\ldots,h_8) &= (-h_2,-h_1,h_3,h_4,h_5,h_6,h_7,h_8)\\
s_3(h_1,\ldots,h_8) &= (h_2,h_1,h_3,h_4,h_5,h_6,h_7,h_8)\\
s_4(h_1,\ldots,h_8) &= (h_1,h_3,h_2,h_4,h_5,h_6,h_7,h_8)\\
s_5(h_1,\ldots,h_8) &= (h_1,h_2,h_4,h_3,h_5,h_6,h_7,h_8)\\
s_6(h_1,\ldots,h_8) &= (h_1,h_2,h_3,h_5,h_4,h_6,h_7,h_8).
\end{aligned}$$

3.7. Type F_4

As with the pair (G_2, D_4), we will describe the Lie algebra of type F_4, denoted by $\tilde{\mathfrak{g}}$ in this subsection, as a subalgebra of the Lie algebra of type E_6, denoted by $\mathfrak{g}$ in the previous subsection. The Lie algebra of type F_4 is simple and its Dynkin diagram is given in Figure 2.

Consider the diagram automorphism σ of the Dynkin diagram of type E_6 which corresponds to a horizontal flip. Then, σ induces a permutation on the simple roots Δ of E_6 as follows:

$$\begin{aligned}
&\alpha_1 \mapsto \alpha_6 \mapsto \alpha_1,\\
&\alpha_2 \mapsto \alpha_2,\\
&\alpha_3 \mapsto \alpha_5 \mapsto \alpha_3, \quad \text{and}\\
&\alpha_4 \mapsto \alpha_4,
\end{aligned}$$

and similarly on the simple coroots. Therefore, σ gives a linear transformation on both $\mathfrak{h}^*$ and $\mathfrak{h}$. We can extend σ to a Lie algebra homomorphism using the Chevalley basis, as before.

The fixed point subalgebra, $\tilde{\mathfrak{g}} := \mathfrak{g}^\sigma$, will be isomorphic to the Lie algebra of type F_4. Let $\tilde{\mathfrak{h}} := \mathfrak{h}^\sigma$ denote the Cartan subalgebra of $\tilde{\mathfrak{g}}$, which will be a four dimensional subspace. Let $\tilde{\Delta} = \{\tilde{\alpha}_1, \tilde{\alpha}_2, \tilde{\alpha}_3, \tilde{\alpha}_4\}$ denote the simple roots of $\tilde{\mathfrak{g}}$. Then,

$$\begin{aligned}
\tilde{\alpha}_1 &= \alpha_2|_{\tilde{\mathfrak{h}}}, \\
\tilde{\alpha}_2 &= \alpha_4|_{\tilde{\mathfrak{h}}}, \\
\tilde{\alpha}_3 &= \frac{1}{2}(\alpha_3 + \alpha_5)|_{\tilde{\mathfrak{h}}}, \\
\tilde{\alpha}_4 &= \frac{1}{2}(\alpha_1 + \alpha_6)|_{\tilde{\mathfrak{h}}}.
\end{aligned}$$

The corresponding coroot system is given by:

$$\begin{aligned}
\tilde{\alpha}_1^\vee &= \alpha_2^\vee, \\
\tilde{\alpha}_2^\vee &= \alpha_4^\vee, \\
\tilde{\alpha}_3^\vee &= \alpha_3^\vee + \alpha_5^\vee, \\
\tilde{\alpha}_4^\vee &= \alpha_1^\vee + \alpha_6^\vee.
\end{aligned}$$

As before, $\tilde{\mathfrak{h}}_+ = \mathfrak{h}_+^\sigma$. Furthermore, if $\{\tilde{\omega}_1, \tilde{\omega}_2, \tilde{\omega}_3, \tilde{\omega}_4\}$ denote the fundamental weights of $\tilde{\mathfrak{g}}$, we have the following relations with the restrictions of the fundamental weights of $\mathfrak{g}$:

$$\begin{aligned}
\tilde{\omega}_1 &= \omega_2|_{\tilde{\mathfrak{h}}}, \\
\tilde{\omega}_2 &= \omega_4|_{\tilde{\mathfrak{h}}}, \\
\tilde{\omega}_3 &= \omega_3|_{\tilde{\mathfrak{h}}} = \omega_5|_{\tilde{\mathfrak{h}}}, \\
\tilde{\omega}_4 &= \omega_1|_{\tilde{\mathfrak{h}}} = \omega_6|_{\tilde{\mathfrak{h}}}.
\end{aligned}$$

Let $\{\tilde{s}_1, \tilde{s}_2, \tilde{s}_3, \tilde{s}_4\}$ be the simple reflections in the Weyl group $\tilde{W}$ of $\tilde{\mathfrak{g}}$ corresponding to the simple roots $\{\tilde{\alpha}_1, \tilde{\alpha}_2, \tilde{\alpha}_3, \tilde{\alpha}_4\}$, respectively. Under the inclusion, $\tilde{W} \subset W$, we have

$$\begin{aligned} \tilde{s}_1 &= s_2, \\ \tilde{s}_2 &= s_4, \\ \tilde{s}_3 &= s_3 s_5, \\ \tilde{s}_4 &= s_1 s_6. \end{aligned}$$

CHAPTER 4

Belkale-Kumar deformed product

Let G be a connected semisimple complex algebraic group and fix $P \subset G$ a parabolic subgroup. In this section, we give the definition of the Belkale-Kumar product in the cohomology of G/P. The results presented below can be found in [**2**]. We begin with a motivating lemma:

LEMMA 8 (Lemma 1 in [**2**]). *For any $g \in G$, $gw^{-1}\Lambda_w^P$ contains the point $e \in G/P$ if and only if $gw^{-1}\Lambda_w^P = pw^{-1}\Lambda_w^P$ for some $p \in P$.*

Combining this lemma and Kleiman's transversality theorem, we have the following proposition:

PROPOSITION 9 (Proposition 2 in [**2**]). *Take any $s \geq 1$ and any $(w_1, \ldots, w_s) \in (W^P)^s$ such that*

$$\sum_{j=1}^{s} \operatorname{codim} \Lambda_{w_j}^P = \dim G/P.$$

Then, $\sigma_{w_1}^P \cdots \sigma_{w_s}^P \neq 0$ if and only if for generic $(p_1, \ldots, p_s) \in P^s$, the intersection

$$p_1 w_1^{-1} \Lambda_{w_1}^P \cap \cdots \cap p_s w_s^{-1} \Lambda_{w_s}^P$$

is transverse at e.

Therefore, if general translates of Schubert varieties whose codimensions sum to the dimension of G/P intersect at a point, we can assume that the corresponding shifted cells were each translated by elements of the parabolic and they intersect at $e \in G/P$. Recall, contained in P is its unique Levi subgroup L containing H.

Definition 10. Let $(w_1, \ldots, w_s) \in (W^P)^s$ such that

$$\sum_{j=1}^{s} \operatorname{codim} \Lambda_{w_j}^P = \dim G/P.$$

We call the s-tuple $(w_1, \ldots, w_s)$ *Levi-movable* if, for generic $(l_1, \ldots, l_s) \in L^s$, the intersection $l_1 w_1^{-1} \Lambda_{w_1}^P \cap \cdots \cap l_s w_s^{-1} \Lambda_{w_s}^P$ is transverse at e.

Belkale and Kumar give a numerical criteria for Levi-movablity in the following theorem. Let ρ denote half the sum of the positive roots R^+ and let ρ^L denote half the sum of the roots in $R_{\mathfrak{l}}^+$, the positive roots of L.

Theorem 11. *Assume $(w_1, \ldots, w_s) \in (W^P)^s$ satisfy*

$$\sum_{j=1}^{s} \operatorname{codim} \Lambda_{w_j}^P = \dim G/P.$$

Then, $(w_1, \ldots, w_s)$ is Levi-movable if and only if $\sigma_{w_1}^P \cdots \sigma_{w_s}^P = d\sigma_e^P \in H^{top}(G/P)$ for some nonzero d and for each $\alpha_i \in \Delta \setminus \Delta(P)$, we have

$$\left(-\chi_e + \sum_{j=1}^{s} \chi_{w_j} \right) (x_i) = 0,$$

where $\chi_w = \rho - 2\rho^L + w^{-1}\rho \in \mathfrak{h}^*$.

Introduce indeterminates τ_i for each $\alpha_i \in \Delta \setminus \Delta(P)$ and write a deformed cup product

$$\sigma_u^P \odot \sigma_v^P = \sum_{w \in W^P} \left(\prod_{\alpha_i \in \Delta \setminus \Delta(P)} \tau_i^{(\chi_w - \chi_u - \chi_v)(x_i)} \right) d_{u,v}^w \, \sigma_w^P,$$

where the definition of χ_w is given in the previous theorem and $d_{u,v}^w$ is defined in Section 1.4. One can show that whenever $d_{u,v}^w \neq 0$, then the exponents of τ_i are nonnegative. Extend this to a $\mathbb{Z}[\tau_i]$-linear product structure on $H^*(G/P) \otimes_{\mathbb{Z}} \mathbb{Z}[\tau_i]$, where $\mathbb{Z}[\tau_i]$ is the polynomial ring with variables $\{\tau_i : \alpha_i \in \Delta \setminus \Delta(P)\}$. This product is commutative and associative. This product should not be confused with the product in the quantum cohomology of G/P. If we substitute each $\tau_i = 1$, we recover the original cohomology ring $H^*(G/P)$.

If we write the cup product in $H^*(G/P)$ in the $\{\epsilon_w^P\}$ basis so that

$$\epsilon_u^P \cdot \epsilon_v^P = \sum_w c_{u,v}^w \epsilon_w^P,$$

then the deformed product in the $\{\epsilon_w^P\}$ basis is given as follows:

$$\epsilon_u^P \odot \epsilon_v^P = \sum_{w \in W^P} \left(\prod_{\alpha_i \in \Delta \setminus \Delta(P)} \tau_i^{(u^{-1}\rho + v^{-1}\rho - w^{-1}\rho - \rho)(x_i)} \right) c_{u,v}^w \, \epsilon_w^P.$$

DEFINITION 12. The cohomology of G/P obtained by setting each $\tau_i = 0$ in $(H^*(G/P) \otimes \mathbb{Z}[\tau_i], \odot)$ is denoted by $(H^*(G/P), \odot_0)$. As a $\mathbb{Z}$-module, this is the same as the singular cohomology $H^*(G/P)$. This degeneration essentially has the effect of ignoring all non Levi-movable intersections. This product is associative, commutative, and Poincaré duality is still satisfied.

4.1. Minuscule type for maximal parabolic subgroups

In this section we will assume $P = P_i$ is maximal and we will give an equivalent definition of $(H^*(G/P), \odot_0)$. Note that in this section we fix some $i \in [n]$.

Since P is maximal, only one indeterminant is introduced for the deformed product. Setting $\tau_i = 0$, we can write the deformed product $\odot_0$ by the following:

$$\epsilon_u^P \odot_0 \epsilon_v^P = \sum_w c_{u,v}^w \delta_{u,v}^w \epsilon_w^P,$$

where $\delta_{u,v}^w = 1$ if $(u^{-1}\rho + v^{-1}\rho - w^{-1}\rho - \rho)(x_i) = 0$ and $\delta_{u,v}^w = 0$ otherwise, where ρ is the half sum of positive roots.

We will need a useful tool when studying elements of the Weyl group. Define the inversion set of w by $\Phi(w) := w^{-1}R^- \cap R^+$. It is a fact that $\ell(w) = |\Phi(w)|$. Similarly, let $\Phi^\vee(w) := w^{-1}(R^\vee)^- \cap (R^\vee)^+$. Given a reduced decomposition of $w = s_{i_k} \cdots s_{i_1}$, the inversion set $\Phi(w) = \{\beta_1, \ldots, \beta_k\}$ is given by:

$$\beta_1 = \alpha_{i_1} \quad \text{and} \quad \beta_j = s_{i_1} \cdots s_{i_{j-1}} \alpha_{i_j}, \text{ for } 1 < j \leq k.$$

Furthermore, given a subset $\Phi(w) \subset R^+$, we can write a reduced decomposition of w recursively as follows. If $\Phi(w) = \varnothing$, then w is the identity. Suppose $\ell(w) = |\Phi(w)| = k > 0$. Among the elements of $\Phi(w)$ will be a simple root; denote it by α_{i_k}. Then, $\ell(ws_{i_k}) = k - 1$ and

$$\Phi(ws_{i_k}) = \{s_{i_k}\beta : \beta \in \Phi(w) \text{ and } \beta \neq \alpha_{i_k}\}.$$

Repeat this procedure for ws_{i_k}. It will terminate after k iterations with $ws_{i_k} \cdots s_{i_1}$ equal to the identity. It follows that $w = s_{i_1} \cdots s_{i_k}$.

We now specialize to the case when $w \in W^P = W^{P_i}$ is a minimal length coset representative.

LEMMA 13. *If $w \in W^P$ and $\alpha \in \Phi(w)$, then when α is written as a linear combination of simple roots, the coefficient of α_i is positive. That is, $\alpha(x_i) > 0$.*

This lemma follows immediately from [**3**, Identity 2]

DEFINITION 14. Define $d(w) = \left(\sum_{\alpha\in\Phi(w)} \alpha(x_i)\right) - \ell(w)$, for $w \in W^P$. By the above lemma, $d(w) \geq 0$ since $\ell(w) = |\Phi(w)|$. If $d = d(w)$, we say $w \in W^P$ has *minuscule type* d.

LEMMA 15. *For $w \in W$, where W is any Weyl group, we have $\rho - w^{-1}\rho = \sum_{\alpha\in\Phi(w)} \alpha$, where ρ is half the sum of the positive roots corresponding to W.*

PROOF. Induct on the length of w and use the fact that $s_i\rho = \rho - \alpha_i$. □

It follows from this Lemma that $d(w) = (\rho - w^{-1}\rho)(x_i) - \ell(w)$. For $u, v, w \in W^P$, define $\widehat{\delta^w_{u,v}} := 1$ if $d(u) + d(v) = d(w)$ and $\widehat{\delta^w_{u,v}} := 0$ otherwise. In general, $\widehat{\delta^w_{u,v}} \neq \delta^w_{u,v}$ for arbitrary $u, v, w \in W^P$. However, if $\ell(u) + \ell(v) = \ell(w)$, they do coincide. It follows that, for any $u, v, w \in W^P$,

$$\widehat{\delta^w_{u,v}} c^w_{u,v} = \delta^w_{u,v} c^w_{u,v}.$$

LEMMA 16. *In the definition of the deformed product, if suffices to replace the condition that $(u^{-1}\rho + v^{-1}\rho - w^{-1}\rho - \rho)(x_i) = 0$ with $d(u) + d(v) = d(w)$.*

CHAPTER 5

Inequalities

5.1. Saturated tensor cone inequalities

Recall for any semisimple connected complex algebraic group G, the irreducible finite-dimensional representations of G are parameterized by the set $X(H)_+$ of dominant characters of H (or dominant integral weights of $\mathfrak{h}$ if G is simply-connected), where H is a maximal torus of G. By virtue of a convexity result in symplectic geometry [**23**], there exists a (unique) convex polyhedral cone $\Gamma \subset (X(H)_+ \otimes_{\mathbb{Z}} \mathbb{R})^s$ such that

$$\Gamma(G, s) = \Gamma \cap (X(H)_+)^s.$$

We have the following theorem due to Klyachko and Berenstein-Sjamaar which gives a system of inequalities describing the cone Γ explicitly.

THEOREM 17. *For $\lambda_1, \ldots, \lambda_s \in X(H)_+$, the following are equivalent:*

a) $(\lambda_1, \ldots, \lambda_s) \in \Gamma(G, s)$

b) For any standard maximal parabolic subgroup $P = P_i$ and any $w_1, \ldots, w_s \in W^P$ such that

$$\sigma^P_{w_1} \cdots \sigma^P_{w_s} = d\, \sigma^P_e \in H^{top}(G/P)$$

for $d > 0$, then the following inequality holds:

$$\sum_{j=1}^{s} \lambda_j(w_j x_i) \leq 0.$$

In general, the system of inequalities given in the above theorem is overdetermined. Belkale and Kumar have the following theorem which gives an irredundant system of inequalities. The irredundancy of this list was proved by Ressayre [**22**]. They are parameterized in terms of the deformed cohomology of G/P for maximal parabolic subgroups P. The following theorem is weaker in the $\Rightarrow$ direction, but much stronger in the $\Leftarrow$ direction.

THEOREM 18. *For $\lambda_1, \dots, \lambda_s \in X(H)_+$, the following are equivalent:*

a) $(\lambda_1, \dots, \lambda_s) \in \Gamma(G, s)$

b) For any standard maximal parabolic subgroup $P = P_i \subset G$ and any $w_1, \dots, w_s \in W^P$ such that

$$\sigma^P_{w_1} \odot_0 \cdots \odot_0 \sigma^P_{w_s} = \sigma^P_e \in (H^{top}(G/P), \odot_0),$$

the following inequality holds:

$$\sum_{j=1}^{s} \lambda_j(w_j x_i) \leq 0.$$

The previous two theorems will be our primary tools for studying the saturated tensor cones of G. Also, the previous two theorems characterize $\Gamma(G, s)$, not $\Gamma_0(G, s)$. Clearly, $\Gamma_0(G, s) \subset \Gamma(G, s)$, but these are not equal in general. When we have equality, we say $\Gamma_0(G, s)$ is *saturated*. Recall, Knutson and Tao proved in [**17**] that $\Gamma_0(GL(n, \mathbb{C}), s)$ is saturated. In [**12**], Kapovich, Kumar, and Millson showed $\Gamma_0(\mathrm{Spin}(8), s)$ is saturated. Note, Spin(8) is of Lie type D_4 which is simply-laced; it is conjectured by Kapovich and Millson [**14**] that $\Gamma_0(G, s)$ is saturated for all simply-laced groups.

5.1.1. Inequalities. In this section, we discuss the origin of the inequalities that appear in Theorems 17 and 18, which follow from the Hilbert-Mumford criterion and the Borel-Weil theorem.

First, we recall some facts from Geometric Invariant Theory. Let S be any reductive algebraic group acting on a projective variety X and let $\mathcal{L}$ be an ample S-equivariant line bundle on X. Denote by E the total space of $\mathcal{L}$. Then, E is also an S-variety such that the projection $\pi : E \to X$ is S-equivariant. Also, for any $s \in S$ and any $x \in X$, the map of fibers $E_x \to E_{s \cdot x}$ is linear (not just algebraic).

Recall, a global section of $\mathcal{L}$ is an algebraic map $\sigma : X \to E$ such that $\pi \circ \sigma = \mathrm{id}_X$, where id_X is the identity map on X. The space of global sections $H^0(X, \mathcal{L})$ has a natural finite dimensional S-module structure given by the following action:

$$(s \cdot \sigma)(x) = s \cdot \sigma(s^{-1} \cdot x).$$

We call a point $x \in X$ *semistable with respect to* $\mathcal{L}$ if for some $N > 0$ there exists an invariant section $\sigma \in H^0(X, \mathcal{L}^{\otimes N})^S$ such that $\sigma(x) \neq 0$. The set of semistable points is open (possibly empty) and denoted $X^{ss}(\mathcal{L})$. The Hilbert-Mumford criterion allows us to determine if a point is semistable in terms of one parameter subgroups of S. We recall the following definition due to Mumford.

Definition 19. Let S be any reductive algebraic group acting on a projective variety X and let $\mathcal{L}$ be an S-equivariant line bundle on X. Take any $x \in X$ and a one parameter subgroup $\nu : \mathbb{C}^* \to S$. The morphism $\nu_x : \mathbb{C}^* \to X$ given by $t \mapsto \nu(t)x$ extends to a morphism $\hat{\nu}_x : \mathbb{C} \to X$. Then, following Mumford, define a number $\mu^{\mathcal{L}}(x, \nu)$ called the *Mumford index* as follows: Let $x_0 \in X$ be the point $\hat{\nu}_x(0)$. Since x_0 is $\mathbb{C}^*$-invariant via ν, the fiber over x_0 is a one dimensional $\mathbb{C}^*$-module; in particular, is given by a character of $\mathbb{C}^*$. This integer is defined as $\mu^{\mathcal{L}}(x, \nu)$.

There are other characterizations of $\mu^{\mathcal{L}}(x, \nu)$ which we will not discuss here. For more details, see [**21**] including a proof of the following theorem:

Theorem 20 (Hilbert-Mumford criterion). *A point $x \in X$ is semistable with respect to $\mathcal{L}$ if and only if for every one parameter subgroup $\nu : \mathbb{C}^* \to S$, $\mu^{\mathcal{L}}(x, \nu) \geq 0$.*

Next, we recall the famous Borel-Weil theorem which connects representation theory of a semisimple complex algebraic group G with the geometry of G/B. For any $\lambda \in X(H)$, a character of the maximal torus H, we define a line bundle $\mathcal{L}(\lambda)$ on G/B. Recall that $B = H \ltimes U$, where $U = [B, B]$ is the unipotent radical. Extend $\lambda : H \to \mathbb{C}^*$ to $\lambda : B \to \mathbb{C}^*$ by letting λ map U to 1. Consider $\mathbb{C} = \mathbb{C}_\lambda$ as a B-module, where $b \cdot z = \lambda(b)z$. Then,

$\mathcal{L}(\lambda)$ is the line bundle: $\pi : G \times_B \mathbb{C}_{-\lambda} \to G/B$. Note that λ is made negative in the definition of $\mathcal{L}(\lambda)$.

THEOREM 21 (Borel-Weil theorem). *If $\lambda \in X(H)_+$, then*

$$H^0(G/B, \mathcal{L}(\lambda)) \simeq V(\lambda)^*,$$

where $V(\lambda)$ is the irreducible representation of G with highest weight λ.

Let $s > 1$ and let $X = G/B \times \cdots \times G/B$ (s terms). Fix $\lambda_1, \ldots, \lambda_s \in X(H)_+$ and consider the G-equivariant line bundle $\mathcal{L} = \mathcal{L}(\lambda_1) \boxtimes \cdots \boxtimes \mathcal{L}(\lambda_s)$. Here, $\boxtimes$ denotes the exterior tensor product of line bundles; each line bundle $\mathcal{L}(\lambda_i)$ sits over its own copy of G/B and G acts diagonally. As a consequence of the Borel-Weil theorem and the Kunneth formula, for any $N \geq 1$,

$$H^0(X, \mathcal{L}^{\otimes N}) \simeq V(N\lambda_1)^* \otimes \cdots \otimes V(N\lambda_s)^*. \tag{1}$$

Our goal is to determine which $(\lambda_1, \ldots, \lambda_s) \in X(H)_+^s$ have the property that

$$[V(N\lambda_1) \otimes \cdots \otimes V(N\lambda_s)]^G \neq 0$$

for some $N \geq 1$. Of course, this condition is equivalent to the property that

$$[V(N\lambda_1)^* \otimes \cdots \otimes V(N\lambda_s)^*]^G \neq 0$$

for some $N \geq 1$. By equation (1), this condition is equivalent the existence of a semistable point on X with respect to $\mathcal{L}$.

However, testing to see if a point $x \in X$ is semistable reduces to checking if $\mu^{\mathcal{L}}(x, \nu) \geq 0$ for all one parameter subgroups ν in G. Assuming the existence of a semistable point and by a clever choice of ν, we can recover the inequalities in Theorem 17. Conversely, assuming no semistable points exist, we can derive a contradiction to one of these inequalities. For details, see [**4**].

5.2. Inequalities for the eigenvalue problem

The eigencone and the saturated tensor cone are related by the Killing form. If we identify $\mathfrak{h}$ with $\mathfrak{h}^*$ via the Killing form, then the two cones coincide. Therefore, we have the following theorem based on Theorem 17 and Theorem 18:

THEOREM 22. *Let $(h_1, \ldots, h_s) \in \mathfrak{h}_+^s$. Then, the following are equivalent:*

a) $(h_1, \ldots, h_s) \in \hat{\Gamma}(G, K, s)$.

b) For any maximal parabolic subgroup $P = P_i \subset G$ and any $w_1, \ldots, w_s \in W^P$ such that

$$\sigma_{w_1}^P \cdots \sigma_{w_s}^P = d\, \sigma_e^P \in H^{top}(G/P)$$

for $d > 0$, then the following inequality holds:

$$\sum_{j=1}^{s} \omega_i(w_j^{-1} h_j) \leq 0.$$

c) For any standard maximal parabolic subgroup $P = P_i \subset G$ and any $w_1, \ldots, w_s \in W^P$ such that

$$\sigma_{w_1}^P \odot_0 \cdots \odot_0 \sigma_{w_s}^P = \sigma_e^P \in (H^{top}(G/P), \odot_0),$$

the following inequality holds:

$$\sum_{j=1}^{s} \omega_i(w_j^{-1} h_j) \leq 0.$$

CHAPTER 6

Comparing eigencones

Suppose G is a simple, simply-connected complex algebraic group, and let K be a maximal compact subgroup of G. Let $\tilde{G}$ be a connected complex simple subgroup of G with maximal compact subgroup $\tilde{K}$ such that $\tilde{K} \subset K$. Furthermore, assume the maximal torus $\tilde{H}$ of $\tilde{G}$ is contained in the maximal torus H of G. Then, the embedding $\tilde{G} \to G$ gives rise to an embedding of $\tilde{\mathfrak{h}} \to \mathfrak{h}$, where $\tilde{\mathfrak{h}}$ is the Lie algebra of $\tilde{H}$ and $\mathfrak{h}$ is the Lie algebra of H. Therefore, we can identify $\tilde{\mathfrak{h}}^s \subset \mathfrak{h}^s$ for any $s > 0$. Lastly, suppose $\tilde{\mathfrak{h}}_+ \hookrightarrow \mathfrak{h}_+$ as in the case of all the embeddings described in Chapter 2. It follows from the functorality of the eigencone that $\hat{\Gamma}(\tilde{G}, \tilde{K}, s) \subset \hat{\Gamma}(G, K, s)$.

Under this identification, the eigencone $\hat{\Gamma}(\tilde{G}, \tilde{K}, s)$ is naturally a subset of $\tilde{\mathfrak{h}}^s \cap \hat{\Gamma}(G, K, s)$. Conversely, one could ask if there is containment in the other direction. In other words, is it true that

$$\hat{\Gamma}(\tilde{G}, \tilde{K}, s) = \tilde{\mathfrak{h}}^s \cap \hat{\Gamma}(G, K, s)?$$

Recent work of Belkale and Kumar confirmed this question for the following pairs of groups $(\tilde{G}, G)$ (see [**3**]). In Chapter 2, we described an embedding of $\tilde{G} = Sp(2n)$ as a subgroup of $G = SL(2n)$. This embedding arose as fixed point subgroup of a certain diagram involution σ on G; that is, $G^\sigma = \tilde{G}$. This involution coincides with the outer automorphism of G induced from the symmetry of the type A_{2n-1} Dynkin diagram.

Similarly, we described an embedding of $SO(2n+1)$ as a fixed point subgroup of $SL(2n+1)$ arising from the outer automorphism of $SL(2n+1)$ induced from the symmetry of the type A_{2n} Dynkin diagram.

Belkale and Kumar conjectured that the eigencones would coincide as above for any fixed point subgroup which arises from a symmetry of the corresponding Dynkin diagram, of which there are three remaining cases.

The diagram of type D_{n+1} has a symmetry by interchanging the two end nodes. The resulting embedding is $B_n \hookrightarrow D_{n+1}$. Emily Braley verified the Belkale-Kumar conjecture for this case in her dissertation [**5**]. In this thesis we concern ourselves with the other two cases.

The diagram of type D_4 has the most symmetries and the resulting embedding is $G_2 \hookrightarrow D_4$. The diagram of type E_6 has a symmetry and the resulting embedding is $F_4 \hookrightarrow E_6$.

6.1. Main result

In what follows, we will let the pair of simply-connected semisimple complex algebraic groups $(\tilde{G}, G)$ denote group and subgroup pairs $\tilde{G} \subset G$ of types (G_2, D_4) or (F_4, E_6) as described previously. Key properties of the embedding $\tilde{\mathfrak{g}} \hookrightarrow \mathfrak{g}$ are given in Chapter 3.

Fix a Borel subgroup B of G and fix a maximal parabolic subgroup $\tilde{P}$ of $\tilde{G}$, which by definition is any subgroup containing the Borel subgroup $\tilde{B} = \tilde{G} \cap B$. The subgroup $\hat{P}$ of G generated by B and $\tilde{P}$ will contain B. Therefore, $\hat{P}$ is a parabolic subgroup of G and contained in some maximal parabolic subgroup P of G, which we fix. It follows that the fundamental weight ω_P of P restricts to the fundamental weight $\omega_{\tilde{P}}$ of $\tilde{P}$.

When $(\tilde{G}, G)$ is of type (G_2, D_4), then one choice of compatible pairs of maximal parabolic subgroups are $(\tilde{P}, P)$ equal to $(\tilde{P}_1, P_1)$ and $(\tilde{P}_2, P_2)$. When $(\tilde{G}, G)$ is of type (F_4, E_6), then one possible choice of compatible pairs of maximal parabolic subgroups are $(\tilde{P}, P)$ equal to $(\tilde{P}_1, P_2)$, $(\tilde{P}_2, P_4)$, $(\tilde{P}_3, P_3)$, and $(\tilde{P}_4, P_1)$.

Furthermore, fix a maximal torus $H \subset B$ and let $\tilde{H} = \tilde{G} \cap H$. Then, the Weyl groups $\tilde{W}$ of $\tilde{G}$ embeds into the Weyl group W of G as described in Chapter 3. Given $\tilde{w} \in \tilde{W}^{\tilde{P}}$, there is a unique elements $w \in W^P$ and $w' \in W_P$ such that $\tilde{w} = ww'$. The mapping $\iota : \tilde{W}^{\tilde{P}} \to W^P$ which takes $\tilde{w}$ to w is given in the following tables for the (G_2, D_4) cases.

In these tables, a string of numbers of the form $i_1 i_2 \cdots i_l$ is shorthand for the Weyl group element $s_{i_1} s_{i_2} \cdots s_{i_l}$ and e denotes the identity element of the Weyl group.

TABLE 1. $W^{\tilde{P}_1} \to W^{P_1}$ mapping for (G_2, D_4)

$\tilde{w}$	$w = \iota(\tilde{w})$
e	e
1	1
21	21
121	3421
2121	23421
12121	123421

TABLE 2. $W^{\tilde{P}_2} \to W^{P_2}$ mapping for (G_2, D_4)

$\tilde{w}$	$w = \iota(\tilde{w})$
e	e
2	2
12	1342
212	21342
1212	13242132
21212	213242132

Tables for the (F_4, E_6) are given later in this thesis.

LEMMA 23. *For $\tilde{w} \in \tilde{W}^{\tilde{P}}$ and $w \in W^P$ described above, if $h \in \tilde{\mathfrak{h}}$, then*

$$\omega_{\tilde{P}}(\tilde{w}^{-1}h) = \omega_P(w^{-1}h)$$

PROOF. Recall that ω_P is W_P-invariant. Then, it follows that

$$\begin{aligned} \omega_{\tilde{P}}(\tilde{w}^{-1}h) &= \omega_P(\tilde{w}^{-1}h) = \omega_P((ww')^{-1}h) \\ &= \omega_P((w')^{-1}w^{-1}h) = (w' \cdot \omega_P)(w^{-1}h) = \omega_P(w^{-1}h). \end{aligned}$$

$\square$

Suppose $\tilde{w}_1, \ldots, \tilde{w}_s \in \tilde{W}^{\tilde{P}}$ and let $w_1, \ldots, w_s \in W^P$ denote the corresponding minimal length coset representatives. Then by the previous lemma we have that for $h_1, \ldots, h_s \in \tilde{\mathfrak{h}}$:

$$\sum_{j=1}^{s} \omega_{\tilde{P}}(\tilde{w}_j^{-1} h_j) = \sum_{j=1}^{s} \omega_P(w_j^{-1} h_j).$$

Specialize to the case where $s = 3$. We have the following theorem:

THEOREM 24. *Suppose for $(\tilde{w}_1, \tilde{w}_2, \tilde{w}_3) \in \tilde{W}^{\tilde{P}}$ we have*

$$\tilde{\sigma}_{\tilde{w}_1} \odot_0 \tilde{\sigma}_{\tilde{w}_2} \odot_0 \tilde{\sigma}_{\tilde{w}_3} = \tilde{\sigma}_e \in (H^{top}(\tilde{G}/\tilde{P}), \odot_0).$$

Then for the corresponding elements $(w_1, w_2, w_3) \in W$ we have:

$$\sigma_{w_1} \odot_0 \sigma_{w_2} \odot_0 \sigma_{w_3} = \sigma_e \in (H^{top}(G/P), \odot_0).$$

Details on the proof of this theorem will be given in the next chapter. It was confirmed using a computer program we developed based on some results by Haibao Duan. Using this program, multiplication tables are generated to check the result. These tables are produced later in this thesis but we give one example here, where G is of type D_4 and our maximal parabolic is $P = P_2$. This example previously appeared in [**12**], but reproduced here. Table 3 lists the Schubert classes which generate $(H^*(G/P), \odot_0)$ as a $\mathbb{Z}$-module in this case. The first column lists the minimal length coset representatives for this case. The second column is just a symbol assigned to the Schubert class for convenience. The next two columns denote the length $\ell(w)$ and minuscule type $d(w)$ of $w \in W^P$. The column labeled PD lists the Poincaré dual Schubert class. Lastly, the column labeled $b(w)$ gives the coordinates of $w\rho$, where ρ is half the sum of the positive roots, in the basis of fundamental weights. These coordinates are used in the computer program outlined in the next chapter.

Table 3. Schubert classes for D_4/P_2

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_{23}	$(1,1,1,1)$
2	b_1	1	0	b_{22}	$(2,-1,2,2)$
12	b_2	2	0	b_{21}	$(-2,1,2,2)$
32	b_3	2	0	b_{20}	$(2,1,-2,2)$
42	b_4	2	0	b_{19}	$(2,1,2,-2)$
132	b_5	3	0	b_{18}	$(-2,3,-2,2)$
142	b_6	3	0	b_{17}	$(-2,3,2,-2)$
342	b_7	3	0	b_{16}	$(2,3,-2,-2)$
1342	b_8	4	0	b_{15}	$(-2,5,-2,-2)$
2132	b_9	4	0	b_{14}	$(1,-3,1,5)$
2142	b_{10}	4	0	b_{13}	$(1,-3,5,1)$
2342	b_{11}	4	0	b_{12}	$(5,-3,1,1)$
12342	b_{12}	5	1	b_{11}	$(-5,2,1,1)$
32142	b_{13}	5	1	b_{10}	$(1,2,-5,1)$
42132	b_{14}	5	1	b_9	$(1,2,1,-5)$
21342	b_{15}	5	1	b_8	$(3,-5,3,3)$
121342	b_{16}	6	1	b_7	$(-3,-2,3,3)$
232142	b_{17}	6	1	b_6	$(3,-2,-3,3)$
242132	b_{18}	6	1	b_5	$(3,-2,3,-3)$
1232142	b_{19}	7	1	b_4	$(-3,1,-3,3)$
1242132	b_{20}	7	1	b_3	$(-3,1,3,-3)$
3242132	b_{21}	7	1	b_2	$(3,1,-3,-3)$
13242132	b_{22}	8	1	b_1	$(-3,4,-3,-3)$
213242132	b_{23}	9	1	b_0	$(1,-4,1,1)$

Only nontrivial products of Schubert classes in $(H^*(G/P), \odot_0)$ are listed in Table 4. If $b_i \odot_0 b_j = 0$, then this product is left off the table. Furthermore, b_0 is the multiplicative unit in $(H^*(G/P), \odot_0)$, so $b_0 \odot_0 b_i = b_i$ for all i. Lastly, nonzero products resulting from Poincaré duality are not listed. That is, $b_i \odot_0 b_j = b_{23}$ if $b_i = PD(b_j)$ and zero otherwise, where b_{23} is the class of a point with respect to the natural orientation. These trivial products are the only nonzero products omitted from the table, up to commutativity of the deformed product.

Table 4. Multiplication table for D_4/P_2

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	$b_2 + b_3 + b_4$
b_1	b_2	$b_5 + b_6$
b_1	b_3	$b_5 + b_7$
b_1	b_4	$b_6 + b_7$
b_1	b_5	$b_8 + b_9$
b_1	b_6	$b_8 + b_{10}$
b_1	b_7	$b_8 + b_{11}$
b_1	b_{12}	b_{16}
b_1	b_{13}	b_{17}
b_1	b_{14}	b_{18}
b_1	b_{15}	$b_{16} + b_{17} + b_{18}$
b_1	b_{16}	$b_{19} + b_{20}$
b_1	b_{17}	$b_{19} + b_{21}$
b_1	b_{18}	$b_{20} + b_{21}$
b_1	b_{19}	b_{22}
b_1	b_{20}	b_{22}
b_1	b_{21}	b_{22}
b_2	b_2	$b_9 + b_{10}$
b_2	b_3	b_8
b_2	b_4	b_8
b_2	b_{13}	b_{21}
b_2	b_{14}	b_{21}
b_2	b_{15}	$b_{19} + b_{20}$
b_2	b_{17}	b_{22}
b_2	b_{18}	b_{22}
b_3	b_3	$b_9 + b_{11}$
b_3	b_4	b_8
b_3	b_{12}	b_{20}
b_3	b_{14}	b_{20}
b_3	b_{15}	$b_{19} + b_{21}$
b_3	b_{16}	b_{22}
b_3	b_{18}	b_{22}
b_4	b_4	$b_{10} + b_{11}$
b_4	b_{12}	b_{19}
b_4	b_{13}	b_{19}
b_4	b_{15}	$b_{20} + b_{21}$
b_4	b_{16}	b_{22}
b_4	b_{17}	b_{22}

continued on next page...

TABLE 4. Multiplication table for D_4/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_5	b_{14}	b_{22}
b_5	b_{15}	b_{22}
b_6	b_{13}	b_{22}
b_6	b_{15}	b_{22}
b_7	b_{12}	b_{22}
b_7	b_{15}	b_{22}

Tables for the other cases are given later (and in the same format). With these tables, Theorem 24 can be proven by brute force. We used the aid of a computer to enumerate and check all of the cases.

In Theorem 24, the use of the deformed product in the hypothesis is necessary. Furthermore, we expected a weaker conclusion; that is, assuming the hypothesis, we sought to conclude

$$\sigma_{w_1} \cdot \sigma_{w_2} \cdot \sigma_{w_3} = d\, \sigma_e \in H^{top}(G/P),$$

where d is a positive integer. The stronger conclusion was surprising but holds.

PROOF OF THEOREM 4. By functorality, we have $\hat{\Gamma}(\tilde{G}, \tilde{K}, 3) \subset \hat{\Gamma}(G, K, 3)$. We will prove the converse. Let $(h_1, h_2, h_3) \in \tilde{\mathfrak{h}}^3 \cap \hat{\Gamma}(G, K, 3)$. If suffices to show that (h_1, h_2, h_3) satisfies the defining inequalities of $\hat{\Gamma}(\tilde{G}, \tilde{K}, 3)$.

We choose a maximal parabolic subgroup $\tilde{P} \subset \tilde{G}$ and Schubert classes $\tilde{\sigma}_{\tilde{w}_1}, \tilde{\sigma}_{\tilde{w}_2}, \tilde{\sigma}_{\tilde{w}_3}$, where $\tilde{w}_1, \tilde{w}_2, \tilde{w}_3 \in W^{\tilde{P}}$, such that

$$\tilde{\sigma}_{\tilde{w}_1} \odot_0 \tilde{\sigma}_{\tilde{w}_2} \odot_0 \tilde{\sigma}_{\tilde{w}_3} = \tilde{\sigma}_e \in (H^{top}(\tilde{G}/\tilde{P}), \odot_0).$$

Thus, we need to show

$$\omega_{\tilde{P}}(\tilde{w}_1^{-1} h_1 + \tilde{w}_2^{-1} h_2 + \tilde{w}_1^{-1} h_3) \leq 0.$$

Choose a maximal parabolic subgroup $P \subset G$ along with $(w_1, w_2, w_3) \in W^P$ corresponding to $\tilde{w}_1, \tilde{w}_2, \tilde{w}_3 \in W^{\tilde{P}}$, as above. Then, by Lemma 23,

$$\omega_{\tilde{P}}(\tilde{w}_1^{-1}h_1 + \tilde{w}_2^{-1}h_2 + \tilde{w}_3^{-1}h_3) = \omega_P(w_1^{-1}h_1 + w_2^{-1}h_2 + w_3^{-1}h_3).$$

However, by Theorem 24, the right hand side of this expression is nonpositive since $\sigma_{w_1} \odot_0 \sigma_{w_2} \odot_0 \sigma_{w_3} = \sigma_e$. □

Since the eigencone and the saturated tensor cones are identified under the Killing form, we have also proven Theorem 5.

6.2. A stronger result for $G_2 \hookrightarrow D_4$

For the pair $(\tilde{G}, G)$ of type (G_2, D_4), we can strengthen Theorem 5 by replacing the saturated tensor cone with the tensor cone, as in Theorem 6. This theorem follows by following two results. The first result due to Kapovich and Millson characterizes the tensor cone in type G_2.

Theorem 25 (Theorem 6.1 in [**14**]). *Suppose that $\mu = (\mu_1, \mu_2, \mu_3) \in \Gamma(\tilde{G}, 3)$. If $\mu_i = x\,\tilde{\omega}_1 + y\,\tilde{\omega}_2$, we will identify μ_i with the vector (x, y). Then,*

(a) If at most one of the weights μ_i is a multiple of $\tilde{\omega}_2$, then $\mu \in \Gamma_0(\tilde{G}, 3)$.

(b) Suppose that $\mu_1 = y_1\,\tilde{\omega}_2$ and $\mu_2 = y_2\,\tilde{\omega}_2$. Then $\mu \notin \Gamma_0(\tilde{G}, 3)$ if and only if μ belongs to the union $\mathcal{E}_1 \cup \mathcal{E}_2 \cup \mathcal{E}_3$ of the following "exceptional" sets:

$$\begin{aligned}
\mathcal{E}_1 &= \{((0, y_1), (0, y_2), (1, y_3)) : y_1, y_2, y_3 \in \mathbb{Z}_+\},\\
\mathcal{E}_2 &= \{((0, 1+n+m), (0, 1+n+2m), (1+3m, 0)) : n, m \in \mathbb{Z}_+\},\\
\mathcal{E}_3 &= \{((0, 1+n+m), (0, 1+m), (1+3m, 1+n)) : n, m \in \mathbb{Z}_+\}.
\end{aligned}$$

The second theorem of Kapovich, Kumar, and Millson characterizes the tensor cone in type D_4.

Theorem 26 (Theorem 5.3 in [**12**]). *The tensor cone* $\Gamma_0(G,3)$ *is saturated; that is,* $\Gamma_0(G,3) = \Gamma(G,3)$. *Furthermore, up to permutations and the actions induced by diagram symmetries, the following is a list of generators of* $\Gamma_0(G,3)$*:*

$$\begin{array}{rl}
(\omega_1, \omega_1, 0) & (\omega_2, \omega_2, 0) \\
(\omega_1, \omega_3, \omega_4) & (\omega_2, \omega_2, \omega_2) \\
(\omega_1, \omega_1, \omega_2) & (2\omega_1, \omega_2, \omega_2) \\
(\omega_1, \omega_2, \omega_3 + \omega_4) & (\omega_2, \omega_2, \omega_1 + \omega_3 + \omega_4) \\
(\omega_1 + \omega_2, \omega_2, \omega_3 + \omega_4) & (2\omega_2, \omega_2, \omega_1 + \omega_3 + \omega_4)
\end{array}$$

Proof of Theorem 6. Recall from Chapter 3 that $\omega_2|_{\tilde{\mathfrak{h}}} = \tilde{\omega}_2$ and $\omega_i|_{\tilde{\mathfrak{h}}} = \tilde{\omega}_1$ if $i = 1, 3, 4$. Observe that all these triples restrict to elements in $\Gamma(\tilde{G}, 3)$ by Theorem 5. It suffices to check that each triple on the list of generators in Theorem 26 restricts to an element of $\Gamma_0(\tilde{G}, 3)$ which is characterized in Theorem 25. In fact, the generators in the left column, when restricted, will satisfy the condition given in part (a) of Theorem 25. The generators in the right column, when restricted, do not satisfy the condition given in (a). However, no element in the right column, when restricted, belongs to one of the exceptional sets listed in part (b) of Theorem 25.

$\square$

CHAPTER 7

Generating cohomology tables

This chapter will be dedicated to explaining how one could generate the cohomology ring $H^*(G/P)$ quickly with the use of computer algorithms based on work by Haibao Duan in [**6, 7, 8**].

7.1. Algorithm 1

Let $\mathfrak{g}$ be a complex semisimple Lie algebra of rank n and denote half the sum of the positive roots by ρ. For any element of the Weyl group $w \in W$, we have

$$w\rho = b_1\omega_1 + \cdots + b_n\omega_n, \quad \text{where each } b_i \in \mathbb{Z}.$$

Define a map $b : W \to \mathbb{Z}^n$ by taking $b(w) = (b_1, \dots, b_n)$. This map is faithful and called the *numerical representation.* Furthermore, each coordinate is never zero. Our first algorithm computes $b(w)$ given a decomposition of $w = s_{i_\ell} \cdots s_{i_1}$.

For $1 \leq i \leq n$, let C_i denote the i-th row of the Cartan matrix of $\mathfrak{g}$. That is, $C_i = (\alpha_i(\alpha_1^\vee), \dots, \alpha_i(\alpha_n^\vee))$. We calculate $b(w)$ recursively. Let $p_0 = (1, \dots, 1)$. For all $j > 0$, let

$$p_j = p_{j-1} - p_{j-1}^{i_j} C_{i_j},$$

where p_{j-1}^k is the k-th coordinate of p_{j-1}. Then, $p_\ell = b(w)$.

7.1.1. Computer implementation.

7.1.1. Computer implementation. Because this algorithm is recursive, it is very easy to implement into a computer program. In `Mathematica`, we let `SimpleRoots` denote a list of the n simple roots, given by their coordinates in the Euclidean basis. Define the following function:

```
CartanForm[a_,b_]:=2a.b/(b.b)
```

Then, we generate the Cartan matrix:

```
CartanMatrix=Table[CartanForm[SimpleRoots[[i]],SimpleRoots[[j]]],
   {i,1,n},{j,1,n}]
```

The function `BeeVector` below generates $b(w)$ from a list of numbers $\{i_1, \ldots, i_k\}$ with the property that $w = s_{i_1} \ldots s_{i_k}$ using the `Fold` function to handle the recursion:

```
FireOnce[v_, i_]:=v-v[[i]]CartanMatrix[[i]]
BeeVector[l_]:=Fold[FireOnce,Table[1,{i,1,n}],Reverse[l]]
```

We should note that we would frequently store the outputs of `BeeVector` to speed up calculations significantly. However, storing can occasionally result in using a lot of memory.

7.2. Generating Weyl group data

The numerical representation has two very nice properties.

LEMMA 27 (Lemma 4 in [**8**]). *Suppose $w \in W$, $b(w) = (b_1, \ldots, b_n)$, and $b(w^{-1}) = (c_1, \ldots, c_n)$.*

(a) $\ell(s_i w) = \ell(w) - 1$ if and only if $b_i < 0$.

(b) For a standard parabolic subgroup P corresponding to $I \subset [n]$ (that is, $P = P_I$), $w \in W^P$ if and only if $c_i > 0$ for all $i \in I$.

This lemma allows us to generate the Weyl group W and each set W^P for each maximal parabolic subgroup P. Let W_j denote the elements of the Weyl group of length j. In particular, $W_0 = \{e\}$, where e is the identity. By the above lemma, we can compute W_j from W_{j-1} by

$$W_j := \bigcup_{w \in W_{j-1}} \{s_i w : \text{for all } i \text{ such that } b_i > 0 \text{ where } b(w) = (b_1, \ldots, b_n)\}.$$

Then, $W = \bigcup_{j \geq 0} W_j$. We fix a reduced decomposition of each element of W once and for all. Given a standard parabolic $P = P_I$, we can identify the elements of W^P as follows:

$$W^P = \{w \in W : c_i > 0 \text{ for } i \in I \text{ where } b(w^{-1}) = (c_1, \ldots, c_n)\}.$$

In practice, our algorithm for generating the Weyl group can take quite a while to calculate. It is sometimes easier to compute W^P from scratch rather than computing the entire Weyl group and searching element by element for those elements which are minimal coset representatives.

7.2.1. Computer implementation. In `Mathematica`, we will denote Weyl group elements by a list of integers that represent a reduced decomposition. The list $\{i_1, \ldots, i_k\}$, with each $i_j \in [n]$, will denote the Weyl group element $w = s_{i_1} \cdots s_{i_k}$. Therefore, the identity is given by the empty list $\{\}$. We let `p` denote the integers corresponding to simple roots that do not occur in $\Delta(P)$. Then, `k=Complement[Range[n],p]` will denote those simple roots that do occur in $\Delta(P)$, so that `k` is given by $I \subset [n]$. Given such a list `l`, we can check if it is a minimal coset representative by the following function, based on Lemma 27:

```
MCRSelection[l_]:=(BeeVector[l][[l[[1]]]]<0)&&
   And@@(BeeVector[Reverse[l]][[#]]>0&/@k)
```

`MCRSelection` returns `True` when the list `l` corresponds to a reduced decomposition of a minimal coset representative, and `False` otherwise.

We will generate the entire set of minimal coset representatives recursively by length using `MCRSelection`. The function `MCR` will take as input an integer $k \geq 0$ and return a list of minimal length coset representatives of length k. First, we define our seeds:

```
MCR[0]:={{}}
MCR[1]:={#}&/@p
```

Now, the recursive rule is given by:

```
MCR[k_]:=MCR[k]=Union[Select[Flatten[Table[Prepend[MCR[k-1][[j]],i],
   {i,1,n},{j,1,Length[MCR[k-1]]}],1],MCRSelection[#]&],
   SameTest->BeeVector[#1]==BeeVector[#2]&]
```

Then, a list of minimal length coset representatives is given by

```
Flatten[Table[MCR[i],{i,0,999}],1]
```

where the `999` in this expression can be replaced by any number that is larger than the length of the longest minimal length coset representative.

If you take `p` to be `Range[n]={1,...,n}` so that the parabolic P corresponds to a Borel subgroup B, then the algorithm will return the entire Weyl group.

7.3. Algorithm 2

Again, fix a standard parabolic subgroup $P = P_I$ corresponding to $I \subset [n]$. For $(u, v, w) \in (W^P)^3$, we would like find those having the property that $\epsilon_u \odot_0 \epsilon_v \odot_0 \epsilon_w = d\epsilon_{w_0^P}$ for some $d > 0$ and calculate d. It is necessary that $\ell(u) + \ell(v) + \ell(w) = \dim G/P$. Furthermore, we need to

i) check that $(u^{-1}\rho + v^{-1}\rho - w^{-1}\rho - \rho)(x_j) = 0$ for each $j \notin I$ and

ii) calculate $d = c_{u,v}^{w_0 w w_{0,P}}$.

Checking the first condition is quite easy and fast. In particular, Algorithm 1 above defined an efficient method for determining expressions like $w\rho$ in the basis of fundamental weights, the numerical representation. That is, for example, the coordinates of $w^{-1}\rho$ in the basis of fundamental weights is exactly $b(w^{-1})$. If we then change coordinates to that of the simple roots (which is matrix multiplication), the j-th coordinate will be exactly $w^{-1}\rho(x_j)$. Note that when P is maximal, the first condition is equivalent to $d(u) + d(v) = d(w)$, where $d(w)$ denotes the minuscule type of $w \in W^P$.

Calculating $c_{u,v}^{w_0 w w_{0,P}}$ in the second condition is much harder. We will use a formula given by Duan. First, we will define the triangular operators T_A and then give a formula using them.

Let $\mathbb{Z}[x_1, \ldots, x_k] = \bigoplus_{r \geq 0} \mathbb{Z}[x_1, \ldots, x_k]^{(r)}$ be the ring of integral polynomials in $x_1, \ldots, x_k$, graded by $|x_k| = 1$. Given a $k \times k$ strictly upper triangular matrix $A = (a_{i,j})$, we define an operator $T_A : \mathbb{Z}[x_1, \ldots, x_k]^{(k)} \to \mathbb{Z}$ recursively by the following:

(a) if $h \in \mathbb{Z}[x_1, \ldots, x_{k-1}]^{(k)}$, then $T_A(h) = 0$;

(b) if $k = 1$ (consequently $A = (0)$), then $T_A(x_1) = 1$;

(c) if $h \in \mathbb{Z}[x_1, \ldots, x_{k-1}]^{(k-r)}$ with $r \geq 1$, then

$$T_A(hx_k^r) = T_{A'}(h(a_{1,k}x_1 + \cdots + a_{k-1,k}x_{k-1})^{r-1}),$$

where A' is obtained from A by deleting the last column and last row.

For $w \in W$, we fix a reduced decomposition of $w = s_{\beta_1} s_{\beta_2} \dots s_{\beta_k}$, where $\ell(w) = k$ and each $\beta_i \in \Delta$, and associate a strictly upper triangular $k \times k$ matrix $A_w = (a_{i,j})$ that depends on the decomposition. The entries of A_w are given by

$$a_{i,j} = \begin{cases} 0 & \text{if } i \geq j \\ -2\frac{\beta_i \cdot \beta_j}{\beta_j \cdot \beta_j} & \text{if } i < j \end{cases}.$$

For a subset $L = \{i_1 < \cdots < i_r\} \subseteq [k]$, set

$$s_L = s_{\beta_{i_1}} \cdots s_{\beta_{i_r}} \quad \text{and} \quad x_L = x_{i_1} \cdots x_{i_r} \in \mathbb{Z}[x_1, \dots, x_k].$$

Duan has the following result:

THEOREM 28 (Main Theorem of [**7**]). *If u,v,$w \in W$ with $k = \ell(w) = \ell(u) + \ell(v)$, then*

$$c_{u,v}^w = T_{A_w}\left[\left(\sum_{|L|=\ell(u), s_L = u} x_L\right)\left(\sum_{|K|=\ell(v), s_K = v} x_K\right)\right]$$

where L,$K \subseteq [k]$.

7.3.1. Computer implementation. The recursive nature of this formula is particularly useful for computer calculations. In `Mathematica`, we define a function called `TriOp` to handle the triangular operators T_{A_w}. In the following definition, `w` is given by a list of integers representing a reduced decomposition of $w \in W$. The symbol `p` will denote a homogeneous polynomial of degree k in the variables $x_1, \dots, x_k$, where $k = \ell(w)$. This very complicated line of code is the heart of the program:

```
TriOp[w_,p_]:=\[Piecewise]{{p,Length[w]==0},
  {TriOp[Delete[w,-1],Expand[Expand[(p-(p/.Subscript[x,Length[w]]->0))/
  Subscript[x,Length[w]]]/.Subscript[x,Length[w]]->
  (Sum[-CartanForm[SimpleRoots[[Last[w]]],SimpleRoots[[w[[j]]]]]
  Subscript[x,j],{j,1,Length[w]-1}])]],Length[w]>0}}
```

With the code in place to handle T_{A_w}, we need to generate for $u, w \in W$, as in the theorem, the homogeneous polynomial of degree $\ell(u)$ in the variables $x_1, \ldots, x_k$ given by:

$$\sum_{|L|=\ell(u), s_L=u} x_L,$$

where $L \subset [k]$. The following two functions utilize the function `BeeVector` to produce that polynomial in `Mathematica`:

```
XMonomial[l_]:=Times@@(Subscript[x, #]&/@l)
Ppoly[w_,u_]:=Plus@@(XMonomial[#]&/@Select[Subsets[Range[Length[w]],
   {Length[u]}],BeeVector[u]==BeeVector[w[[#]]]&])
```

The output of `Ppoly` is the polynomial we desire. The function `XMonomial` is an intermediary function to generate the individual monomials of the polynomial, denoted above by x_L, where `l` is given by L.

Finally, we collect everything into one function. For $u, v, w \in W$ such that $\ell(u) + \ell(v) = \ell(w)$ with corresponding `u`, `v`, `w`, the value of $c_{u,v}^w$ is given by:

```
StructureCoeff[w_,u_,v_]:=TriOp[w,Expand[Ppoly[w,u]Ppoly[w,v]]]
```

With the $c_{u,v}^w$ computed for all triples u,v,$w \in W^P$, this information can be used to generate a multiplication table for the ring $H^*(G/P)$. These table will be given in the next chapter.

7.4. A full program

In this section, we compile all of the functions in order so that the reader can see how they should be implemented in `Mathematica`. The input for the program will vary depending on a simple root system, A_n, B_n, C_n, D_n, G_2, F_4, E_6, E_7, or E_8, associated to G and a choice of a standard parabolic subgroup P. This program will allow the user to do calculations in $H^*(G/P)$.

Step 1: Assign a rank. Define `n` to be the rank of the root system. The value for `n` is dictated for the exceptional cases, but can vary in the classic cases. In particular, in type

A_n, $n \geq 1$; in type B_n, $n \geq 2$; in type C_n, $n \geq 3$; and in type D_n, $n \geq 4$. For example, if you are working in A_6, then the program should begin with the code:

```
n=6;
```

Step 2: Assign simple roots. Next `SimpleRoots` must be stored for each case. This code should be copied verbatim. For A_n, use:

```
SimpleRoots=Table[PadRight[Normal[SparseArray[{{i}->1,{i+1}->-1}]],n+1],
   {i,1,n}]
```

For B_n, use:

```
SimpleRoots=Append[Table[PadRight[Normal[SparseArray[{{i}->1,
   {i+1}->-1}]],n],{i,1,n-1}],PadRight[Normal[SparseArray[{{n}->1}]],n]];
```

For C_n, use:

```
SimpleRoots=Append[Table[PadRight[Normal[SparseArray[{{i}->1,
   {i+1}->-1}]],n],{i,1,n-1}],PadRight[Normal[SparseArray[{{n}->2}]],n]];
```

For D_n, use:

```
SimpleRoots=Append[Table[PadRight[Normal[SparseArray[{{i}->1,
  {i+1}->-1}]],n],{i,1,n-1}],PadRight[Normal[SparseArray[{{n-1}->1,
  {n}->1}]],n]];
```

For G_2, use:

```
SimpleRoots={{0,1,-1},{1,-2,1}};
```

For F_4, use:

```
SimpleRoots={{0,1,-1,0},{0,0,1,-1},{0,0,0,1},{1,-1,-1,-1}/2};
```

For E_6, use:

```
SimpleRoots={{1,-1,-1,-1,-1,-1,-1,1}/2,{1,1,0,0,0,0,0,0},
  {-1,1,0,0,0,0,0,0},{0,-1,1,0,0,0,0,0},{0,0,-1,1,0,0,0,0},
  {0,0,0,-1,1,0,0,0}};
```

For E_7, use:

```
SimpleRoots={{1,-1,-1,-1,-1,-1,-1,1}/2,{1,1,0,0,0,0,0,0},
  {-1,1,0,0,0,0,0,0},{0,-1,1,0,0,0,0,0},{0,0,-1,1,0,0,0,0},
  {0,0,0,-1,1,0,0,0},{0,0,0,0,-1,1,0,0}};
```

For E_8, use:

```
SimpleRoots={{1,-1,-1,-1,-1,-1,-1,1}/2,{1,1,0,0,0,0,0,0},
  {-1,1,0,0,0,0,0,0},{0,-1,1,0,0,0,0,0},{0,0,-1,1,0,0,0,0},
  {0,0,0,-1,1,0,0,0},{0,0,0,0,-1,1,0,0},{0,0,0,0,0,-1,1,0}};
```

7.4.1. Step 3: Choose a parabolic subgroup. Next, the user must choose a parabolic subgroup. Let `p` be a subset of the integers between 1 and `n` corresponding to the simple roots $\{\alpha_1, \ldots, \alpha_n\}$ which do not occur in $\Delta(P)$. For example, returning to our A_6 example, if P is the Borel subgroup and `n=6`, then use:

```
p={1,2,3,4,5,6};
```

If P is maximal, then `p` should have exactly one element. For example, if `n=6` and $P = P_3$, then use:

```
p={3};
```

The parabolic subgroup P will be the entire group G is `p={};`. However, then the quotient G/P is not very interesting.

7.4.2. Step 4: Enter the main code. After the input, the following code should be copied into `Mathematica` verbatim:

```
(*---begin program---*)
k=Complement[Range[n],p];
CartanForm[a_,b_]:=2 a.b/(b.b)
CartanMatrix=Table[CartanForm[SimpleRoots[[i]],SimpleRoots[[j]]],
   {i,1,n},{j,1,n}];
FireOnce[v_,i_]:=v-v[[i]]CartanMatrix[[i]]
Remove[BeeVector];
BeeVector[l_]:=BeeVector[l]=Fold[FireOnce,Table[1,{i,1,n}],Reverse[l]]
```

```
MCRSelection[l_]:=(BeeVector[l][[l[[1]]]]<0)&&And@@(BeeVector[
   Reverse[l]][[#]]>0&/@k)
Remove[MCR]
MCR[0]:={{}};
MCR[1]:={#}&/@p;
MCR[k_]:=MCR[k]=Union[Select[Flatten[Table[Prepend[MCR[k-1][[j]],i],
   {i,1,n},{j,1,Length[MCR[k-1]]}],1],MCRSelection[#]&],SameTest->
   (BeeVector[#1]==BeeVector[#2]&)]
MinCosReps=Flatten[Table[MCR[i],{i,0,999}],1];
XMonomial[l_]:=Times@@(Subscript[x, #]&/@l)
Ppoly[w_,u_]:=Plus@@(XMonomial[#]&/@Select[Subsets[Range[
   Length[w]],{Length[u]}],BeeVector[u]==BeeVector[w[[#]]]&])
Remove[TriOp]
TriOp[w_,p_]:=\[Piecewise]p Length[w]==0
TriOp[Delete[w,-1],Expand[Expand[(p-(p/.Subscript[x, Length[w]]->0))/
  Subscript[x, Length[w]]]/.Subscript[x, Length[w]]->(Sum[-CartanForm[
  SimpleRoots[[Last[w]]],SimpleRoots[[w[[j]]]]] Subscript[x, j],
  {j,1,Length[w]-1}])]] Length[w]>0
StructureCoeff[w_,u_,v_]:=TriOp[w,Expand[Ppoly[w,u]Ppoly[w,v]]]
CupProd[u_,v_]:=Plus@@(#[[1]]Subscript[\[Epsilon], #[[2]]]&/@
   ({StructureCoeff[#,u,v],#}&/@MCR[Length[u]+Length[v]]))
(*---end program---*)
```

Following the program, a user can recall a list of the minimal length coset representatives by entering `MinCosReps`. Each minimal length coset representative is given by a list of integers between 1 and `n`, which corresponds to a reduced decomposition. If `u`, `v`, and `w` are minimal length coset representatives, then by entering `StructureCoeff[w,u,v]`, `Mathematica` will return the value of $c^w_{u,v}$, which is the coefficient of ϵ_w in the product

$\epsilon_u \cdot \epsilon_v$. Lastly, by entering `CupProd[u,v]`, `Mathematica` will return $\epsilon_u \cdot \epsilon_v$ expanded in the $\{\epsilon_w\}_{w \in W^P}$ basis.

This program is the basic tool that allowed for the proof of Theorem 24 and the calculation of the cohomology tables shown above and those to come. Of course, every detail of the program is not given here. A reader familiar with `Mathematica` could easily generate such tables. Furthermore, the code will be available on the authors website or by contacting him via email at `brandyn@unc.edu` or `brandyn.lee@gmail.com`.

7.5. A classic example

A well-known classical problem in Schubert calculus is to determine the number of affine lines that intersect four generic affine lines in 3-space. This problem can be solved by considering the cohomology ring of the Grassmannian $Gr(2,4) = SL(4)/P_2$. In this case, the longest minimal length coset representative is $w = s_2 s_1 s_3 s_2$ and the incidence variety of lines to a fixed line is represented by the Schubert class ϵ_{s_2}. Let $u = s_2$. Then,

$$\sum_{|L|=\ell(u), s_L = u} x_L = x_1 + x_4.$$

Thus, the answer to the question is exactly $T_{A_w}((x_1 + x_4)^4)$, where

$$A_w = \begin{pmatrix} 0 & 1 & 1 & -2 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{pmatrix}.$$

Let A'_w, A''_w, and A'''_w denote the upper left 3×3, 2×2, and 1×1 minors of A_w, respectively. Then following the definition of the triangular operators, we have:

$$\begin{aligned} T_{A_w}((x_1+x_4)^4) &= T_{A_w}(x_1^4+4x_1^3x_4+6x_1^2x_4^2+4x_1x_4^3+x_4^4) \\ &= T_{A'_w}(2x_1^2x_2-2x_1x_2^2+x_2^3+2x_1^2x_3-4x_1x_2x_3 \\ &\qquad +3x_2^2x_3-2x_1x_3^2+3x_2x_3^2+x_3^3) \\ &= T_{A''_w}(x_1^2-x_1x_2+3x_2^2) \\ &= T_{A'''_w}(2x_1) \\ &= 2. \end{aligned}$$

In our program, we give the following initial data:

```
n=3
p={2}
SimpleRoots=Table[PadRight[Normal[SparseArray[{{i}->1,{i+1}->-1}]],n+1],
   {i,1,n}]
```

The value of `n` gives the rank of the group G. The value of `p` gives the parabolic we are considering. In this case, we are working with $P = P_I$ where $I = \{1,3\}$ since `p={2}`. Lastly, `SimpleRoots` will store the vectors for the simple roots of the A_n root system; this line depends heavily on the root system. In this case, the value of `SimpleRoots` is:

```
{{1,-1,0,0},{0,1,-1,0},{0,0,1,-1}}
```

After defining all functions previously given in this chapter, the following code will return the answer to our question:

```
w={2,1,3,2}
u={2}
TriOp[w,Ppoly[w,u]^4]
```

Of course, the last line returns the correct answer, which is two. In addition, below is a list of the minimal length coset representatives and the corresponding multiplication table. By inspection, one can check that $\epsilon_2^4 = 2\,\epsilon_{2132}$ on the tables below.

TABLE 5. W^{P_2} when $G = SL(4)$

w	ϵ_w	$\ell(w)$	$w_0 w w_{0,P_2}$	$b(w)$
e	ϵ_e	0	$s_2s_1s_3s_2$	$(1,1,1)$
s_2	ϵ_2	1	$s_1s_3s_2$	$(2,-1,2)$
s_1s_2	ϵ_{12}	2	s_1s_2	$(-2,1,2)$
s_3s_2	ϵ_{32}	2	s_3s_2	$(2,1,-2)$
$s_1s_3s_2$	ϵ_{132}	3	s_2	$(-2,3,-2)$
$s_2s_1s_3s_2$	ϵ_{2132}	4	e	$(1,-3,1)$

TABLE 6. Multiplication table of $H^*(Gr(2,4))$

	ϵ_e	ϵ_2	ϵ_{12}	ϵ_{32}	ϵ_{132}	ϵ_{2132}
ϵ_e	ϵ_e	ϵ_2	ϵ_{12}	ϵ_{32}	ϵ_{132}	ϵ_{2132}
ϵ_2	ϵ_2	$\epsilon_{12}+\epsilon_{32}$	ϵ_{132}	ϵ_{132}	ϵ_{2132}	0
ϵ_{12}	ϵ_{12}	ϵ_{132}	ϵ_{2132}	0	0	0
ϵ_{32}	ϵ_{32}	ϵ_{132}	0	ϵ_{2132}	0	0
ϵ_{132}	ϵ_{132}	ϵ_{2132}	0	0	0	0
ϵ_{2132}	ϵ_{2132}	0	0	0	0	0

CHAPTER 8

Cohomology tables

In this chapter, we will list the relevant cohomology tables for the proofs given earlier in this document. The reader should review the discussions of Tables 1, 2, 3 and 4 in Chapter 6. Also, note that there are no nontrivial products for the G_2/P_1 case.

TABLE 7. $W^{\tilde{P}_1} \to W^{P_2}$ mapping for (F_4, E_6)

w	$\iota(w)$
e	e
1	2
21	42
321	3542
2321	43542
4321	136542
12321	243542
24321	1436542
124321	12436542
324321	315436542
1324321	2315436542
2324321	4315436542
12324321	24315436542
21324321	42315436542
121324321	242315436542
321324321	3454231436542
1321324321	23454231436542
4321324321	134565423143542
14321324321	1234565423143542
21321324321	423454231436542
214321324321	14234565423143542
3214321324321	315423456542314354 2
23214321324321	4315423456542314354 2
123214321324321	24315423456542314354 2

TABLE 8. $W^{\tilde{P}_2} \to W^{P_4}$ mapping for (F_4, E_6)

w	$\iota(w)$
e	e
2	4
12	24
32	354
132	2354
232	4354
432	13654
1232	24354
1432	123654
2132	42354
2432	143654
12132	242354
12432	1243654
21432	1423654
32132	3454234
32432	31543654
121432	12423654
132132	23454234
132432	231543654
232432	431543654
321432	315423654
432132	134654234
1232432	2431543654
1321432	2315423654
1432132	1234654234
2132132	423454234
2132432	4231543654
2321432	4315423654
3432132	13154654234
12132432	24231543654
12321432	24315423654
13432132	123154654234
21321432	42315423654
21432132	14234654234
23432132	143154654234
32132432	345423143654
121321432	242315423654
123432132	1243154654234
continued on next page...	

TABLE 8. $W^{\tilde{P}_2} \to W^{P_4}$ mapping for (F_4, E_6) continued...

w	$\iota(w)$
132132432	2345423143654
213432132	1423154654234
232132432	3435423143654
321432132	3154234654234
323432132	31435431654234
432132432	13456542314354
1213432132	12423154654234
1232132432	23435423143654
1323432132	231435431654234
1432132432	123456542314354
2132132432	42345423143654
2321432132	43154234654234
2432132432	134356542314354
3213432132	314542314654234
12132132432	242345423143654
12321432132	243154234654234
12432132432	1234356542314354
13213432132	2314542314654234
21323432132	4231435431654234
21432132432	1423456542314354
23213432132	3431542314654234
32432132432	13145436542314354
121432132432	12423456542314354
123213432132	23431542314654234
132432132432	123145436542314354
213213432132	42314542314654234
232432132432	134315436542314354
321323432132	342542314354654234
321432132432	315423456542314354
1213213432132	242314542314654234
1232432132432	1234315436542314354
1321432132432	2315423456542314354
2132432132432	1423145436542314354
2321323432132	3423542314354654234
2321432132432	4315423456542314354
4321323432132	1342546542314354265 4
12132432132432	12423145436542314354
12321323432132	23423542314354654234

continued on next page...

Table 8. $W^{\tilde{P}_2} \to W^{P_4}$ mapping for (F_4, E_6) continued...

w	$\iota(w)$
12321432132432	24315423456542314354
21321432132432	42315423456542314354
24321323432132	13423546542314354 2654
32132432132432	31454231435654231435 4
121321432132432	242315423456542314354
124321323432132	123423546542314354 2654
132132432132432	231454231435654231435 4
232132432132432	343154231435654231435 4
324321323432132	131454234654231435 42654
1232132432132432	2343154231435654231435 4
1324321323432132	1231454234654231435 42654
2132132432132432	4231454231435654231435 4
2324321323432132	1343154234654231435 42654
12132132432132432	24231454231435654231435 4
12324321323432132	12343154234654231435 42654
21324321323432132	14231454234654231435 42654
121324321323432132	124231454234654231435 42654
321324321323432132	314354231435465423143542654
1321324321323432132	2314354231435465423143542654
21321324321323432132	42314354231435465423143542654

Table 9. $W^{\tilde{P}_3} \to W^{P_3}$ mapping for (F_4, E_6)

w	$\iota(w)$
e	e
3	3
23	43
43	13
123	243
243	143
323	543
1243	1243
1323	2543
3243	31543
4323	16543
13243	231543
14323	126543
21323	42543

continued on next page...

TABLE 9. $W^{\tilde{P}_3} \to W^{P_3}$ mapping for (F_4, E_6) continued...

w	$\iota(w)$
23243	431543
34323	316543
123243	2431543
134323	2316543
213243	4231543
214323	1426543
234323	4316543
321323	342543
1213243	24231543
1234323	24316543
2134323	42316543
3213243	345423143
3214323	315426543
3234323	54316543
4321323	13426543
12134323	242316543
13213243	2345423143
13234323	254316543
23214323	4315426543
32134323	3542316543
34321323	1315426543
43213243	13465423143
123214323	24315426543
132134323	23542316543
143213243	123465423143
213213243	42345423143
213234323	4254316543
232134323	43542316543
234321323	14315426543
343213243	135465423143
1232134323	243542316543
1234321323	124315426543
1343213243	1235465423143
2132134323	423542316543
2143213243	1423465423143
2343213243	1435465423143
3213234323	342542316543
3234321323	3143542316543
continued on next page...	

TABLE 9. $W^{\tilde{P}_3} \to W^{P_3}$ mapping for (F_4, E_6) continued...

w	$\iota(w)$
12132134323	2423542316543
12343213243	12435465423143
13234321323	23143542316543
21343213243	14235465423143
23213234323	3423542316543
32143213243	315423465423143
32343213243	31435465423143
43213234323	13425465423143
121343213243	124235465423143
123213234323	23423542316543
132343213243	231435465423143
213234321323	423143542316543
232143213243	4315423465423143
243213234323	134235465423143
321343213243	3145423465423143
1232143213243	24315423465423143
1243213234323	1234235465423143
1321343213243	23145423465423143
2132343213243	4231435465423143
2321343213243	34315423465423143
3213234321323	34254231435426543
3243213234323	13145423465423143
12321343213243	234315423465423143
13243213234323	123145423465423143
21321343213243	423145423465423143
23243213234323	134315423465423143
32132343213243	354231435465423143
43213234321323	134265423143542654 3
121321343213243	2423145423465423143
123243213234323	1234315423465423143
213243213234323	1423145423465423143
232132343213243	4354231435465423143
343213234321323	1354265423143542654 3
1213243213234323	12423145423465423143
1232132343213243	24354231435465423143
2343213234321323	14354265423143542654 3
3213243213234323	31435423143546542314 3
12343213234321323	12435426542314354265 43
continued on next page...	

Table 9. $W^{\tilde{P}_3} \to W^{P_3}$ mapping for (F_4, E_6) continued...

w	$\iota(w)$
13213243213234323	2314354231435465423143
32343213234321323	3143542654231435426543
132343213234321323	23143542654231435426543
213213243213234323	4231435423143546542314 3
2132343213234321323	423143542654231435426543
32132343213234321323	5423143542654231435426543

Table 10. $W^{\tilde{P}_4} \to W^{P_1}$ mapping for (F_4, E_6)

w	$\iota(w)$
e	e
4	1
34	31
234	431
1234	2431
3234	5431
13234	25431
43234	65431
143234	265431
213234	425431
2143234	4265431
3213234	3425431
32143234	354265431
43213234	134265431
232143234	4354265431
343213234	1354265431
1232143234	24354265431
2343213234	14354265431
12343213234	124354265431
32343213234	314354265431
132343213234	2314354265431
2132343213234	42314354265431
32132343213234	542314354265431
432132343213234	6542314354265431

Table 11. Schubert classes for G_2/P_1

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_5	$(1,1)$
1	b_1	1	0	b_4	$(-1,2)$
21	b_2	2	2	b_3	$(5,-2)$
121	b_3	3	3	b_2	$(-5,3)$
2121	b_4	4	5	b_1	$(4,-3)$
12121	b_5	5	5	b_0	$(-4,1)$

Table 12. Schubert classes for G_2/P_2

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_5	$(1,1)$
2	b_1	1	0	b_4	$(4,-1)$
12	b_2	2	0	b_3	$(-4,3)$
212	b_3	3	1	b_2	$(5,-3)$
1212	b_4	4	1	b_1	$(-5,2)$
21212	b_5	5	1	b_0	$(1,-2)$

Table 13. Multiplication table for G_2/P_2

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	$3b_2$
b_1	b_3	$3b_4$

Table 14. Schubert classes for D_4/P_1

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_7	$(1,1,1,1)$
1	b_1	1	0	b_6	$(-1,2,1,1)$
21	b_2	2	0	b_5	$(1,-2,3,3)$
321	b_3	3	0	b_4	$(1,1,-3,3)$
421	b_4	3	0	b_3	$(1,1,3,-3)$
3421	b_5	4	0	b_2	$(1,4,-3,-3)$
23421	b_6	5	0	b_1	$(5,-4,1,1)$
123421	b_7	6	0	b_0	$(-5,1,1,1)$

Table 15. Multiplication table for D_4/P_1

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	b_2
b_1	b_2	$b_3 + b_4$
b_1	b_3	b_5
b_1	b_4	b_5
b_1	b_5	b_6
b_2	b_2	$2b_5$
b_2	b_3	b_6
b_2	b_4	b_6

Table 16. Schubert classes for D_4/P_3

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_7	$(1, 1, 1, 1)$
3	b_1	1	0	b_6	$(1, 2, -1, 1)$
23	b_2	2	0	b_5	$(3, -2, 1, 3)$
123	b_3	3	0	b_4	$(-3, 1, 1, 3)$
423	b_4	3	0	b_3	$(3, 1, 1, -3)$
1423	b_5	4	0	b_2	$(-3, 4, 1, -3)$
21423	b_6	5	0	b_1	$(1, -4, 5, 1)$
321423	b_7	6	0	b_0	$(1, 1, -5, 1)$

Table 17. Multiplication table for D_4/P_3

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	b_2
b_1	b_2	$b_3 + b_4$
b_1	b_3	b_5
b_1	b_4	b_5
b_1	b_5	b_6
b_2	b_2	$2b_5$
b_2	b_3	b_6
b_2	b_4	b_6

Table 18. Schubert classes for D_4/P_4

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_7	$(1,1,1,1)$
4	b_1	1	0	b_6	$(1,2,1,-1)$
24	b_2	2	0	b_5	$(3,-2,3,1)$
124	b_3	3	0	b_4	$(-3,1,3,1)$
324	b_4	3	0	b_3	$(3,1,-3,1)$
1324	b_5	4	0	b_2	$(-3,4,-3,1)$
21324	b_6	5	0	b_1	$(1,-4,1,5)$
421324	b_7	6	0	b_0	$(1,1,1,-5)$

Table 19. Multiplication table for D_4/P_4

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	b_2
b_1	b_2	$b_3 + b_4$
b_1	b_3	b_5
b_1	b_4	b_5
b_1	b_5	b_6
b_2	b_2	$2b_5$
b_2	b_3	b_6
b_2	b_4	b_6

Table 20. Schubert classes for F_4/P_1

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_{23}	$(1,1,1,1)$
1	b_1	1	0	b_{22}	$(-1,2,1,1)$
21	b_2	2	0	b_{21}	$(1,-2,5,1)$
321	b_3	3	0	b_{20}	$(1,3,-5,6)$
2321	b_4	4	0	b_{19}	$(4,-3,1,6)$
4321	b_5	4	0	b_{18}	$(1,3,1,-6)$
12321	b_6	5	0	b_{17}	$(-4,1,1,6)$
24321	b_7	5	0	b_{16}	$(4,-3,7,-6)$
124321	b_8	6	0	b_{15}	$(-4,1,7,-6)$
324321	b_9	6	0	b_{14}	$(4,4,-7,1)$
1324321	b_{10}	7	0	b_{13}	$(-4,8,-7,1)$
2324321	b_{11}	7	0	b_{12}	$(8,-4,1,1)$
12324321	b_{12}	8	1	b_{11}	$(-8,4,1,1)$
21324321	b_{13}	8	1	b_{10}	$(4,-8,9,1)$

continued on next page...

Table 20. Schubert classes for F_4/P_1 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
121324321	b_{14}	9	1	b_9	$(-4,-4,9,1)$
321324321	b_{15}	9	1	b_8	$(4,1,-9,10)$
1321324321	b_{16}	10	1	b_7	$(-4,5,-9,10)$
4321324321	b_{17}	10	1	b_6	$(4,1,1,-10)$
21321324321	b_{18}	11	1	b_5	$(1,-5,1,10)$
14321324321	b_{19}	11	1	b_4	$(-4,5,1,-10)$
214321324321	b_{20}	12	1	b_3	$(1,-5,11,-10)$
3214321324321	b_{21}	13	1	b_2	$(1,6,-11,1)$
23214321324321	b_{22}	14	1	b_1	$(7,-6,1,1)$
123214321324321	b_{23}	15	1	b_0	$(-7,1,1,1)$

Table 21. Multiplication table for F_4/P_1

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	b_2
b_1	b_2	$2b_3$
b_1	b_3	$b_4 + 2b_5$
b_1	b_4	$b_6 + 2b_7$
b_1	b_5	b_7
b_1	b_6	$2b_8$
b_1	b_7	$b_8 + 2b_9$
b_1	b_8	$2b_{10}$
b_1	b_9	$b_{10} + b_{11}$
b_1	b_{12}	b_{14}
b_1	b_{13}	$b_{14} + 2b_{15}$
b_1	b_{14}	$2b_{16}$
b_1	b_{15}	$b_{16} + 2b_{17}$
b_1	b_{16}	$b_{18} + 2b_{19}$
b_1	b_{17}	b_{19}
b_1	b_{18}	$2b_{20}$
b_1	b_{19}	b_{20}
b_1	b_{20}	$2b_{21}$
b_1	b_{21}	b_{22}
b_2	b_2	$2b_4 + 4b_5$
b_2	b_3	$b_6 + 4b_7$
b_2	b_4	$4b_8 + 4b_9$
b_2	b_5	$b_8 + 2b_9$
b_2	b_6	$4b_{10}$

continued on next page...

Table 21. Multiplication table for F_4/P_1 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_7	$4b_{10} + 2b_{11}$
b_2	b_{12}	$2b_{16}$
b_2	b_{13}	$4b_{16} + 4b_{17}$
b_2	b_{14}	$2b_{18} + 4b_{19}$
b_2	b_{15}	$b_{18} + 4b_{19}$
b_2	b_{16}	$4b_{20}$
b_2	b_{17}	b_{20}
b_2	b_{18}	$4b_{21}$
b_2	b_{19}	$2b_{21}$
b_2	b_{20}	$2b_{22}$
b_3	b_3	$3b_8 + 4b_9$
b_3	b_4	$6b_{10} + 2b_{11}$
b_3	b_5	$2b_{10} + b_{11}$
b_3	b_{12}	$b_{18} + 2b_{19}$
b_3	b_{13}	$2b_{18} + 6b_{19}$
b_3	b_{14}	$4b_{20}$
b_3	b_{15}	$3b_{20}$
b_3	b_{16}	$4b_{21}$
b_3	b_{17}	b_{21}
b_3	b_{18}	$2b_{22}$
b_3	b_{19}	b_{22}
b_4	b_{12}	$2b_{20}$
b_4	b_{13}	$6b_{20}$
b_4	b_{14}	$4b_{21}$
b_4	b_{15}	$4b_{21}$
b_4	b_{16}	$2b_{22}$
b_4	b_{17}	b_{22}
b_5	b_{12}	b_{20}
b_5	b_{13}	$2b_{20}$
b_5	b_{14}	$2b_{21}$
b_5	b_{15}	b_{21}
b_5	b_{16}	b_{22}
b_6	b_{13}	$4b_{21}$
b_6	b_{15}	$2b_{22}$
b_7	b_{12}	$2b_{21}$
b_7	b_{13}	$4b_{21}$
b_7	b_{14}	$2b_{22}$
b_7	b_{15}	b_{22}

continued on next page...

Table 21. Multiplication table for F_4/P_1 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_8	b_{13}	$2b_{22}$
b_9	b_{12}	b_{22}
b_9	b_{13}	b_{22}

Table 22. Schubert classes for F_4/P_2

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_{95}	$(1,1,1,1)$
2	b_1	1	0	b_{94}	$(2,-1,3,1)$
12	b_2	2	0	b_{93}	$(-2,1,3,1)$
32	b_3	2	0	b_{92}	$(2,2,-3,4)$
132	b_4	3	0	b_{91}	$(-2,4,-3,4)$
232	b_5	3	0	b_{90}	$(4,-2,1,4)$
432	b_6	3	0	b_{89}	$(2,2,1,-4)$
1232	b_7	4	1	b_{88}	$(-4,2,1,4)$
1432	b_8	4	0	b_{87}	$(-2,4,1,-4)$
2132	b_9	4	1	b_{86}	$(2,-4,5,4)$
2432	b_{10}	4	0	b_{85}	$(4,-2,5,-4)$
12132	b_{11}	5	1	b_{84}	$(-2,-2,5,4)$
12432	b_{12}	5	1	b_{83}	$(-4,2,5,-4)$
21432	b_{13}	5	1	b_{82}	$(2,-4,9,-4)$
32132	b_{14}	5	1	b_{81}	$(2,1,-5,9)$
32432	b_{15}	5	0	b_{80}	$(4,3,-5,1)$
121432	b_{16}	6	1	b_{79}	$(-2,-2,9,-4)$
132132	b_{17}	6	1	b_{78}	$(-2,3,-5,9)$
132432	b_{18}	6	1	b_{77}	$(-4,7,-5,1)$
232432	b_{19}	6	0	b_{76}	$(7,-3,1,1)$
321432	b_{20}	6	2	b_{75}	$(2,5,-9,5)$
432132	b_{21}	6	2	b_{74}	$(2,1,4,-9)$
1232432	b_{22}	7	2	b_{73}	$(-7,4,1,1)$
1321432	b_{23}	7	2	b_{72}	$(-2,7,-9,5)$
1432132	b_{24}	7	2	b_{71}	$(-2,3,4,-9)$
2132132	b_{25}	7	1	b_{70}	$(1,-3,1,9)$
2132432	b_{26}	7	3	b_{69}	$(3,-7,9,1)$
2321432	b_{27}	7	3	b_{68}	$(7,-5,1,5)$
3432132	b_{28}	7	2	b_{67}	$(2,5,-4,-5)$
12132432	b_{29}	8	3	b_{66}	$(-3,-4,9,1)$
12321432	b_{30}	8	5	b_{65}	$(-7,2,1,5)$
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Table 22. Schubert classes for F_4/P_2 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
13432132	b_{31}	8	2	b_{64}	$(-2, 7, -4, -5)$
21321432	b_{32}	8	4	b_{63}	$(5, -7, 5, 5)$
21432132	b_{33}	8	2	b_{62}	$(1, -3, 10, -9)$
23432132	b_{34}	8	3	b_{61}	$(7, -5, 6, -5)$
32132432	b_{35}	8	4	b_{60}	$(3, 2, -9, 10)$
121321432	b_{36}	9	5	b_{59}	$(-5, -2, 5, 5)$
123432132	b_{37}	9	5	b_{58}	$(-7, 2, 6, -5)$
132132432	b_{38}	9	4	b_{57}	$(-3, 5, -9, 10)$
213432132	b_{39}	9	4	b_{56}	$(5, -7, 10, -5)$
232132432	b_{40}	9	4	b_{55}	$(5, -2, -5, 10)$
321432132	b_{41}	9	3	b_{54}	$(1, 7, -10, 1)$
323432132	b_{42}	9	3	b_{53}	$(7, 1, -6, 1)$
432132432	b_{43}	9	5	b_{52}	$(3, 2, 1, -10)$
1213432132	b_{44}	10	5	b_{51}	$(-5, -2, 10, -5)$
1232132432	b_{45}	10	5	b_{50}	$(-5, 3, -5, 10)$
1323432132	b_{46}	10	5	b_{49}	$(-7, 8, -6, 1)$
1432132432	b_{47}	10	5	b_{48}	$(-3, 5, 1, -10)$
2132132432	b_{48}	10	5	b_{47}	$(2, -5, 1, 10)$
2321432132	b_{49}	10	5	b_{46}	$(8, -7, 4, 1)$
2432132432	b_{50}	10	5	b_{45}	$(5, -2, 5, -10)$
3213432132	b_{51}	10	5	b_{44}	$(5, 3, -10, 5)$
12132132432	b_{52}	11	5	b_{43}	$(-2, -3, 1, 10)$
12321432132	b_{53}	11	7	b_{42}	$(-8, 1, 4, 1)$
21323432132	b_{54}	11	7	b_{41}	$(1, -8, 10, 1)$
12432132432	b_{55}	11	6	b_{40}	$(-5, 3, 5, -10)$
13213432132	b_{56}	11	6	b_{39}	$(-5, 8, -10, 5)$
21432132432	b_{57}	11	6	b_{38}	$(2, -5, 11, -10)$
23213432132	b_{58}	11	5	b_{37}	$(8, -3, -4, 5)$
32432132432	b_{59}	11	5	b_{36}	$(5, 3, -5, -5)$
121432132432	b_{60}	12	6	b_{35}	$(-2, -3, 11, -10)$
123213432132	b_{61}	12	7	b_{34}	$(-8, 5, -4, 5)$
321323432132	b_{62}	12	8	b_{33}	$(1, 2, -10, 11)$
132432132432	b_{63}	12	6	b_{32}	$(-5, 8, -5, -5)$
213213432132	b_{64}	12	8	b_{31}	$(3, -8, 6, 5)$
232432132432	b_{65}	12	5	b_{30}	$(8, -3, 1, -5)$
321432132432	b_{66}	12	7	b_{29}	$(2, 6, -11, 1)$
1213213432132	b_{67}	13	8	b_{28}	$(-3, -5, 6, 5)$
1232432132432	b_{68}	13	7	b_{27}	$(-8, 5, 1, -5)$

continued on next page...

TABLE 22. Schubert classes for F_4/P_2 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
1321432132432	b_{69}	13	7	b_{26}	$(-2, 8, -11, 1)$
4321323432132	b_{70}	13	9	b_{25}	$(1, 2, 1, -11)$
2321323432132	b_{71}	13	8	b_{24}	$(3, -2, -6, 11)$
2132432132432	b_{72}	13	8	b_{23}	$(3, -8, 11, -5)$
2321432132432	b_{73}	13	8	b_{22}	$(8, -6, 1, 1)$
12321323432132	b_{74}	14	8	b_{21}	$(-3, 1, -6, 11)$
12132432132432	b_{75}	14	8	b_{20}	$(-3, -5, 11, -5)$
12321432132432	b_{76}	14	10	b_{19}	$(-8, 2, 1, 1)$
21321432132432	b_{77}	14	9	b_{18}	$(6, -8, 5, 1)$
24321323432132	b_{78}	14	9	b_{17}	$(3, -2, 5, -11)$
32132432132432	b_{79}	14	9	b_{16}	$(3, 3, -11, 6)$
121321432132432	b_{80}	15	10	b_{15}	$(-6, -2, 5, 1)$
124321323432132	b_{81}	15	9	b_{14}	$(-3, 1, 5, -11)$
132132432132432	b_{82}	15	9	b_{13}	$(-3, 6, -11, 6)$
232132432132432	b_{83}	15	9	b_{12}	$(6, -3, -5, 6)$
324321323432132	b_{84}	15	9	b_{11}	$(3, 3, -5, -6)$
1232132432132432	b_{85}	16	10	b_{10}	$(-6, 3, -5, 6)$
1324321323432132	b_{86}	16	9	b_9	$(-3, 6, -5, -6)$
2132132432132432	b_{87}	16	10	b_8	$(3, -6, 1, 6)$
2324321323432132	b_{88}	16	9	b_7	$(6, -3, 1, -6)$
12132132432132432	b_{89}	17	10	b_6	$(-3, -3, 1, 6)$
12324321323432132	b_{90}	17	10	b_5	$(-6, 3, 1, -6)$
21324321323432132	b_{91}	17	10	b_4	$(3, -6, 7, -6)$
121324321323432132	b_{92}	18	10	b_3	$(-3, -3, 7, -6)$
321324321323432132	b_{93}	18	10	b_2	$(3, 1, -7, 1)$
1321324321323432132	b_{94}	19	10	b_1	$(-3, 4, -7, 1)$
21321324321323432132	b_{95}	20	10	b_0	$(1, -4, 1, 1)$

TABLE 23. Multiplication table for F_4/P_2

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	$b_2 + 2b_3$
b_1	b_2	$2b_4$
b_1	b_3	$b_4 + b_5 + 2b_6$
b_1	b_4	$2b_8$
b_1	b_5	$2b_{10}$
b_1	b_6	$b_8 + b_{10}$
b_1	b_7	$b_{11} + 2b_{12}$
continued on next page...		

Table 23. Multiplication table for F_4/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_9	$b_{11} + 2b_{13} + 2b_{14}$
b_1	b_{10}	$2b_{15}$
b_1	b_{11}	$2b_{16} + 2b_{17}$
b_1	b_{12}	$b_{16} + 2b_{18}$
b_1	b_{13}	b_{16}
b_1	b_{14}	b_{17}
b_1	b_{15}	b_{19}
b_1	b_{17}	b_{25}
b_1	b_{20}	$b_{23} + 2b_{28}$
b_1	b_{21}	$b_{24} + 2b_{28}$
b_1	b_{23}	$2b_{31}$
b_1	b_{24}	$2b_{31} + b_{33}$
b_1	b_{26}	b_{29}
b_1	b_{27}	$2b_{34}$
b_1	b_{28}	b_{31}
b_1	b_{30}	$b_{36} + 2b_{37}$
b_1	b_{32}	$2b_{39} + 2b_{40}$
b_1	b_{34}	$2b_{42}$
b_1	b_{35}	$b_{38} + b_{40}$
b_1	b_{36}	$2b_{44} + 2b_{45}$
b_1	b_{37}	$b_{44} + 2b_{46}$
b_1	b_{43}	$b_{47} + b_{50}$
b_1	b_{45}	b_{52}
b_1	b_{48}	b_{52}
b_1	b_{49}	$2b_{58}$
b_1	b_{50}	$2b_{59}$
b_1	b_{51}	$b_{58} + 2b_{59}$
b_1	b_{53}	$2b_{61}$
b_1	b_{55}	$b_{60} + 2b_{63}$
b_1	b_{56}	$2b_{63}$
b_1	b_{57}	b_{60}
b_1	b_{58}	$2b_{65}$
b_1	b_{59}	b_{65}
b_1	b_{61}	$2b_{68}$
b_1	b_{62}	b_{71}
b_1	b_{64}	$b_{67} + 2b_{71} + 2b_{72}$
b_1	b_{66}	b_{69}
b_1	b_{67}	$2b_{74} + 2b_{75}$

continued on next page...

Table 23. Multiplication table for F_4/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{70}	b_{78}
b_1	b_{71}	b_{74}
b_1	b_{72}	b_{75}
b_1	b_{76}	b_{80}
b_1	b_{77}	$2b_{83}$
b_1	b_{78}	$b_{81} + 2b_{84}$
b_1	b_{79}	$b_{82} + b_{83} + 2b_{84}$
b_1	b_{80}	$2b_{85}$
b_1	b_{81}	$2b_{86}$
b_1	b_{82}	$2b_{86}$
b_1	b_{83}	$2b_{88}$
b_1	b_{84}	$b_{86} + b_{88}$
b_1	b_{85}	$b_{89} + 2b_{90}$
b_1	b_{87}	$b_{89} + 2b_{91}$
b_1	b_{89}	$2b_{92}$
b_1	b_{90}	b_{92}
b_1	b_{91}	$b_{92} + 2b_{93}$
b_1	b_{92}	$2b_{94}$
b_1	b_{93}	b_{94}
b_2	b_3	$2b_8$
b_2	b_7	$2b_{16}$
b_2	b_9	$2b_{17}$
b_2	b_{14}	b_{25}
b_2	b_{20}	$2b_{31}$
b_2	b_{21}	b_{33}
b_2	b_{30}	$2b_{44}$
b_2	b_{51}	$2b_{65}$
b_2	b_{62}	b_{74}
b_2	b_{64}	$2b_{75}$
b_2	b_{70}	b_{81}
b_2	b_{78}	$2b_{86}$
b_2	b_{79}	$2b_{88}$
b_2	b_{87}	$2b_{92}$
b_2	b_{91}	$2b_{94}$
b_3	b_3	$b_8 + 2b_{10}$
b_3	b_5	$2b_{15}$
b_3	b_6	b_{15}
b_3	b_7	$b_{16} + b_{17} + 2b_{18}$

continued on next page...

Table 23. Multiplication table for F_4/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_9	$2b_{16} + b_{17}$
b_3	b_{10}	b_{19}
b_3	b_{11}	b_{25}
b_3	b_{20}	b_{31}
b_3	b_{21}	$2b_{31}$
b_3	b_{27}	$2b_{42}$
b_3	b_{30}	$b_{44} + b_{45} + 2b_{46}$
b_3	b_{36}	b_{52}
b_3	b_{43}	b_{59}
b_3	b_{49}	$2b_{65}$
b_3	b_{50}	b_{65}
b_3	b_{51}	b_{65}
b_3	b_{53}	$2b_{68}$
b_3	b_{64}	$2b_{74} + b_{75}$
b_3	b_{70}	b_{84}
b_3	b_{76}	b_{85}
b_3	b_{77}	$2b_{88}$
b_3	b_{78}	$b_{86} + b_{88}$
b_3	b_{79}	$2b_{86} + b_{88}$
b_3	b_{80}	$b_{89} + 2b_{90}$
b_3	b_{85}	$2b_{92}$
b_3	b_{87}	$b_{92} + 2b_{93}$
b_3	b_{89}	$2b_{94}$
b_3	b_{90}	b_{94}
b_3	b_{91}	b_{94}
b_4	b_9	b_{25}
b_4	b_{70}	b_{86}
b_4	b_{87}	$2b_{94}$
b_5	b_6	b_{19}
b_5	b_7	b_{25}
b_5	b_{30}	b_{52}
b_5	b_{43}	b_{65}
b_5	b_{70}	b_{88}
b_5	b_{76}	b_{89}
b_5	b_{80}	$2b_{92}$
b_5	b_{85}	$2b_{94}$
b_6	b_{76}	b_{90}
b_6	b_{80}	b_{92}

continued on next page...

Table 23. Multiplication table for F_4/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_6	b_{85}	b_{94}
b_6	b_{87}	b_{94}
b_7	b_7	$2b_{33}$
b_7	b_9	$4b_{31}$
b_7	b_{30}	$2b_{60}$
b_7	b_{35}	$2b_{65}$
b_7	b_{62}	$2b_{88}$
b_7	b_{64}	$4b_{86}$
b_7	b_{70}	b_{90}
b_7	b_{77}	$2b_{92}$
b_7	b_{78}	b_{92}
b_7	b_{79}	$b_{92} + 2b_{93}$
b_7	b_{83}	$2b_{94}$
b_7	b_{84}	b_{94}
b_9	b_9	$8b_{31} + 4b_{33}$
b_9	b_{30}	$4b_{63}$
b_9	b_{32}	$4b_{65}$
b_9	b_{62}	$4b_{86}$
b_9	b_{64}	$8b_{86} + 4b_{88}$
b_9	b_{70}	b_{91}
b_9	b_{78}	$b_{92} + 2b_{93}$
b_9	b_{79}	$2b_{92}$
b_9	b_{81}	$2b_{94}$
b_9	b_{82}	$2b_{94}$
b_9	b_{84}	b_{94}
b_{10}	b_{76}	b_{92}
b_{10}	b_{80}	$2b_{94}$
b_{11}	b_{70}	b_{92}
b_{11}	b_{78}	$2b_{94}$
b_{11}	b_{79}	$2b_{94}$
b_{12}	b_{77}	$2b_{94}$
b_{12}	b_{79}	b_{94}
b_{13}	b_{79}	b_{94}
b_{14}	b_{70}	b_{93}
b_{14}	b_{78}	b_{94}
b_{15}	b_{76}	b_{94}
b_{17}	b_{70}	b_{94}
b_{20}	b_{64}	$b_{92} + 2b_{93}$
continued on next page...		

Table 23. Multiplication table for F_4/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{20}	b_{67}	$2b_{94}$
b_{20}	b_{72}	b_{94}
b_{21}	b_{62}	b_{93}
b_{21}	b_{64}	$2b_{92}$
b_{21}	b_{67}	$2b_{94}$
b_{21}	b_{71}	b_{94}
b_{23}	b_{64}	$2b_{94}$
b_{24}	b_{62}	b_{94}
b_{24}	b_{64}	$2b_{94}$
b_{26}	b_{66}	b_{94}
b_{27}	b_{53}	$2b_{92}$
b_{27}	b_{61}	$2b_{94}$
b_{28}	b_{64}	b_{94}
b_{30}	b_{32}	$4b_{86}$
b_{30}	b_{35}	$2b_{88}$
b_{30}	b_{43}	b_{90}
b_{30}	b_{49}	$2b_{92}$
b_{30}	b_{50}	b_{92}
b_{30}	b_{51}	$b_{92} + 2b_{93}$
b_{30}	b_{58}	$2b_{94}$
b_{30}	b_{59}	b_{94}
b_{32}	b_{55}	$2b_{94}$
b_{32}	b_{56}	$2b_{94}$
b_{34}	b_{53}	$2b_{94}$
b_{35}	b_{55}	b_{94}
b_{35}	b_{57}	b_{94}
b_{36}	b_{43}	b_{92}
b_{36}	b_{50}	$2b_{94}$
b_{36}	b_{51}	$2b_{94}$
b_{37}	b_{49}	$2b_{94}$
b_{37}	b_{51}	b_{94}
b_{43}	b_{45}	b_{94}
b_{43}	b_{48}	b_{94}

Table 24. Schubert classes for F_4/P_3

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_{95}	$(1,1,1,1)$
3	b_1	1	0	b_{94}	$(1,2,-1,2)$
23	b_2	2	1	b_{93}	$(3,-2,3,2)$
43	b_3	2	0	b_{92}	$(1,2,1,-2)$
123	b_4	3	2	b_{91}	$(-3,1,3,2)$
243	b_5	3	1	b_{90}	$(3,-2,5,-2)$
323	b_6	3	1	b_{89}	$(3,1,-3,5)$
1243	b_7	4	2	b_{88}	$(-3,1,5,-2)$
1323	b_8	4	2	b_{87}	$(-3,4,-3,5)$
3243	b_9	4	2	b_{86}	$(3,3,-5,3)$
4323	b_{10}	4	2	b_{85}	$(3,1,2,-5)$
13243	b_{11}	5	3	b_{84}	$(-3,6,-5,3)$
14323	b_{12}	5	3	b_{83}	$(-3,4,2,-5)$
21323	b_{13}	5	3	b_{82}	$(1,-4,5,5)$
23243	b_{14}	5	3	b_{81}	$(6,-3,1,3)$
34323	b_{15}	5	2	b_{80}	$(3,3,-2,-3)$
123243	b_{16}	6	6	b_{79}	$(-6,3,1,3)$
134323	b_{17}	6	3	b_{78}	$(-3,6,-2,-3)$
213243	b_{18}	6	6	b_{77}	$(3,-6,7,3)$
214323	b_{19}	6	4	b_{76}	$(1,-4,10,-5)$
234323	b_{20}	6	3	b_{75}	$(6,-3,4,-3)$
321323	b_{21}	6	3	b_{74}	$(1,1,-5,10)$
1213243	b_{22}	7	7	b_{73}	$(-3,-3,7,3)$
1234323	b_{23}	7	6	b_{72}	$(-6,3,4,-3)$
2134323	b_{24}	7	6	b_{71}	$(3,-6,10,-3)$
3213243	b_{25}	7	7	b_{70}	$(3,1,-7,10)$
3214323	b_{26}	7	6	b_{69}	$(1,6,-10,5)$
3234323	b_{27}	7	3	b_{68}	$(6,1,-4,1)$
4321323	b_{28}	7	5	b_{67}	$(1,1,5,-10)$
12134323	b_{29}	8	7	b_{66}	$(-3,-3,10,-3)$
13213243	b_{30}	8	8	b_{65}	$(-3,4,-7,10)$
13234323	b_{31}	8	6	b_{64}	$(-6,7,-4,1)$
23214323	b_{32}	8	9	b_{63}	$(7,-6,2,5)$
32134323	b_{33}	8	8	b_{62}	$(3,4,-10,7)$
34321323	b_{34}	8	6	b_{61}	$(1,6,-5,-5)$
43213243	b_{35}	8	9	b_{60}	$(3,1,3,-10)$
123214323	b_{36}	9	12	b_{59}	$(-7,1,2,5)$
132134323	b_{37}	9	9	b_{58}	$(-3,7,-10,7)$
continued on next page...					

Table 24. Schubert classes for F_4/P_3 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
143213243	b_{38}	9	10	b_{57}	$(-3, 4, 3, -10)$
213213243	b_{39}	9	9	b_{56}	$(1, -4, 1, 10)$
213234323	b_{40}	9	9	b_{55}	$(1, -7, 10, 1)$
232134323	b_{41}	9	9	b_{54}	$(7, -4, -2, 7)$
234321323	b_{42}	9	9	b_{53}	$(7, -6, 7, -5)$
343213243	b_{43}	9	9	b_{52}	$(3, 4, -3, -7)$
1232134323	b_{44}	10	12	b_{51}	$(-7, 3, -2, 7)$
1234321323	b_{45}	10	12	b_{50}	$(-7, 1, 7, -5)$
1343213243	b_{46}	10	10	b_{49}	$(-3, 7, -3, -7)$
2143213243	b_{47}	10	11	b_{48}	$(1, -4, 11, -10)$
3213234323	b_{48}	10	11	b_{47}	$(1, 3, -10, 11)$
2132134323	b_{49}	10	12	b_{46}	$(4, -7, 4, 7)$
3234321323	b_{50}	10	10	b_{45}	$(7, 1, -7, 2)$
2343213243	b_{51}	10	10	b_{44}	$(7, -4, 5, -7)$
12132134323	b_{52}	11	13	b_{43}	$(-4, -3, 4, 7)$
13234321323	b_{53}	11	13	b_{42}	$(-7, 8, -7, 2)$
12343213243	b_{54}	11	13	b_{41}	$(-7, 3, 5, -7)$
32143213243	b_{55}	11	13	b_{40}	$(1, 7, -11, 1)$
43213234323	b_{56}	11	13	b_{39}	$(1, 3, 1, -11)$
23213234323	b_{57}	11	12	b_{38}	$(4, -3, -4, 11)$
21343213243	b_{58}	11	13	b_{37}	$(4, -7, 11, -7)$
32343213243	b_{59}	11	10	b_{36}	$(7, 1, -5, -2)$
123213234323	b_{60}	12	13	b_{35}	$(-4, 1, -4, 11)$
213234321323	b_{61}	12	16	b_{34}	$(1, -8, 9, 2)$
121343213243	b_{62}	12	14	b_{33}	$(-4, -3, 11, -7)$
132343213243	b_{63}	12	13	b_{32}	$(-7, 8, -5, -2)$
232143213243	b_{64}	12	16	b_{31}	$(8, -7, 3, 1)$
243213234323	b_{65}	12	14	b_{30}	$(4, -3, 7, -11)$
321343213243	b_{66}	12	15	b_{29}	$(4, 4, -11, 4)$
3213234321323	b_{67}	13	17	b_{28}	$(1, 1, -9, 11)$
1232143213243	b_{68}	13	19	b_{27}	$(-8, 1, 3, 1)$
2132343213243	b_{69}	13	16	b_{26}	$(1, -8, 11, -2)$
1243213234323	b_{70}	13	15	b_{25}	$(-4, 1, 7, -11)$
1321343213243	b_{71}	13	16	b_{24}	$(-4, 8, -11, 4)$
2321343213243	b_{72}	13	16	b_{23}	$(8, -4, -3, 4)$
3243213234323	b_{73}	13	15	b_{22}	$(4, 4, -7, -4)$
43213234321323	b_{74}	14	19	b_{21}	$(1, 1, 2, -11)$
12321343213243	b_{75}	14	19	b_{20}	$(-8, 4, -3, 4)$

continued on next page...

Table 24. Schubert classes for F_4/P_3 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
32132343213243	b_{76}	14	18	b_{19}	$(1, 3, -11, 9)$
13243213234323	b_{77}	14	16	b_{18}	$(-4, 8, -7, -4)$
21321343213243	b_{78}	14	19	b_{17}	$(4, -8, 5, 4)$
23243213234323	b_{79}	14	16	b_{16}	$(8, -4, 1, -4)$
121321343213243	b_{80}	15	20	b_{15}	$(-4, -4, 5, 4)$
123243213234323	b_{81}	15	19	b_{14}	$(-8, 4, 1, -4)$
343213234321323	b_{82}	15	19	b_{13}	$(1, 3, -2, -9)$
232132343213243	b_{83}	15	19	b_{12}	$(4, -3, -5, 9)$
213243213234323	b_{84}	15	19	b_{11}	$(4, -8, 9, -4)$
1232132343213243	b_{85}	16	20	b_{10}	$(-4, 1, -5, 9)$
1213243213234323	b_{86}	16	20	b_9	$(-4, -4, 9, -4)$
2343213234321323	b_{87}	16	20	b_8	$(4, -3, 4, -9)$
3213243213234323	b_{88}	16	20	b_7	$(4, 1, -9, 5)$
12343213234321323	b_{89}	17	21	b_6	$(-4, 1, 4, -9)$
13213243213234323	b_{90}	17	21	b_5	$(-4, 5, -9, 5)$
32343213234321323	b_{91}	17	20	b_4	$(4, 1, -4, -5)$
213213243213234323	b_{92}	18	22	b_3	$(1, -5, 1, 5)$
132343213234321323	b_{93}	18	21	b_2	$(-4, 5, -4, -5)$
2132343213234321323	b_{94}	19	22	b_1	$(1, -5, 6, -5)$
32132343213234321323	b_{95}	20	22	b_0	$(1, 1, -6, 1)$

Table 25. Multiplication table for F_4/P_3

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	b_3
b_1	b_2	$b_5 + b_6$
b_1	b_4	$b_7 + b_8$
b_1	b_9	b_{15}
b_1	b_{10}	b_{15}
b_1	b_{11}	b_{17}
b_1	b_{12}	b_{17}
b_1	b_{13}	b_{21}
b_1	b_{14}	b_{20}
b_1	b_{16}	b_{23}
b_1	b_{18}	b_{24}
b_1	b_{20}	b_{27}
b_1	b_{22}	b_{29}
b_1	b_{23}	b_{31}

continued on next page...

Table 25. Multiplication table for F_4/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{26}	b_{34}
b_1	b_{32}	$b_{41} + b_{42}$
b_1	b_{35}	b_{43}
b_1	b_{36}	$b_{44} + b_{45}$
b_1	b_{38}	b_{46}
b_1	b_{49}	b_{57}
b_1	b_{50}	b_{59}
b_1	b_{51}	b_{59}
b_1	b_{52}	b_{60}
b_1	b_{53}	b_{63}
b_1	b_{54}	b_{63}
b_1	b_{61}	b_{69}
b_1	b_{64}	b_{72}
b_1	b_{66}	b_{73}
b_1	b_{68}	b_{75}
b_1	b_{71}	b_{77}
b_1	b_{72}	b_{79}
b_1	b_{74}	b_{82}
b_1	b_{75}	b_{81}
b_1	b_{78}	$b_{83} + b_{84}$
b_1	b_{80}	$b_{85} + b_{86}$
b_1	b_{87}	b_{91}
b_1	b_{88}	b_{91}
b_1	b_{89}	b_{93}
b_1	b_{90}	b_{93}
b_1	b_{92}	b_{94}
b_2	b_2	$b_7 + 2b_8 + 2b_9 + 2b_{10}$
b_2	b_4	$2b_{11} + 2b_{12} + b_{13}$
b_2	b_5	$2b_{15}$
b_2	b_6	$2b_{15}$
b_2	b_7	$2b_{17}$
b_2	b_8	$2b_{17} + b_{21}$
b_2	b_9	$2b_{17} + b_{20}$
b_2	b_{10}	$b_{17} + b_{20}$
b_2	b_{15}	b_{27}
b_2	b_{16}	$2b_{29}$
b_2	b_{18}	b_{29}
b_2	b_{32}	$2b_{50} + 2b_{51}$
continued on next page...		

Table 25. Multiplication table for F_4/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{35}	$b_{46} + b_{51}$
b_2	b_{36}	$b_{52} + 2b_{53} + 2b_{54}$
b_2	b_{41}	$2b_{59}$
b_2	b_{42}	$2b_{59}$
b_2	b_{43}	b_{59}
b_2	b_{44}	$b_{60} + 2b_{63}$
b_2	b_{45}	$2b_{63}$
b_2	b_{49}	b_{60}
b_2	b_{66}	$b_{77} + 2b_{79}$
b_2	b_{68}	b_{80}
b_2	b_{74}	b_{87}
b_2	b_{75}	$b_{85} + b_{86}$
b_2	b_{78}	$b_{85} + 2b_{86} + 2b_{87} + 2b_{88}$
b_2	b_{80}	$2b_{89} + 2b_{90}$
b_2	b_{82}	b_{91}
b_2	b_{83}	$2b_{91}$
b_2	b_{84}	$2b_{91}$
b_2	b_{85}	$2b_{93}$
b_2	b_{86}	$2b_{93}$
b_2	b_{87}	$2b_{93}$
b_2	b_{88}	b_{93}
b_2	b_{89}	b_{94}
b_2	b_{90}	b_{94}
b_3	b_{14}	b_{27}
b_3	b_{16}	b_{31}
b_3	b_{64}	b_{79}
b_3	b_{68}	b_{81}
b_4	b_4	$2b_{19}$
b_4	b_5	$2b_{17}$
b_4	b_6	$2b_{17} + b_{21}$
b_4	b_{33}	$2b_{59}$
b_4	b_{36}	$2b_{62}$
b_4	b_{74}	b_{89}
b_4	b_{76}	$2b_{91}$
b_4	b_{78}	$2b_{89} + 2b_{90}$
b_4	b_{82}	b_{93}
b_4	b_{83}	$2b_{93}$
b_4	b_{84}	$2b_{93}$
continued on next page...		

Table 25. Multiplication table for F_4/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{87}	b_{94}
b_4	b_{88}	b_{94}
b_5	b_9	b_{27}
b_5	b_{32}	$2b_{59}$
b_5	b_{36}	$2b_{63}$
b_5	b_{68}	b_{86}
b_5	b_{78}	$2b_{91}$
b_5	b_{80}	$2b_{93}$
b_6	b_{10}	b_{27}
b_6	b_{32}	$2b_{59}$
b_6	b_{35}	b_{59}
b_6	b_{36}	$b_{60} + 2b_{63}$
b_6	b_{68}	b_{85}
b_6	b_{74}	b_{91}
b_6	b_{78}	$2b_{91}$
b_6	b_{80}	$2b_{93}$
b_7	b_{78}	$2b_{93}$
b_8	b_{74}	b_{93}
b_8	b_{78}	$2b_{93}$
b_9	b_{68}	b_{90}
b_9	b_{75}	b_{93}
b_9	b_{78}	$2b_{93}$
b_9	b_{80}	b_{94}
b_{10}	b_{68}	b_{89}
b_{10}	b_{75}	b_{93}
b_{10}	b_{78}	b_{93}
b_{10}	b_{80}	b_{94}
b_{11}	b_{78}	b_{94}
b_{12}	b_{78}	b_{94}
b_{13}	b_{74}	b_{94}
b_{14}	b_{68}	b_{92}
b_{14}	b_{75}	b_{94}
b_{15}	b_{68}	b_{93}
b_{16}	b_{64}	b_{92}
b_{16}	b_{66}	$2b_{93}$
b_{16}	b_{72}	b_{94}
b_{18}	b_{66}	b_{93}
b_{18}	b_{71}	b_{94}

continued on next page...

TABLE 25. Multiplication table for F_4/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{20}	b_{68}	b_{94}
b_{22}	b_{66}	b_{94}
b_{23}	b_{64}	b_{94}
b_{26}	b_{61}	b_{94}
b_{32}	b_{36}	$2b_{89} + 2b_{90}$
b_{32}	b_{44}	$2b_{93}$
b_{32}	b_{45}	$2b_{93}$
b_{32}	b_{53}	b_{94}
b_{32}	b_{54}	b_{94}
b_{33}	b_{36}	$2b_{91}$
b_{35}	b_{36}	b_{89}
b_{35}	b_{44}	b_{93}
b_{35}	b_{49}	b_{93}
b_{35}	b_{52}	b_{94}
b_{36}	b_{41}	$2b_{93}$
b_{36}	b_{42}	$2b_{93}$
b_{36}	b_{43}	b_{93}
b_{36}	b_{50}	b_{94}
b_{36}	b_{51}	b_{94}
b_{38}	b_{49}	b_{94}

TABLE 26. Schubert classes for F_4/P_4

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_{23}	$(1,1,1,1)$
4	b_1	1	0	b_{22}	$(1,1,2,-1)$
34	b_2	2	0	b_{21}	$(1,3,-2,1)$
234	b_3	3	1	b_{20}	$(4,-3,4,1)$
1234	b_4	4	2	b_{19}	$(-4,1,4,1)$
3234	b_5	4	1	b_{18}	$(4,1,-4,5)$
13234	b_6	5	2	b_{17}	$(-4,5,-4,5)$
43234	b_7	5	1	b_{16}	$(4,1,1,-5)$
143234	b_8	6	2	b_{15}	$(-4,5,1,-5)$
213234	b_9	6	3	b_{14}	$(1,-5,6,5)$
2143234	b_{10}	7	3	b_{13}	$(1,-5,11,-5)$
3213234	b_{11}	7	3	b_{12}	$(1,1,-6,11)$
43213234	b_{12}	8	4	b_{11}	$(1,1,5,-11)$
32143234	b_{13}	8	4	b_{10}	$(1,6,-11,6)$

continued on next page...

Table 26. Schubert classes for F_4/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
343213234	b_{14}	9	4	b_9	$(1,6,-5,-6)$
232143234	b_{15}	9	5	b_8	$(7,-6,1,6)$
1232143234	b_{16}	10	6	b_7	$(-7,1,1,6)$
2343213234	b_{17}	10	5	b_6	$(7,-6,7,-6)$
12343213234	b_{18}	11	6	b_5	$(-7,1,7,-6)$
32343213234	b_{19}	11	5	b_4	$(7,1,-7,1)$
132343213234	b_{20}	12	6	b_3	$(-7,8,-7,1)$
2132343213234	b_{21}	13	7	b_2	$(1,-8,9,1)$
32132343213234	b_{22}	14	7	b_1	$(1,1,-9,10)$
432132343213234	b_{23}	15	7	b_0	$(1,1,1,-10)$

Table 27. Multiplication table for F_4/P_4

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	b_2
b_1	b_3	b_5
b_1	b_4	b_6
b_1	b_5	b_7
b_1	b_6	b_8
b_1	b_9	$b_{10}+b_{11}$
b_1	b_{12}	b_{14}
b_1	b_{13}	b_{14}
b_1	b_{15}	b_{17}
b_1	b_{16}	b_{18}
b_1	b_{17}	b_{19}
b_1	b_{18}	b_{20}
b_1	b_{21}	b_{22}
b_2	b_3	b_7
b_2	b_4	b_8
b_2	b_{15}	b_{19}
b_2	b_{16}	b_{20}
b_3	b_3	$3b_8$
b_3	b_4	$2b_{10}+b_{11}$
b_3	b_9	$6b_{14}$
b_3	b_{12}	b_{19}
b_3	b_{13}	$2b_{19}$
b_3	b_{15}	$3b_{20}$
b_3	b_{16}	b_{21}

continued on next page...

Table 27. Multiplication table for F_4/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{18}	b_{22}
b_4	b_4	$2b_{12} + 2b_{13}$
b_4	b_6	$4b_{14}$
b_4	b_9	$4b_{17}$
b_4	b_{10}	$2b_{19}$
b_4	b_{11}	$2b_{19}$
b_4	b_{12}	b_{20}
b_4	b_{13}	$2b_{20}$
b_4	b_{15}	b_{21}
b_4	b_{17}	b_{22}
b_5	b_{16}	b_{22}
b_6	b_9	$4b_{19}$
b_6	b_{15}	b_{22}
b_9	b_9	$6b_{20}$
b_9	b_{12}	b_{22}
b_9	b_{13}	b_{22}

Table 28. Schubert classes for E_6/P_1

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_{26}	$(1,1,1,1,1,1)$
1	b_1	1	0	b_{25}	$(-1,1,2,1,1,1)$
31	b_2	2	0	b_{24}	$(1,1,-2,3,1,1)$
431	b_3	3	0	b_{23}	$(1,4,1,-3,4,1)$
2431	b_4	4	0	b_{22}	$(1,-4,1,1,4,1)$
5431	b_5	4	0	b_{21}	$(1,4,1,1,-4,5)$
25431	b_6	5	0	b_{20}	$(1,-4,1,5,-4,5)$
65431	b_7	5	0	b_{19}	$(1,4,1,1,1,-5)$
265431	b_8	6	0	b_{18}	$(1,-4,1,5,1,-5)$
425431	b_9	6	0	b_{17}	$(1,1,6,-5,1,5)$
3425431	b_{10}	7	0	b_{16}	$(7,1,-6,1,1,5)$
4265431	b_{11}	7	0	b_{15}	$(1,1,6,-5,6,-5)$
13425431	b_{12}	8	0	b_{12}	$(-7,1,1,1,1,5)$
34265431	b_{13}	8	0	b_{13}	$(7,1,-6,1,6,-5)$
54265431	b_{14}	8	0	b_{14}	$(1,1,6,1,-6,1)$
354265431	b_{15}	9	0	b_{11}	$(7,1,-6,7,-6,1)$
134265431	b_{16}	9	0	b_{10}	$(-7,1,1,1,6,-5)$
1354265431	b_{17}	10	0	b_9	$(-7,1,1,7,-6,1)$
continued on next page...					

TABLE 28. Schubert classes for E_6/P_1 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
4354265431	b_{18}	10	0	b_8	$(7, 8, 1, -7, 1, 1)$
24354265431	b_{19}	11	0	b_7	$(7, -8, 1, 1, 1, 1)$
14354265431	b_{20}	11	0	b_6	$(-7, 8, 8, -7, 1, 1)$
124354265431	b_{21}	12	0	b_5	$(-7, -8, 8, 1, 1, 1)$
314354265431	b_{22}	12	0	b_4	$(1, 8, -8, 1, 1, 1)$
2314354265431	b_{23}	13	0	b_3	$(1, -8, -8, 9, 1, 1)$
42314354265431	b_{24}	14	0	b_2	$(1, 1, 1, -9, 10, 1)$
542314354265431	b_{25}	15	0	b_1	$(1, 1, 1, 1, -10, 11)$
6542314354265431	b_{26}	16	0	b_0	$(1, 1, 1, 1, 1, -11)$

TABLE 29. Multiplication table for E_6/P_1

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	b_2
b_1	b_2	b_3
b_1	b_3	$b_4 + b_5$
b_1	b_4	b_6
b_1	b_5	$b_6 + b_7$
b_1	b_6	$b_8 + b_9$
b_1	b_7	b_8
b_1	b_8	b_{11}
b_1	b_9	$b_{10} + b_{11}$
b_1	b_{10}	$b_{12} + b_{13}$
b_1	b_{11}	$b_{13} + b_{14}$
b_1	b_{12}	b_{16}
b_1	b_{13}	$b_{15} + b_{16}$
b_1	b_{14}	b_{15}
b_1	b_{15}	$b_{17} + b_{18}$
b_1	b_{16}	b_{17}
b_1	b_{17}	b_{20}
b_1	b_{18}	$b_{19} + b_{20}$
b_1	b_{19}	b_{21}
b_1	b_{20}	$b_{21} + b_{22}$
b_1	b_{21}	b_{23}
b_1	b_{22}	b_{23}
b_1	b_{23}	b_{24}
b_1	b_{24}	b_{25}
b_2	b_2	$b_4 + b_5$

continued on next page...

Table 29. Multiplication table for E_6/P_1 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_3	$2b_6 + b_7$
b_2	b_4	$b_8 + b_9$
b_2	b_5	$2b_8 + b_9$
b_2	b_6	$b_{10} + 2b_{11}$
b_2	b_7	b_{11}
b_2	b_8	$b_{13} + b_{14}$
b_2	b_9	$b_{12} + 2b_{13} + b_{14}$
b_2	b_{10}	$b_{15} + 2b_{16}$
b_2	b_{11}	$2b_{15} + b_{16}$
b_2	b_{12}	b_{17}
b_2	b_{13}	$2b_{17} + b_{18}$
b_2	b_{14}	$b_{17} + b_{18}$
b_2	b_{15}	$b_{19} + 2b_{20}$
b_2	b_{16}	b_{20}
b_2	b_{17}	$b_{21} + b_{22}$
b_2	b_{18}	$2b_{21} + b_{22}$
b_2	b_{19}	b_{23}
b_2	b_{20}	$2b_{23}$
b_2	b_{21}	b_{24}
b_2	b_{22}	b_{24}
b_2	b_{23}	b_{25}
b_3	b_3	$3b_8 + 2b_9$
b_3	b_4	$b_{10} + 2b_{11}$
b_3	b_5	$b_{10} + 3b_{11}$
b_3	b_6	$b_{12} + 3b_{13} + 2b_{14}$
b_3	b_7	$b_{13} + b_{14}$
b_3	b_8	$2b_{15} + b_{16}$
b_3	b_9	$3b_{15} + 3b_{16}$
b_3	b_{10}	$3b_{17} + b_{18}$
b_3	b_{11}	$3b_{17} + 2b_{18}$
b_3	b_{12}	b_{20}
b_3	b_{13}	$b_{19} + 3b_{20}$
b_3	b_{14}	$b_{19} + 2b_{20}$
b_3	b_{15}	$3b_{21} + 2b_{22}$
b_3	b_{16}	$b_{21} + b_{22}$
b_3	b_{17}	$2b_{23}$
b_3	b_{18}	$3b_{23}$
b_3	b_{19}	b_{24}

continued on next page...

Table 29. Multiplication table for E_6/P_1 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{20}	$2b_{24}$
b_3	b_{21}	b_{25}
b_3	b_{22}	b_{25}
b_4	b_4	$b_{12} + b_{13} + b_{14}$
b_4	b_5	$2b_{13} + b_{14}$
b_4	b_6	$2b_{15} + 2b_{16}$
b_4	b_7	b_{15}
b_4	b_8	$b_{17} + b_{18}$
b_4	b_9	$3b_{17} + b_{18}$
b_4	b_{10}	$2b_{20}$
b_4	b_{11}	$b_{19} + 2b_{20}$
b_4	b_{12}	b_{22}
b_4	b_{13}	$2b_{21} + b_{22}$
b_4	b_{14}	$b_{21} + b_{22}$
b_4	b_{15}	$2b_{23}$
b_4	b_{16}	b_{23}
b_4	b_{17}	b_{24}
b_4	b_{18}	b_{24}
b_4	b_{20}	b_{25}
b_5	b_5	$b_{12} + 2b_{13} + 2b_{14}$
b_5	b_6	$3b_{15} + 2b_{16}$
b_5	b_7	$b_{15} + b_{16}$
b_5	b_8	$2b_{17} + b_{18}$
b_5	b_9	$3b_{17} + 2b_{18}$
b_5	b_{10}	$b_{19} + 2b_{20}$
b_5	b_{11}	$b_{19} + 3b_{20}$
b_5	b_{12}	b_{21}
b_5	b_{13}	$2b_{21} + 2b_{22}$
b_5	b_{14}	$2b_{21} + b_{22}$
b_5	b_{15}	$3b_{23}$
b_5	b_{16}	b_{23}
b_5	b_{17}	b_{24}
b_5	b_{18}	$2b_{24}$
b_5	b_{19}	b_{25}
b_5	b_{20}	b_{25}
b_6	b_6	$4b_{17} + 2b_{18}$
b_6	b_7	$b_{17} + b_{18}$
b_6	b_8	$b_{19} + 2b_{20}$

continued on next page...

TABLE 29. Multiplication table for E_6/P_1 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_6	b_9	$b_{19} + 4b_{20}$
b_6	b_{10}	$2b_{21} + 2b_{22}$
b_6	b_{11}	$3b_{21} + 2b_{22}$
b_6	b_{12}	b_{23}
b_6	b_{13}	$3b_{23}$
b_6	b_{14}	$2b_{23}$
b_6	b_{15}	$2b_{24}$
b_6	b_{16}	b_{24}
b_6	b_{17}	b_{25}
b_6	b_{18}	b_{25}
b_7	b_7	b_{17}
b_7	b_8	b_{20}
b_7	b_9	$b_{19} + b_{20}$
b_7	b_{10}	b_{21}
b_7	b_{11}	$b_{21} + b_{22}$
b_7	b_{13}	b_{23}
b_7	b_{14}	b_{23}
b_7	b_{15}	b_{24}
b_7	b_{18}	b_{25}
b_8	b_8	$b_{21} + b_{22}$
b_8	b_9	$2b_{21} + b_{22}$
b_8	b_{10}	b_{23}
b_8	b_{11}	$2b_{23}$
b_8	b_{13}	b_{24}
b_8	b_{14}	b_{24}
b_8	b_{15}	b_{25}
b_9	b_9	$3b_{21} + 3b_{22}$
b_9	b_{10}	$3b_{23}$
b_9	b_{11}	$3b_{23}$
b_9	b_{12}	b_{24}
b_9	b_{13}	$2b_{24}$
b_9	b_{14}	b_{24}
b_9	b_{15}	b_{25}
b_9	b_{16}	b_{25}
b_{10}	b_{10}	$2b_{24}$
b_{10}	b_{11}	b_{24}
b_{10}	b_{12}	b_{25}
b_{10}	b_{13}	b_{25}

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Table 29. Multiplication table for E_6/P_1 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{11}	b_{11}	$2b_{24}$
b_{11}	b_{13}	b_{25}
b_{11}	b_{14}	b_{25}

Table 30. Schubert classes for E_6/P_2

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_{71}	$(1,1,1,1,1,1)$
2	b_1	1	0	b_{70}	$(1,-1,1,2,1,1)$
42	b_2	2	0	b_{69}	$(1,1,3,-2,3,1)$
342	b_3	3	0	b_{68}	$(4,1,-3,1,3,1)$
542	b_4	3	0	b_{67}	$(1,1,3,1,-3,4)$
1342	b_5	4	0	b_{66}	$(-4,1,1,1,3,1)$
3542	b_6	4	0	b_{65}	$(4,1,-3,4,-3,4)$
6542	b_7	4	0	b_{64}	$(1,1,3,1,1,-4)$
13542	b_8	5	0	b_{63}	$(-4,1,1,4,-3,4)$
36542	b_9	5	0	b_{62}	$(4,1,-3,4,1,-4)$
43542	b_{10}	5	0	b_{61}	$(4,5,1,-4,1,4)$
136542	b_{11}	6	0	b_{60}	$(-4,1,1,4,1,-4)$
143542	b_{12}	6	0	b_{59}	$(-4,5,5,-4,1,4)$
243542	b_{13}	6	0	b_{58}	$(4,-5,1,1,1,4)$
436542	b_{14}	6	0	b_{57}	$(4,5,1,-4,5,-4)$
1243542	b_{15}	7	0	b_{56}	$(-4,-5,5,1,1,4)$
1436542	b_{16}	7	0	b_{55}	$(-4,5,5,-4,5,-4)$
2436542	b_{17}	7	0	b_{54}	$(4,-5,1,1,5,-4)$
3143542	b_{18}	7	0	b_{53}	$(1,5,-5,1,1,4)$
5436542	b_{19}	7	0	b_{52}	$(4,5,1,1,-5,1)$
12436542	b_{20}	8	0	b_{51}	$(-4,-5,5,1,5,-4)$
15436542	b_{21}	8	0	b_{50}	$(-4,5,5,1,-5,1)$
23143542	b_{22}	8	0	b_{49}	$(1,-5,-5,6,1,4)$
25436542	b_{23}	8	0	b_{48}	$(4,-5,1,6,-5,1)$
31436542	b_{24}	8	0	b_{47}	$(1,5,-5,1,5,-4)$
125436542	b_{25}	9	0	b_{46}	$(-4,-5,5,6,-5,1)$
231436542	b_{26}	9	0	b_{45}	$(1,-5,-5,6,5,-4)$
315436542	b_{27}	9	0	b_{44}	$(1,5,-5,6,-5,1)$
423143542	b_{28}	9	0	b_{43}	$(1,1,1,-6,7,4)$
425436542	b_{29}	9	0	b_{42}	$(4,1,7,-6,1,1)$
1425436542	b_{30}	10	0	b_{41}	$(-4,1,11,-6,1,1)$
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Table 30. Schubert classes for E_6/P_2 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
2315436542	b_{31}	10	0	b_{40}	$(1,-5,-5,11,-5,1)$
3425436542	b_{32}	10	0	b_{39}	$(11,1,-7,1,1,1)$
4231436542	b_{33}	10	0	b_{38}	$(1,1,1,-6,11,-4)$
4315436542	b_{34}	10	0	b_{37}	$(1,11,1,-6,1,1)$
5423143542	b_{35}	10	0	b_{36}	$(1,1,1,1,-7,11)$
13425436542	b_{36}	11	1	b_{35}	$(-11,1,4,1,1,1)$
24315436542	b_{37}	11	1	b_{34}	$(1,-11,1,5,1,1)$
31425436542	b_{38}	11	1	b_{33}	$(7,1,-11,5,1,1)$
65423143542	b_{39}	11	1	b_{32}	$(1,1,1,1,4,-11)$
42315436542	b_{40}	11	1	b_{31}	$(1,6,6,-11,6,1)$
54231436542	b_{41}	11	1	b_{30}	$(1,1,1,5,-11,7)$
565423143542	b_{42}	12	1	b_{29}	$(1,1,1,5,-4,-7)$
131425436542	b_{43}	12	1	b_{28}	$(-7,1,-4,5,1,1)$
242315436542	b_{44}	12	1	b_{27}	$(1,-6,6,-5,6,1)$
342315436542	b_{45}	12	1	b_{26}	$(7,6,-6,-5,6,1)$
454231436542	b_{46}	12	1	b_{25}	$(1,6,6,-5,-6,7)$
2342315436542	b_{47}	13	1	b_{24}	$(7,-6,-6,1,6,1)$
4565423143542	b_{48}	13	1	b_{23}	$(1,6,6,-5,1,-7)$
1342315436542	b_{49}	13	1	b_{22}	$(-7,6,1,-5,6,1)$
2454231436542	b_{50}	13	1	b_{21}	$(1,-6,6,1,-6,7)$
3454231436542	b_{51}	13	1	b_{20}	$(7,6,-6,1,-6,7)$
24565423143542	b_{52}	14	1	b_{19}	$(1,-6,6,1,1,-7)$
12342315436542	b_{53}	14	1	b_{18}	$(-7,-6,1,1,6,1)$
34565423143542	b_{54}	14	1	b_{17}	$(7,6,-6,1,1,-7)$
23454231436542	b_{55}	14	1	b_{16}	$(7,-6,-6,7,-6,7)$
13454231436542	b_{56}	14	1	b_{15}	$(-7,6,1,1,-6,7)$
234565423143542	b_{57}	15	1	b_{14}	$(7,-6,-6,7,1,-7)$
134565423143542	b_{58}	15	1	b_{13}	$(-7,6,1,1,1,-7)$
123454231436542	b_{59}	15	1	b_{12}	$(-7,-6,1,7,-6,7)$
423454231436542	b_{60}	15	1	b_{11}	$(7,1,1,-7,1,7)$
1234565423143542	b_{61}	16	1	b_{10}	$(-7,-6,1,7,1,-7)$
4234565423143542	b_{62}	16	1	b_{9}	$(7,1,1,-7,8,-7)$
1423454231436542	b_{63}	16	1	b_{8}	$(-7,1,8,-7,1,7)$
54234565423143542	b_{64}	17	1	b_{7}	$(7,1,1,1,-8,1)$
14234565423143542	b_{65}	17	1	b_{6}	$(-7,1,8,-7,8,-7)$
31423454231436542	b_{66}	17	1	b_{5}	$(1,1,-8,1,1,7)$
154234565423143542	b_{67}	18	1	b_{4}	$(-7,1,8,1,-8,1)$
314234565423143542	b_{68}	18	1	b_{3}	$(1,1,-8,1,8,-7)$

continued on next page...

Table 30. Schubert classes for E_6/P_2 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
3154234565423143542	b_{69}	19	1	b_2	$(1, 1, -8, 9, -8, 1)$
43154234565423143542	b_{70}	20	1	b_1	$(1, 10, 1, -9, 1, 1)$
243154234565423143542	b_{71}	21	1	b_0	$(1, -10, 1, 1, 1, 1)$

Table 31. Multiplication table for E_6/P_2

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	b_2
b_1	b_2	$b_3 + b_4$
b_1	b_3	$b_5 + b_6$
b_1	b_4	$b_6 + b_7$
b_1	b_5	b_8
b_1	b_6	$b_8 + b_9 + b_{10}$
b_1	b_7	b_9
b_1	b_8	$b_{11} + b_{12}$
b_1	b_9	$b_{11} + b_{14}$
b_1	b_{10}	$b_{12} + b_{13} + b_{14}$
b_1	b_{11}	b_{16}
b_1	b_{12}	$b_{15} + b_{16} + b_{18}$
b_1	b_{13}	$b_{15} + b_{17}$
b_1	b_{14}	$b_{16} + b_{17} + b_{19}$
b_1	b_{15}	$b_{20} + b_{22}$
b_1	b_{16}	$b_{20} + b_{21} + b_{24}$
b_1	b_{17}	$b_{20} + b_{23}$
b_1	b_{18}	$b_{22} + b_{24}$
b_1	b_{19}	$b_{21} + b_{23}$
b_1	b_{20}	$b_{25} + b_{26}$
b_1	b_{21}	$b_{25} + b_{27}$
b_1	b_{22}	$b_{26} + b_{28}$
b_1	b_{23}	$b_{25} + b_{29}$
b_1	b_{24}	$b_{26} + b_{27}$
b_1	b_{25}	$b_{30} + b_{31}$
b_1	b_{26}	$b_{31} + b_{33}$
b_1	b_{27}	$b_{31} + b_{34}$
b_1	b_{28}	$b_{33} + b_{35}$
b_1	b_{29}	$b_{30} + b_{32}$
b_1	b_{36}	b_{43}
b_1	b_{37}	b_{44}
continued on next page...		

Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{38}	$b_{43} + b_{45}$
b_1	b_{39}	b_{42}
b_1	b_{40}	$b_{44} + b_{45} + b_{46}$
b_1	b_{41}	$b_{42} + b_{46}$
b_1	b_{42}	b_{48}
b_1	b_{43}	b_{49}
b_1	b_{44}	$b_{47} + b_{50}$
b_1	b_{45}	$b_{47} + b_{49} + b_{51}$
b_1	b_{46}	$b_{48} + b_{50} + b_{51}$
b_1	b_{47}	$b_{53} + b_{55}$
b_1	b_{48}	$b_{52} + b_{54}$
b_1	b_{49}	$b_{53} + b_{56}$
b_1	b_{50}	$b_{52} + b_{55}$
b_1	b_{51}	$b_{54} + b_{55} + b_{56}$
b_1	b_{52}	b_{57}
b_1	b_{53}	b_{59}
b_1	b_{54}	$b_{57} + b_{58}$
b_1	b_{55}	$b_{57} + b_{59} + b_{60}$
b_1	b_{56}	$b_{58} + b_{59}$
b_1	b_{57}	$b_{61} + b_{62}$
b_1	b_{58}	b_{61}
b_1	b_{59}	$b_{61} + b_{63}$
b_1	b_{60}	$b_{62} + b_{63}$
b_1	b_{61}	b_{65}
b_1	b_{62}	$b_{64} + b_{65}$
b_1	b_{63}	$b_{65} + b_{66}$
b_1	b_{64}	b_{67}
b_1	b_{65}	$b_{67} + b_{68}$
b_1	b_{66}	b_{68}
b_1	b_{67}	b_{69}
b_1	b_{68}	b_{69}
b_1	b_{69}	b_{70}
b_2	b_2	$b_5 + 2b_6 + b_7$
b_2	b_3	$2b_8 + b_9 + b_{10}$
b_2	b_4	$b_8 + 2b_9 + b_{10}$
b_2	b_5	$b_{11} + b_{12}$
b_2	b_6	$2b_{11} + 2b_{12} + b_{13} + 2b_{14}$
b_2	b_7	$b_{11} + b_{14}$
continued on next page...		

Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_8	$b_{15} + 2b_{16} + b_{18}$
b_2	b_9	$2b_{16} + b_{17} + b_{19}$
b_2	b_{10}	$2b_{15} + 2b_{16} + 2b_{17} + b_{18} + b_{19}$
b_2	b_{11}	$b_{20} + b_{21} + b_{24}$
b_2	b_{12}	$2b_{20} + b_{21} + 2b_{22} + 2b_{24}$
b_2	b_{13}	$2b_{20} + b_{22} + b_{23}$
b_2	b_{14}	$2b_{20} + 2b_{21} + 2b_{23} + b_{24}$
b_2	b_{15}	$b_{25} + 2b_{26} + b_{28}$
b_2	b_{16}	$2b_{25} + 2b_{26} + 2b_{27}$
b_2	b_{17}	$2b_{25} + b_{26} + b_{29}$
b_2	b_{18}	$2b_{26} + b_{27} + b_{28}$
b_2	b_{19}	$2b_{25} + b_{27} + b_{29}$
b_2	b_{20}	$b_{30} + 2b_{31} + b_{33}$
b_2	b_{21}	$b_{30} + 2b_{31} + b_{34}$
b_2	b_{22}	$b_{31} + 2b_{33} + b_{35}$
b_2	b_{23}	$2b_{30} + b_{31} + b_{32}$
b_2	b_{24}	$2b_{31} + b_{33} + b_{34}$
b_2	b_{36}	b_{49}
b_2	b_{37}	$b_{47} + b_{50}$
b_2	b_{38}	$b_{47} + 2b_{49} + b_{51}$
b_2	b_{39}	b_{48}
b_2	b_{40}	$2b_{47} + b_{48} + b_{49} + 2b_{50} + 2b_{51}$
b_2	b_{41}	$2b_{48} + b_{50} + b_{51}$
b_2	b_{42}	$b_{52} + b_{54}$
b_2	b_{43}	$b_{53} + b_{56}$
b_2	b_{44}	$b_{52} + b_{53} + 2b_{55}$
b_2	b_{45}	$2b_{53} + b_{54} + 2b_{55} + 2b_{56}$
b_2	b_{46}	$2b_{52} + 2b_{54} + 2b_{55} + b_{56}$
b_2	b_{47}	$b_{57} + 2b_{59} + b_{60}$
b_2	b_{48}	$2b_{57} + b_{58}$
b_2	b_{49}	$b_{58} + 2b_{59}$
b_2	b_{50}	$2b_{57} + b_{59} + b_{60}$
b_2	b_{51}	$2b_{57} + 2b_{58} + 2b_{59} + b_{60}$
b_2	b_{52}	$b_{61} + b_{62}$
b_2	b_{53}	$b_{61} + b_{63}$
b_2	b_{54}	$2b_{61} + b_{62}$
b_2	b_{55}	$2b_{61} + 2b_{62} + 2b_{63}$
b_2	b_{56}	$2b_{61} + b_{63}$

continued on next page...

Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{57}	$b_{64} + 2b_{65}$
b_2	b_{58}	b_{65}
b_2	b_{59}	$2b_{65} + b_{66}$
b_2	b_{60}	$b_{64} + 2b_{65} + b_{66}$
b_2	b_{61}	$b_{67} + b_{68}$
b_2	b_{62}	$2b_{67} + b_{68}$
b_2	b_{63}	$b_{67} + 2b_{68}$
b_2	b_{64}	b_{69}
b_2	b_{65}	$2b_{69}$
b_2	b_{66}	b_{69}
b_2	b_{67}	b_{70}
b_2	b_{68}	b_{70}
b_3	b_3	$b_{11} + 2b_{12} + b_{14}$
b_3	b_4	$2b_{11} + b_{12} + b_{13} + b_{14}$
b_3	b_5	$b_{16} + b_{18}$
b_3	b_6	$2b_{15} + 3b_{16} + b_{17} + b_{18} + b_{19}$
b_3	b_7	$b_{16} + b_{17}$
b_3	b_8	$b_{20} + b_{21} + b_{22} + 2b_{24}$
b_3	b_9	$2b_{20} + b_{21} + b_{23} + b_{24}$
b_3	b_{10}	$3b_{20} + 2b_{21} + 2b_{22} + b_{23} + b_{24}$
b_3	b_{11}	$b_{25} + b_{26} + b_{27}$
b_3	b_{12}	$b_{25} + 3b_{26} + 2b_{27} + b_{28}$
b_3	b_{13}	$2b_{25} + b_{26} + b_{28}$
b_3	b_{14}	$3b_{25} + 2b_{26} + b_{27} + b_{29}$
b_3	b_{15}	$2b_{31} + b_{33} + b_{35}$
b_3	b_{16}	$b_{30} + 3b_{31} + b_{33} + b_{34}$
b_3	b_{17}	$2b_{30} + b_{31} + b_{33}$
b_3	b_{18}	$b_{31} + 2b_{33} + b_{34}$
b_3	b_{19}	$b_{30} + 2b_{31} + b_{32}$
b_3	b_{36}	b_{56}
b_3	b_{37}	$b_{53} + b_{55}$
b_3	b_{38}	$2b_{53} + b_{54} + b_{55} + b_{56}$
b_3	b_{39}	b_{52}
b_3	b_{40}	$2b_{52} + b_{53} + b_{54} + 3b_{55} + 2b_{56}$
b_3	b_{41}	$b_{52} + 2b_{54} + b_{55}$
b_3	b_{42}	b_{57}
b_3	b_{43}	$b_{58} + b_{59}$
b_3	b_{44}	$b_{57} + 2b_{59} + b_{60}$

continued on next page...

Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{45}	$2b_{57} + b_{58} + 3b_{59} + b_{60}$
b_3	b_{46}	$3b_{57} + 2b_{58} + b_{59} + b_{60}$
b_3	b_{47}	$b_{61} + b_{62} + 2b_{63}$
b_3	b_{48}	$b_{61} + b_{62}$
b_3	b_{49}	$2b_{61} + b_{63}$
b_3	b_{50}	$2b_{61} + b_{62} + b_{63}$
b_3	b_{51}	$3b_{61} + 2b_{62} + b_{63}$
b_3	b_{52}	b_{65}
b_3	b_{53}	$b_{65} + b_{66}$
b_3	b_{54}	$b_{64} + b_{65}$
b_3	b_{55}	$b_{64} + 3b_{65} + b_{66}$
b_3	b_{56}	$2b_{65}$
b_3	b_{57}	$b_{67} + b_{68}$
b_3	b_{58}	b_{67}
b_3	b_{59}	$b_{67} + 2b_{68}$
b_3	b_{60}	$2b_{67} + b_{68}$
b_3	b_{61}	b_{69}
b_3	b_{62}	b_{69}
b_3	b_{63}	$2b_{69}$
b_3	b_{65}	b_{70}
b_3	b_{66}	b_{70}
b_4	b_4	$b_{11} + b_{12} + 2b_{14}$
b_4	b_5	$b_{15} + b_{16}$
b_4	b_6	$b_{15} + 3b_{16} + 2b_{17} + b_{18} + b_{19}$
b_4	b_7	$b_{16} + b_{19}$
b_4	b_8	$2b_{20} + b_{21} + b_{22} + b_{24}$
b_4	b_9	$b_{20} + 2b_{21} + b_{23} + b_{24}$
b_4	b_{10}	$3b_{20} + b_{21} + b_{22} + 2b_{23} + 2b_{24}$
b_4	b_{11}	$b_{25} + b_{26} + b_{27}$
b_4	b_{12}	$2b_{25} + 3b_{26} + b_{27} + b_{28}$
b_4	b_{13}	$b_{25} + 2b_{26} + b_{29}$
b_4	b_{14}	$3b_{25} + b_{26} + 2b_{27} + b_{29}$
b_4	b_{15}	$b_{30} + b_{31} + 2b_{33}$
b_4	b_{16}	$b_{30} + 3b_{31} + b_{33} + b_{34}$
b_4	b_{17}	$b_{30} + 2b_{31} + b_{32}$
b_4	b_{18}	$2b_{31} + b_{33} + b_{35}$
b_4	b_{19}	$2b_{30} + b_{31} + b_{34}$
b_4	b_{36}	b_{53}

continued on next page...

Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{37}	$b_{52} + b_{55}$
b_4	b_{38}	$b_{53} + b_{55} + 2b_{56}$
b_4	b_{39}	b_{54}
b_4	b_{40}	$b_{52} + 2b_{53} + 2b_{54} + 3b_{55} + b_{56}$
b_4	b_{41}	$2b_{52} + b_{54} + b_{55} + b_{56}$
b_4	b_{42}	$b_{57} + b_{58}$
b_4	b_{43}	b_{59}
b_4	b_{44}	$2b_{57} + b_{59} + b_{60}$
b_4	b_{45}	$b_{57} + 2b_{58} + 3b_{59} + b_{60}$
b_4	b_{46}	$3b_{57} + b_{58} + 2b_{59} + b_{60}$
b_4	b_{47}	$2b_{61} + b_{62} + b_{63}$
b_4	b_{48}	$2b_{61} + b_{62}$
b_4	b_{49}	$b_{61} + b_{63}$
b_4	b_{50}	$b_{61} + 2b_{62} + b_{63}$
b_4	b_{51}	$3b_{61} + b_{62} + 2b_{63}$
b_4	b_{52}	$b_{64} + b_{65}$
b_4	b_{53}	b_{65}
b_4	b_{54}	$2b_{65}$
b_4	b_{55}	$b_{64} + 3b_{65} + b_{66}$
b_4	b_{56}	$b_{65} + b_{66}$
b_4	b_{57}	$2b_{67} + b_{68}$
b_4	b_{58}	b_{68}
b_4	b_{59}	$b_{67} + b_{68}$
b_4	b_{60}	$b_{67} + 2b_{68}$
b_4	b_{61}	b_{69}
b_4	b_{62}	$2b_{69}$
b_4	b_{63}	b_{69}
b_4	b_{64}	b_{70}
b_4	b_{65}	b_{70}
b_5	b_5	b_{24}
b_5	b_6	$b_{20} + b_{21} + b_{22} + b_{24}$
b_5	b_7	b_{20}
b_5	b_8	$b_{26} + b_{27}$
b_5	b_9	$b_{25} + b_{26}$
b_5	b_{10}	$b_{25} + b_{26} + b_{27} + b_{28}$
b_5	b_{11}	b_{31}
b_5	b_{12}	$b_{31} + b_{33} + b_{34}$
b_5	b_{13}	$b_{31} + b_{35}$

continued on next page...

Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_5	b_{14}	$b_{30} + b_{31} + b_{33}$
b_5	b_{36}	b_{58}
b_5	b_{37}	b_{59}
b_5	b_{38}	$b_{57} + b_{59}$
b_5	b_{40}	$b_{57} + b_{58} + b_{59} + b_{60}$
b_5	b_{41}	b_{57}
b_5	b_{43}	b_{61}
b_5	b_{44}	$b_{61} + b_{63}$
b_5	b_{45}	$b_{61} + b_{62} + b_{63}$
b_5	b_{46}	$b_{61} + b_{62}$
b_5	b_{47}	$b_{65} + b_{66}$
b_5	b_{49}	b_{65}
b_5	b_{50}	b_{65}
b_5	b_{51}	$b_{64} + b_{65}$
b_5	b_{53}	b_{68}
b_5	b_{55}	$b_{67} + b_{68}$
b_5	b_{56}	b_{67}
b_5	b_{59}	b_{69}
b_5	b_{60}	b_{69}
b_5	b_{63}	b_{70}
b_6	b_6	$5b_{20} + 3b_{21} + 2b_{22} + 2b_{23} + 3b_{24}$
b_6	b_7	$b_{20} + b_{21} + b_{23} + b_{24}$
b_6	b_8	$2b_{25} + 3b_{26} + 2b_{27} + b_{28}$
b_6	b_9	$3b_{25} + 2b_{26} + 2b_{27} + b_{29}$
b_6	b_{10}	$5b_{25} + 5b_{26} + 2b_{27} + b_{28} + b_{29}$
b_6	b_{11}	$b_{30} + 2b_{31} + b_{33} + b_{34}$
b_6	b_{12}	$b_{30} + 5b_{31} + 3b_{33} + b_{34} + b_{35}$
b_6	b_{13}	$2b_{30} + 2b_{31} + 2b_{33}$
b_6	b_{14}	$3b_{30} + 5b_{31} + b_{32} + b_{33} + b_{34}$
b_6	b_{36}	b_{59}
b_6	b_{37}	$b_{57} + b_{59} + b_{60}$
b_6	b_{38}	$b_{57} + 2b_{58} + 3b_{59} + b_{60}$
b_6	b_{39}	b_{57}
b_6	b_{40}	$5b_{57} + 2b_{58} + 5b_{59} + 2b_{60}$
b_6	b_{41}	$3b_{57} + 2b_{58} + b_{59} + b_{60}$
b_6	b_{42}	$b_{61} + b_{62}$
b_6	b_{43}	$b_{61} + b_{63}$
b_6	b_{44}	$2b_{61} + 2b_{62} + 2b_{63}$

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Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_6	b_{45}	$5b_{61} + 2b_{62} + 3b_{63}$
b_6	b_{46}	$5b_{61} + 3b_{62} + 2b_{63}$
b_6	b_{47}	$b_{64} + 3b_{65} + b_{66}$
b_6	b_{48}	$b_{64} + 2b_{65}$
b_6	b_{49}	$2b_{65} + b_{66}$
b_6	b_{50}	$b_{64} + 3b_{65} + b_{66}$
b_6	b_{51}	$b_{64} + 5b_{65} + b_{66}$
b_6	b_{52}	$b_{67} + b_{68}$
b_6	b_{53}	$b_{67} + b_{68}$
b_6	b_{54}	$2b_{67} + b_{68}$
b_6	b_{55}	$3b_{67} + 3b_{68}$
b_6	b_{56}	$b_{67} + 2b_{68}$
b_6	b_{57}	$2b_{69}$
b_6	b_{58}	b_{69}
b_6	b_{59}	$2b_{69}$
b_6	b_{60}	$2b_{69}$
b_6	b_{61}	b_{70}
b_6	b_{62}	b_{70}
b_6	b_{63}	b_{70}
b_7	b_7	b_{21}
b_7	b_8	$b_{25} + b_{26}$
b_7	b_9	$b_{25} + b_{27}$
b_7	b_{10}	$b_{25} + b_{26} + b_{27} + b_{29}$
b_7	b_{11}	b_{31}
b_7	b_{12}	$b_{30} + b_{31} + b_{33}$
b_7	b_{13}	$b_{31} + b_{32}$
b_7	b_{14}	$b_{30} + b_{31} + b_{34}$
b_7	b_{37}	b_{57}
b_7	b_{38}	b_{59}
b_7	b_{39}	b_{58}
b_7	b_{40}	$b_{57} + b_{58} + b_{59} + b_{60}$
b_7	b_{41}	$b_{57} + b_{59}$
b_7	b_{42}	b_{61}
b_7	b_{44}	$b_{61} + b_{62}$
b_7	b_{45}	$b_{61} + b_{63}$
b_7	b_{46}	$b_{61} + b_{62} + b_{63}$
b_7	b_{47}	b_{65}
b_7	b_{48}	b_{65}

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Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_7	b_{50}	$b_{64} + b_{65}$
b_7	b_{51}	$b_{65} + b_{66}$
b_7	b_{52}	b_{67}
b_7	b_{54}	b_{68}
b_7	b_{55}	$b_{67} + b_{68}$
b_7	b_{57}	b_{69}
b_7	b_{60}	b_{69}
b_7	b_{62}	b_{70}
b_8	b_8	$2b_{31} + b_{33} + b_{34}$
b_8	b_9	$b_{30} + 2b_{31} + b_{33}$
b_8	b_{10}	$b_{30} + 3b_{31} + 2b_{33} + b_{34} + b_{35}$
b_8	b_{36}	b_{61}
b_8	b_{37}	$b_{61} + b_{63}$
b_8	b_{38}	$2b_{61} + b_{62} + b_{63}$
b_8	b_{40}	$3b_{61} + 2b_{62} + 2b_{63}$
b_8	b_{41}	$b_{61} + b_{62}$
b_8	b_{43}	b_{65}
b_8	b_{44}	$2b_{65} + b_{66}$
b_8	b_{45}	$b_{64} + 3b_{65} + b_{66}$
b_8	b_{46}	$b_{64} + 2b_{65}$
b_8	b_{47}	$b_{67} + 2b_{68}$
b_8	b_{49}	$b_{67} + b_{68}$
b_8	b_{50}	$b_{67} + b_{68}$
b_8	b_{51}	$2b_{67} + b_{68}$
b_8	b_{53}	b_{69}
b_8	b_{55}	$2b_{69}$
b_8	b_{56}	b_{69}
b_8	b_{59}	b_{70}
b_8	b_{60}	b_{70}
b_9	b_9	$b_{30} + 2b_{31} + b_{34}$
b_9	b_{10}	$2b_{30} + 3b_{31} + b_{32} + b_{33} + b_{34}$
b_9	b_{37}	$b_{61} + b_{62}$
b_9	b_{38}	$b_{61} + b_{63}$
b_9	b_{39}	b_{61}
b_9	b_{40}	$3b_{61} + 2b_{62} + 2b_{63}$
b_9	b_{41}	$2b_{61} + b_{62} + b_{63}$
b_9	b_{42}	b_{65}
b_9	b_{44}	$b_{64} + 2b_{65}$

continued on next page...

Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_9	b_{45}	$2b_{65} + b_{66}$
b_9	b_{46}	$b_{64} + 3b_{65} + b_{66}$
b_9	b_{47}	$b_{67} + b_{68}$
b_9	b_{48}	$b_{67} + b_{68}$
b_9	b_{50}	$2b_{67} + b_{68}$
b_9	b_{51}	$b_{67} + 2b_{68}$
b_9	b_{52}	b_{69}
b_9	b_{54}	b_{69}
b_9	b_{55}	$2b_{69}$
b_9	b_{57}	b_{70}
b_9	b_{60}	b_{70}
b_{10}	b_{10}	$3b_{30} + 6b_{31} + 3b_{33}$
b_{10}	b_{36}	b_{63}
b_{10}	b_{37}	$b_{62} + b_{63}$
b_{10}	b_{38}	$3b_{61} + b_{62} + 2b_{63}$
b_{10}	b_{39}	b_{62}
b_{10}	b_{40}	$6b_{61} + 3b_{62} + 3b_{63}$
b_{10}	b_{41}	$3b_{61} + 2b_{62} + b_{63}$
b_{10}	b_{42}	$b_{64} + b_{65}$
b_{10}	b_{43}	$b_{65} + b_{66}$
b_{10}	b_{44}	$b_{64} + 2b_{65} + b_{66}$
b_{10}	b_{45}	$b_{64} + 5b_{65} + b_{66}$
b_{10}	b_{46}	$b_{64} + 5b_{65} + b_{66}$
b_{10}	b_{47}	$2b_{67} + b_{68}$
b_{10}	b_{48}	$2b_{67} + b_{68}$
b_{10}	b_{49}	$b_{67} + 2b_{68}$
b_{10}	b_{50}	$b_{67} + 2b_{68}$
b_{10}	b_{51}	$3b_{67} + 3b_{68}$
b_{10}	b_{52}	b_{69}
b_{10}	b_{53}	b_{69}
b_{10}	b_{54}	$2b_{69}$
b_{10}	b_{55}	$2b_{69}$
b_{10}	b_{56}	$2b_{69}$
b_{10}	b_{57}	b_{70}
b_{10}	b_{58}	b_{70}
b_{10}	b_{59}	b_{70}
b_{11}	b_{37}	b_{65}
b_{11}	b_{38}	b_{65}
continued on next page...		

Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{11}	b_{40}	$b_{64} + 2b_{65} + b_{66}$
b_{11}	b_{41}	b_{65}
b_{11}	b_{44}	$b_{67} + b_{68}$
b_{11}	b_{45}	$b_{67} + b_{68}$
b_{11}	b_{46}	$b_{67} + b_{68}$
b_{11}	b_{47}	b_{69}
b_{11}	b_{50}	b_{69}
b_{11}	b_{51}	b_{69}
b_{11}	b_{55}	b_{70}
b_{12}	b_{36}	b_{65}
b_{12}	b_{37}	$b_{65} + b_{66}$
b_{12}	b_{38}	$b_{64} + 3b_{65} + b_{66}$
b_{12}	b_{40}	$b_{64} + 5b_{65} + b_{66}$
b_{12}	b_{41}	$b_{64} + b_{65}$
b_{12}	b_{43}	$b_{67} + b_{68}$
b_{12}	b_{44}	$b_{67} + 2b_{68}$
b_{12}	b_{45}	$3b_{67} + 3b_{68}$
b_{12}	b_{46}	$2b_{67} + b_{68}$
b_{12}	b_{47}	$2b_{69}$
b_{12}	b_{49}	$2b_{69}$
b_{12}	b_{50}	b_{69}
b_{12}	b_{51}	$2b_{69}$
b_{12}	b_{53}	b_{70}
b_{12}	b_{55}	b_{70}
b_{12}	b_{56}	b_{70}
b_{13}	b_{36}	b_{66}
b_{13}	b_{38}	$2b_{65}$
b_{13}	b_{39}	b_{64}
b_{13}	b_{40}	$b_{64} + 2b_{65} + b_{66}$
b_{13}	b_{41}	$2b_{65}$
b_{13}	b_{42}	b_{67}
b_{13}	b_{43}	b_{68}
b_{13}	b_{45}	$2b_{67} + b_{68}$
b_{13}	b_{46}	$b_{67} + 2b_{68}$
b_{13}	b_{48}	b_{69}
b_{13}	b_{49}	b_{69}
b_{13}	b_{51}	$2b_{69}$
b_{13}	b_{54}	b_{70}

continued on next page...

Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{13}	b_{56}	b_{70}
b_{14}	b_{37}	$b_{64} + b_{65}$
b_{14}	b_{38}	$b_{65} + b_{66}$
b_{14}	b_{39}	b_{65}
b_{14}	b_{40}	$b_{64} + 5b_{65} + b_{66}$
b_{14}	b_{41}	$b_{64} + 3b_{65} + b_{66}$
b_{14}	b_{42}	$b_{67} + b_{68}$
b_{14}	b_{44}	$2b_{67} + b_{68}$
b_{14}	b_{45}	$b_{67} + 2b_{68}$
b_{14}	b_{46}	$3b_{67} + 3b_{68}$
b_{14}	b_{47}	b_{69}
b_{14}	b_{48}	$2b_{69}$
b_{14}	b_{50}	$2b_{69}$
b_{14}	b_{51}	$2b_{69}$
b_{14}	b_{52}	b_{70}
b_{14}	b_{54}	b_{70}
b_{14}	b_{55}	b_{70}
b_{15}	b_{36}	b_{68}
b_{15}	b_{38}	$2b_{67} + b_{68}$
b_{15}	b_{40}	$b_{67} + 2b_{68}$
b_{15}	b_{41}	b_{67}
b_{15}	b_{43}	b_{69}
b_{15}	b_{45}	$2b_{69}$
b_{15}	b_{46}	b_{69}
b_{15}	b_{49}	b_{70}
b_{15}	b_{51}	b_{70}
b_{16}	b_{37}	$b_{67} + b_{68}$
b_{16}	b_{38}	$b_{67} + b_{68}$
b_{16}	b_{40}	$3b_{67} + 3b_{68}$
b_{16}	b_{41}	$b_{67} + b_{68}$
b_{16}	b_{44}	$2b_{69}$
b_{16}	b_{45}	$2b_{69}$
b_{16}	b_{46}	$2b_{69}$
b_{16}	b_{47}	b_{70}
b_{16}	b_{50}	b_{70}
b_{16}	b_{51}	b_{70}
b_{17}	b_{38}	b_{68}
b_{17}	b_{39}	b_{67}

continued on next page...

Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{17}	b_{40}	$2b_{67} + b_{68}$
b_{17}	b_{41}	$b_{67} + 2b_{68}$
b_{17}	b_{42}	b_{69}
b_{17}	b_{45}	b_{69}
b_{17}	b_{46}	$2b_{69}$
b_{17}	b_{48}	b_{70}
b_{17}	b_{51}	b_{70}
b_{18}	b_{36}	b_{67}
b_{18}	b_{37}	b_{68}
b_{18}	b_{38}	$b_{67} + 2b_{68}$
b_{18}	b_{40}	$2b_{67} + b_{68}$
b_{18}	b_{43}	b_{69}
b_{18}	b_{44}	b_{69}
b_{18}	b_{45}	$2b_{69}$
b_{18}	b_{47}	b_{70}
b_{18}	b_{49}	b_{70}
b_{19}	b_{37}	b_{67}
b_{19}	b_{39}	b_{68}
b_{19}	b_{40}	$b_{67} + 2b_{68}$
b_{19}	b_{41}	$2b_{67} + b_{68}$
b_{19}	b_{42}	b_{69}
b_{19}	b_{44}	b_{69}
b_{19}	b_{46}	$2b_{69}$
b_{19}	b_{48}	b_{70}
b_{19}	b_{50}	b_{70}
b_{20}	b_{38}	b_{69}
b_{20}	b_{40}	$2b_{69}$
b_{20}	b_{41}	b_{69}
b_{20}	b_{45}	b_{70}
b_{20}	b_{46}	b_{70}
b_{21}	b_{37}	b_{69}
b_{21}	b_{40}	$2b_{69}$
b_{21}	b_{41}	b_{69}
b_{21}	b_{44}	b_{70}
b_{21}	b_{46}	b_{70}
b_{22}	b_{36}	b_{69}
b_{22}	b_{38}	$2b_{69}$
b_{22}	b_{40}	b_{69}

continued on next page...

Table 31. Multiplication table for E_6/P_2 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{22}	b_{43}	b_{70}
b_{22}	b_{45}	b_{70}
b_{23}	b_{39}	b_{69}
b_{23}	b_{40}	b_{69}
b_{23}	b_{41}	$2b_{69}$
b_{23}	b_{42}	b_{70}
b_{23}	b_{46}	b_{70}
b_{24}	b_{37}	b_{69}
b_{24}	b_{38}	b_{69}
b_{24}	b_{40}	$2b_{69}$
b_{24}	b_{44}	b_{70}
b_{24}	b_{45}	b_{70}
b_{25}	b_{40}	b_{70}
b_{25}	b_{41}	b_{70}
b_{26}	b_{38}	b_{70}
b_{26}	b_{40}	b_{70}
b_{27}	b_{37}	b_{70}
b_{27}	b_{40}	b_{70}
b_{28}	b_{36}	b_{70}
b_{28}	b_{38}	b_{70}
b_{29}	b_{39}	b_{70}
b_{29}	b_{41}	b_{70}

Table 32. Schubert classes for E_6/P_3

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_{215}	$(1,1,1,1,1,1)$
3	b_1	1	0	b_{214}	$(2,1,-1,2,1,1)$
13	b_2	2	0	b_{213}	$(-2,1,1,2,1,1)$
43	b_3	2	0	b_{212}	$(2,3,1,-2,3,1)$
143	b_4	3	0	b_{211}	$(-2,3,3,-2,3,1)$
243	b_5	3	0	b_{210}	$(2,-3,1,1,3,1)$
543	b_6	3	0	b_{209}	$(2,3,1,1,-3,4)$
1243	b_7	4	0	b_{208}	$(-2,-3,3,1,3,1)$
1543	b_8	4	0	b_{207}	$(-2,3,3,1,-3,4)$
2543	b_9	4	0	b_{206}	$(2,-3,1,4,-3,4)$
3143	b_{10}	4	0	b_{205}	$(1,3,-3,1,3,1)$
6543	b_{11}	4	0	b_{204}	$(2,3,1,1,1,-4)$
continued on next page...					

TABLE 32. Schubert classes for E_6/P_3 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
12543	b_{12}	5	0	b_{203}	$(-2,-3,3,4,-3,4)$
16543	b_{13}	5	0	b_{202}	$(-2,3,3,1,1,-4)$
23143	b_{14}	5	0	b_{201}	$(1,-3,-3,4,3,1)$
26543	b_{15}	5	0	b_{200}	$(2,-3,1,4,1,-4)$
31543	b_{16}	5	0	b_{199}	$(1,3,-3,4,-3,4)$
42543	b_{17}	5	0	b_{198}	$(2,1,5,-4,1,4)$
126543	b_{18}	6	0	b_{197}	$(-2,-3,3,4,1,-4)$
142543	b_{19}	6	0	b_{196}	$(-2,1,7,-4,1,4)$
231543	b_{20}	6	0	b_{195}	$(1,-3,-3,7,-3,4)$
316543	b_{21}	6	0	b_{194}	$(1,3,-3,4,1,-4)$
342543	b_{22}	6	0	b_{193}	$(7,1,-5,1,1,4)$
423143	b_{23}	6	0	b_{192}	$(1,1,1,-4,7,1)$
426543	b_{24}	6	0	b_{191}	$(2,1,5,-4,5,-4)$
431543	b_{25}	6	0	b_{190}	$(1,7,1,-4,1,4)$
1342543	b_{26}	7	1	b_{189}	$(-7,1,2,1,1,4)$
1426543	b_{27}	7	0	b_{188}	$(-2,1,7,-4,5,-4)$
2316543	b_{28}	7	0	b_{187}	$(1,-3,-3,7,1,-4)$
2431543	b_{29}	7	1	b_{186}	$(1,-7,1,3,1,4)$
3142543	b_{30}	7	1	b_{185}	$(5,1,-7,3,1,4)$
3426543	b_{31}	7	0	b_{184}	$(7,1,-5,1,5,-4)$
4231543	b_{32}	7	1	b_{183}	$(1,4,4,-7,4,4)$
4316543	b_{33}	7	0	b_{182}	$(1,7,1,-4,5,-4)$
5423143	b_{34}	7	1	b_{181}	$(1,1,1,3,-7,8)$
5426543	b_{35}	7	0	b_{180}	$(2,1,5,1,-5,1)$
13142543	b_{36}	8	1	b_{179}	$(-5,1,-2,3,1,4)$
13426543	b_{37}	8	1	b_{178}	$(-7,1,2,1,5,-4)$
15426543	b_{38}	8	0	b_{177}	$(-2,1,7,1,-5,1)$
24231543	b_{39}	8	1	b_{176}	$(1,-4,4,-3,4,4)$
24316543	b_{40}	8	1	b_{175}	$(1,-7,1,3,5,-4)$
31426543	b_{41}	8	1	b_{174}	$(5,1,-7,3,5,-4)$
34231543	b_{42}	8	1	b_{173}	$(5,4,-4,-3,4,4)$
35426543	b_{43}	8	0	b_{172}	$(7,1,-5,6,-5,1)$
42316543	b_{44}	8	1	b_{171}	$(1,4,4,-7,8,-4)$
45423143	b_{45}	8	1	b_{170}	$(1,4,4,-3,-4,8)$
54316543	b_{46}	8	0	b_{169}	$(1,7,1,1,-5,1)$
65423143	b_{47}	8	2	b_{168}	$(1,1,1,3,1,-8)$
131426543	b_{48}	9	1	b_{167}	$(-5,1,-2,3,5,-4)$
134231543	b_{49}	9	1	b_{166}	$(-5,4,1,-3,4,4)$

continued on next page...

Table 32. Schubert classes for E_6/P_3 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
135426543	b_{50}	9	1	b_{165}	$(-7,1,2,6,-5,1)$
234231543	b_{51}	9	1	b_{164}	$(5,-4,-4,1,4,4)$
242316543	b_{52}	9	1	b_{163}	$(1,-4,4,-3,8,-4)$
245423143	b_{53}	9	1	b_{162}	$(1,-4,4,1,-4,8)$
254316543	b_{54}	9	1	b_{161}	$(1,-7,1,8,-5,1)$
315426543	b_{55}	9	1	b_{160}	$(5,1,-7,8,-5,1)$
342316543	b_{56}	9	1	b_{159}	$(5,4,-4,-3,8,-4)$
345423143	b_{57}	9	1	b_{158}	$(5,4,-4,1,-4,8)$
435426543	b_{58}	9	0	b_{157}	$(7,7,1,-6,1,1)$
465423143	b_{59}	9	2	b_{156}	$(1,4,4,-3,4,-8)$
542316543	b_{60}	9	2	b_{155}	$(1,4,4,1,-8,4)$
1234231543	b_{61}	10	1	b_{154}	$(-5,-4,1,1,4,4)$
1315426543	b_{62}	10	1	b_{153}	$(-5,1,-2,8,-5,1)$
1342316543	b_{63}	10	1	b_{152}	$(-5,4,1,-3,8,-4)$
1345423143	b_{64}	10	1	b_{151}	$(-5,4,1,1,-4,8)$
1435426543	b_{65}	10	1	b_{150}	$(-7,7,8,-6,1,1)$
2342316543	b_{66}	10	1	b_{149}	$(5,-4,-4,1,8,-4)$
2345423143	b_{67}	10	1	b_{148}	$(5,-4,-4,5,-4,8)$
2435426543	b_{68}	10	0	b_{147}	$(7,-7,1,1,1,1)$
2465423143	b_{69}	10	2	b_{146}	$(1,-4,4,1,4,-8)$
2542316543	b_{70}	10	2	b_{145}	$(1,-4,4,5,-8,4)$
3465423143	b_{71}	10	2	b_{144}	$(5,4,-4,1,4,-8)$
3542316543	b_{72}	10	2	b_{143}	$(5,4,-4,5,-8,4)$
4254316543	b_{73}	10	2	b_{142}	$(1,1,9,-8,3,1)$
4315426543	b_{74}	10	2	b_{141}	$(5,9,1,-8,3,1)$
5465423143	b_{75}	10	2	b_{140}	$(1,4,4,1,-4,-4)$
12342316543	b_{76}	11	1	b_{139}	$(-5,-4,1,1,8,-4)$
12345423143	b_{77}	11	1	b_{138}	$(-5,-4,1,5,-4,8)$
12435426543	b_{78}	11	1	b_{137}	$(-7,-7,8,1,1,1)$
13465423143	b_{79}	11	2	b_{136}	$(-5,4,1,1,4,-8)$
13542316543	b_{80}	11	2	b_{135}	$(-5,4,1,5,-8,4)$
14315426543	b_{81}	11	2	b_{134}	$(-5,9,6,-8,3,1)$
23465423143	b_{82}	11	2	b_{133}	$(5,-4,-4,5,4,-8)$
23542316543	b_{83}	11	2	b_{132}	$(5,-4,-4,9,-8,4)$
24315426543	b_{84}	11	3	b_{131}	$(5,-9,1,1,3,1)$
25465423143	b_{85}	11	2	b_{130}	$(1,-4,4,5,-4,-4)$
31435426543	b_{86}	11	2	b_{129}	$(1,7,-8,2,1,1)$
34254316543	b_{87}	11	3	b_{128}	$(10,1,-9,1,3,1)$
continued on next page...					

TABLE 32. Schubert classes for E_6/P_3 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
35465423143	b_{88}	11	2	b_{127}	$(5,4,-4,5,-4,-4)$
42345423143	b_{89}	11	1	b_{126}	$(5,1,1,-5,1,8)$
42542316543	b_{90}	11	2	b_{125}	$(1,1,9,-5,-3,4)$
43542316543	b_{91}	11	2	b_{124}	$(5,9,1,-5,-3,4)$
123465423143	b_{92}	12	2	b_{123}	$(-5,-4,1,5,4,-8)$
123542316543	b_{93}	12	2	b_{122}	$(-5,-4,1,9,-8,4)$
124315426543	b_{94}	12	3	b_{121}	$(-5,-9,6,1,3,1)$
134254316543	b_{95}	12	4	b_{120}	$(-10,1,1,1,3,1)$
135465423143	b_{96}	12	2	b_{119}	$(-5,4,1,5,-4,-4)$
142345423143	b_{97}	12	1	b_{118}	$(-5,1,6,-5,1,8)$
143542316543	b_{98}	12	2	b_{117}	$(-5,9,6,-5,-3,4)$
231435426543	b_{99}	12	2	b_{116}	$(1,-7,-8,9,1,1)$
235465423143	b_{100}	12	2	b_{115}	$(5,-4,-4,9,-4,-4)$
243542316543	b_{101}	12	3	b_{114}	$(5,-9,1,4,-3,4)$
314315426543	b_{102}	12	2	b_{113}	$(1,9,-6,-2,3,1)$
342542316543	b_{103}	12	3	b_{112}	$(10,1,-9,4,-3,4)$
423465423143	b_{104}	12	2	b_{111}	$(5,1,1,-5,9,-8)$
423542316543	b_{105}	12	3	b_{110}	$(5,5,5,-9,1,4)$
425465423143	b_{106}	12	2	b_{109}	$(1,1,9,-5,1,-4)$
435465423143	b_{107}	12	2	b_{108}	$(5,9,1,-5,1,-4)$
2435465423143	b_{108}	13	3	b_{107}	$(5,-9,1,4,1,-4)$
5423465423143	b_{109}	13	3	b_{106}	$(5,1,1,4,-9,1)$
1235465423143	b_{110}	13	2	b_{105}	$(-5,-4,1,9,-4,-4)$
3425465423143	b_{111}	13	3	b_{104}	$(10,1,-9,4,1,-4)$
1423465423143	b_{112}	13	2	b_{103}	$(-5,1,6,-5,9,-8)$
2314315426543	b_{113}	13	3	b_{102}	$(1,-9,-6,7,3,1)$
1435465423143	b_{114}	13	2	b_{101}	$(-5,9,6,-5,1,-4)$
4235465423143	b_{115}	13	3	b_{100}	$(5,5,5,-9,5,-4)$
4231435426543	b_{116}	13	3	b_{99}	$(1,2,1,-9,10,1)$
1243542316543	b_{117}	13	3	b_{98}	$(-5,-9,6,4,-3,4)$
1342542316543	b_{118}	13	4	b_{97}	$(-10,1,1,4,-3,4)$
2423542316543	b_{119}	13	3	b_{96}	$(5,-5,5,-4,1,4)$
3142345423143	b_{120}	13	1	b_{95}	$(1,1,-6,1,1,8)$
3143542316543	b_{121}	13	2	b_{94}	$(1,9,-6,1,-3,4)$
1423542316543	b_{122}	13	3	b_{93}	$(-5,5,10,-9,1,4)$
3423542316543	b_{123}	13	3	b_{92}	$(10,5,-5,-4,1,4)$
12435465423143	b_{124}	14	3	b_{91}	$(-5,-9,6,4,1,-4)$
15423465423143	b_{125}	14	3	b_{90}	$(-5,1,6,4,-9,1)$

continued on next page...

Table 32. Schubert classes for E_6/P_3 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
13425465423143	b_{126}	14	4	b_{89}	$(-10, 1, 1, 4, 1, -4)$
24235465423143	b_{127}	14	3	b_{88}	$(5, -5, 5, -4, 5, -4)$
31423465423143	b_{128}	14	2	b_{87}	$(1, 1, -6, 1, 9, -8)$
24231435426543	b_{129}	14	3	b_{86}	$(1, -2, 1, -7, 10, 1)$
45423465423143	b_{130}	14	3	b_{85}	$(5, 5, 5, -4, -5, 1)$
31435465423143	b_{131}	14	2	b_{84}	$(1, 9, -6, 1, 1, -4)$
14235465423143	b_{132}	14	3	b_{83}	$(-5, 5, 10, -9, 5, -4)$
34235465423143	b_{133}	14	3	b_{82}	$(10, 5, -5, -4, 5, -4)$
23143542316543	b_{134}	14	3	b_{81}	$(1, -9, -6, 10, -3, 4)$
12423542316543	b_{135}	14	3	b_{80}	$(-5, -5, 10, -4, 1, 4)$
23423542316543	b_{136}	14	3	b_{79}	$(10, -5, -5, 1, 1, 4)$
54231435426543	b_{137}	14	4	b_{78}	$(1, 2, 1, 1, -10, 11)$
13423542316543	b_{138}	14	4	b_{77}	$(-10, 5, 5, -4, 1, 4)$
31423542316543	b_{139}	14	4	b_{76}	$(5, 5, -10, 1, 1, 4)$
245423465423143	b_{140}	15	3	b_{75}	$(5, -5, 5, 1, -5, 1)$
231435465423143	b_{141}	15	3	b_{74}	$(1, -9, -6, 10, 1, -4)$
315423465423143	b_{142}	15	3	b_{73}	$(1, 1, -6, 10, -9, 1)$
124235465423143	b_{143}	15	3	b_{72}	$(-5, -5, 10, -4, 5, -4)$
234235465423143	b_{144}	15	3	b_{71}	$(10, -5, -5, 1, 5, -4)$
145423465423143	b_{145}	15	3	b_{70}	$(-5, 5, 10, -4, -5, 1)$
345423465423143	b_{146}	15	3	b_{69}	$(10, 5, -5, 1, -5, 1)$
654231435426543	b_{147}	15	5	b_{68}	$(1, 2, 1, 1, 1, -11)$
134235465423143	b_{148}	15	4	b_{67}	$(-10, 5, 5, -4, 5, -4)$
314235465423143	b_{149}	15	4	b_{66}	$(5, 5, -10, 1, 5, -4)$
254231435426543	b_{150}	15	4	b_{65}	$(1, -2, 1, 3, -10, 11)$
123423542316543	b_{151}	15	4	b_{64}	$(-10, -5, 5, 1, 1, 4)$
231423542316543	b_{152}	15	4	b_{63}	$(5, -5, -10, 6, 1, 4)$
423143542316543	b_{153}	15	4	b_{62}	$(1, 1, 4, -10, 7, 4)$
131423542316543	b_{154}	15	4	b_{61}	$(-5, 5, -5, 1, 1, 4)$
1245423465423143	b_{155}	16	3	b_{60}	$(-5, -5, 10, 1, -5, 1)$
2345423465423143	b_{156}	16	3	b_{59}	$(10, -5, -5, 6, -5, 1)$
2654231435426543	b_{157}	16	5	b_{58}	$(1, -2, 1, 3, 1, -11)$
1234235465423143	b_{158}	16	4	b_{57}	$(-10, -5, 5, 1, 5, -4)$
2314235465423143	b_{159}	16	4	b_{56}	$(5, -5, -10, 6, 5, -4)$
4231435465423143	b_{160}	16	4	b_{55}	$(1, 1, 4, -10, 11, -4)$
4315423465423143	b_{161}	16	4	b_{54}	$(1, 11, 4, -10, 1, 1)$
1345423465423143	b_{162}	16	4	b_{53}	$(-10, 5, 5, 1, -5, 1)$
3145423465423143	b_{163}	16	4	b_{52}	$(5, 5, -10, 6, -5, 1)$

continued on next page...

TABLE 32. Schubert classes for E_6/P_3 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
1314235465423143	b_{164}	16	4	b_{51}	$(-5,5,-5,1,5,-4)$
4254231435426543	b_{165}	16	4	b_{50}	$(1,1,4,-3,-7,11)$
1231423542316543	b_{166}	16	4	b_{49}	$(-5,-5,-5,6,1,4)$
3423143542316543	b_{167}	16	4	b_{48}	$(5,1,-4,-6,7,4)$
42345423465423143	b_{168}	17	3	b_{47}	$(10,1,1,-6,1,1)$
24315423465423143	b_{169}	17	5	b_{46}	$(1,-11,4,1,1,1)$
12345423465423143	b_{170}	17	4	b_{45}	$(-10,-5,5,6,-5,1)$
23145423465423143	b_{171}	17	4	b_{44}	$(5,-5,-10,11,-5,1)$
42654231435426543	b_{172}	17	5	b_{43}	$(1,1,4,-3,4,-11)$
12314235465423143	b_{173}	17	4	b_{42}	$(-5,-5,-5,6,5,-4)$
34231435465423143	b_{174}	17	4	b_{41}	$(5,1,-4,-6,11,-4)$
34315423465423143	b_{175}	17	4	b_{40}	$(5,11,-4,-6,1,1)$
13145423465423143	b_{176}	17	4	b_{39}	$(-5,5,-5,6,-5,1)$
54231435465423143	b_{177}	17	5	b_{38}	$(1,1,4,1,-11,7)$
34254231435426543	b_{178}	17	4	b_{37}	$(5,1,-4,1,-7,11)$
13423143542316543	b_{179}	17	4	b_{36}	$(-5,1,1,-6,7,4)$
542654231435426543	b_{180}	18	5	b_{35}	$(1,1,4,1,-4,-7)$
142345423465423143	b_{181}	18	4	b_{34}	$(-10,1,11,-6,1,1)$
234315423465423143	b_{182}	18	5	b_{33}	$(5,-11,-4,5,1,1)$
123145423465423143	b_{183}	18	4	b_{32}	$(-5,-5,-5,11,-5,1)$
342654231435426543	b_{184}	18	5	b_{31}	$(5,1,-4,1,4,-11)$
134231435465423143	b_{185}	18	4	b_{30}	$(-5,1,1,-6,11,-4)$
134315423465423143	b_{186}	18	4	b_{29}	$(-5,11,1,-6,1,1)$
423145423465423143	b_{187}	18	5	b_{28}	$(5,6,1,-11,6,1)$
354231435465423143	b_{188}	18	5	b_{27}	$(5,1,-4,5,-11,7)$
134254231435426543	b_{189}	18	4	b_{26}	$(-5,1,1,1,-7,11)$
1234315423465423143	b_{190}	19	5	b_{25}	$(-5,-11,1,5,1,1)$
3542654231435426543	b_{191}	19	5	b_{24}	$(5,1,-4,5,-4,-7)$
3142345423465423143	b_{192}	19	5	b_{23}	$(1,1,-11,5,1,1)$
1342654231435426543	b_{193}	19	5	b_{22}	$(-5,1,1,1,4,-11)$
2423145423465423143	b_{194}	19	5	b_{21}	$(5,-6,1,-5,6,1)$
1423145423465423143	b_{195}	19	5	b_{20}	$(-5,6,6,-11,6,1)$
1354231435465423143	b_{196}	19	5	b_{19}	$(-5,1,1,5,-11,7)$
4354231435465423143	b_{197}	19	5	b_{18}	$(5,6,1,-5,-6,7)$
13542654231435426543	b_{198}	20	5	b_{17}	$(-5,1,1,5,-4,-7)$
12423145423465423143	b_{199}	20	5	b_{16}	$(-5,-6,6,-5,6,1)$
43542654231435426543	b_{200}	20	5	b_{15}	$(5,6,1,-5,1,-7)$
31423145423465423143	b_{201}	20	5	b_{14}	$(1,6,-6,-5,6,1)$

continued on next page...

Table 32. Schubert classes for E_6/P_3 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
24354231435465423143	b_{202}	20	5	b_{13}	$(5,-6,1,1,-6,7)$
14354231435465423143	b_{203}	20	5	b_{12}	$(-5,6,6,-5,-6,7)$
243542654231435426543	b_{204}	21	5	b_{11}	$(5,-6,1,1,1,-7)$
231423145423465423143	b_{205}	21	5	b_{10}	$(1,-6,-6,1,6,1)$
143542654231435426543	b_{206}	21	5	b_9	$(-5,6,6,-5,1,-7)$
124354231435465423143	b_{207}	21	5	b_8	$(-5,-6,6,1,-6,7)$
314354231435465423143	b_{208}	21	5	b_7	$(1,6,-6,1,-6,7)$
1243542654231435426543	b_{209}	22	5	b_6	$(-5,-6,6,1,1,-7)$
3143542654231435426543	b_{210}	22	5	b_5	$(1,6,-6,1,1,-7)$
2314354231435465423143	b_{211}	22	5	b_4	$(1,-6,-6,7,-6,7)$
23143542654231435426543	b_{212}	23	5	b_3	$(1,-6,-6,7,1,-7)$
42314354231435465423143	b_{213}	23	5	b_2	$(1,1,1,-7,1,7)$
423143542654231435426543	b_{214}	24	5	b_1	$(1,1,1,-7,8,-7)$
5423143542654231435426543	b_{215}	25	5	b_0	$(1,1,1,1,-8,1)$

Table 33. Multiplication table for E_6/P_3

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	$b_2 + b_3$
b_1	b_2	b_4
b_1	b_3	$b_4 + b_5 + b_6$
b_1	b_4	$b_7 + b_8 + b_{10}$
b_1	b_5	$b_7 + b_9$
b_1	b_6	$b_8 + b_9 + b_{11}$
b_1	b_7	$b_{12} + b_{14}$
b_1	b_8	$b_{12} + b_{13} + b_{16}$
b_1	b_9	$b_{12} + b_{15} + b_{17}$
b_1	b_{10}	$b_{14} + b_{16}$
b_1	b_{11}	$b_{13} + b_{15}$
b_1	b_{12}	$b_{18} + b_{19} + b_{20}$
b_1	b_{13}	$b_{18} + b_{21}$
b_1	b_{14}	$b_{20} + b_{23}$
b_1	b_{15}	$b_{18} + b_{24}$
b_1	b_{16}	$b_{20} + b_{21} + b_{25}$
b_1	b_{17}	$b_{19} + b_{22} + b_{24}$
b_1	b_{18}	$b_{27} + b_{28}$
b_1	b_{19}	b_{27}
b_1	b_{20}	b_{28}
continued on next page...		

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{21}	$b_{28} + b_{33}$
b_1	b_{22}	b_{31}
b_1	b_{24}	$b_{27} + b_{31} + b_{35}$
b_1	b_{25}	b_{33}
b_1	b_{26}	$b_{36} + b_{37}$
b_1	b_{27}	b_{38}
b_1	b_{29}	$b_{39} + b_{40}$
b_1	b_{30}	$b_{36} + b_{41} + b_{42}$
b_1	b_{31}	b_{43}
b_1	b_{32}	$b_{39} + b_{42} + b_{44} + b_{45}$
b_1	b_{33}	b_{46}
b_1	b_{34}	b_{45}
b_1	b_{35}	$b_{38} + b_{43}$
b_1	b_{36}	$b_{48} + b_{49}$
b_1	b_{37}	$b_{48} + b_{50}$
b_1	b_{39}	$b_{51} + b_{52} + b_{53}$
b_1	b_{40}	$b_{52} + b_{54}$
b_1	b_{41}	$b_{48} + b_{55} + b_{56}$
b_1	b_{42}	$b_{49} + b_{51} + b_{56} + b_{57}$
b_1	b_{43}	b_{58}
b_1	b_{44}	$b_{52} + b_{56}$
b_1	b_{45}	$b_{53} + b_{57}$
b_1	b_{47}	b_{59}
b_1	b_{48}	$b_{62} + b_{63}$
b_1	b_{49}	$b_{61} + b_{63} + b_{64}$
b_1	b_{50}	$b_{62} + b_{65}$
b_1	b_{51}	$b_{61} + b_{66} + b_{67}$
b_1	b_{52}	b_{66}
b_1	b_{53}	b_{67}
b_1	b_{55}	b_{62}
b_1	b_{56}	$b_{63} + b_{66}$
b_1	b_{57}	$b_{64} + b_{67}$
b_1	b_{58}	b_{68}
b_1	b_{59}	$b_{69} + b_{71} + b_{75}$
b_1	b_{60}	$b_{70} + b_{72} + b_{75}$
b_1	b_{61}	$b_{76} + b_{77}$
b_1	b_{63}	b_{76}
b_1	b_{64}	b_{77}
continued on next page...		

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{65}	b_{78}
b_1	b_{66}	b_{76}
b_1	b_{67}	$b_{77} + b_{89}$
b_1	b_{69}	$b_{82} + b_{85}$
b_1	b_{70}	$b_{83} + b_{85} + b_{90}$
b_1	b_{71}	$b_{79} + b_{82} + b_{88}$
b_1	b_{72}	$b_{80} + b_{83} + b_{88} + b_{91}$
b_1	b_{73}	b_{90}
b_1	b_{74}	$b_{81} + b_{91}$
b_1	b_{75}	$b_{85} + b_{88}$
b_1	b_{77}	b_{97}
b_1	b_{79}	$b_{92} + b_{96}$
b_1	b_{80}	$b_{93} + b_{96} + b_{98}$
b_1	b_{81}	$b_{98} + b_{102}$
b_1	b_{82}	$b_{92} + b_{100} + b_{104}$
b_1	b_{83}	$b_{93} + b_{100}$
b_1	b_{84}	$b_{94} + b_{101}$
b_1	b_{85}	$b_{100} + b_{106}$
b_1	b_{86}	$b_{99} + b_{102}$
b_1	b_{87}	b_{103}
b_1	b_{88}	$b_{96} + b_{100} + b_{107}$
b_1	b_{89}	b_{97}
b_1	b_{90}	b_{106}
b_1	b_{91}	$b_{98} + b_{107}$
b_1	b_{92}	$b_{110} + b_{112}$
b_1	b_{93}	b_{110}
b_1	b_{94}	$b_{113} + b_{117}$
b_1	b_{95}	b_{118}
b_1	b_{96}	$b_{110} + b_{114}$
b_1	b_{97}	b_{120}
b_1	b_{98}	$b_{114} + b_{121}$
b_1	b_{100}	b_{110}
b_1	b_{101}	$b_{108} + b_{117} + b_{119}$
b_1	b_{102}	b_{121}
b_1	b_{103}	$b_{111} + b_{123}$
b_1	b_{104}	b_{112}
b_1	b_{105}	$b_{115} + b_{119} + b_{122} + b_{123}$
b_1	b_{107}	b_{114}

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{108}	$b_{124} + b_{127}$
b_1	b_{109}	$b_{125} + b_{130}$
b_1	b_{111}	b_{133}
b_1	b_{112}	b_{128}
b_1	b_{113}	$b_{129} + b_{134}$
b_1	b_{114}	b_{131}
b_1	b_{115}	$b_{127} + b_{130} + b_{132} + b_{133}$
b_1	b_{116}	b_{129}
b_1	b_{117}	$b_{124} + b_{134} + b_{135}$
b_1	b_{118}	$b_{126} + b_{138}$
b_1	b_{119}	$b_{127} + b_{135} + b_{136}$
b_1	b_{121}	b_{131}
b_1	b_{122}	$b_{132} + b_{135}$
b_1	b_{123}	$b_{133} + b_{136}$
b_1	b_{124}	$b_{141} + b_{143}$
b_1	b_{125}	$b_{142} + b_{145}$
b_1	b_{126}	b_{148}
b_1	b_{127}	$b_{140} + b_{143} + b_{144}$
b_1	b_{130}	$b_{140} + b_{145} + b_{146}$
b_1	b_{132}	$b_{143} + b_{145}$
b_1	b_{133}	$b_{144} + b_{146}$
b_1	b_{134}	b_{141}
b_1	b_{135}	b_{143}
b_1	b_{136}	b_{144}
b_1	b_{137}	b_{150}
b_1	b_{138}	$b_{148} + b_{151} + b_{154}$
b_1	b_{139}	$b_{149} + b_{152} + b_{154}$
b_1	b_{140}	$b_{155} + b_{156}$
b_1	b_{143}	b_{155}
b_1	b_{144}	b_{156}
b_1	b_{145}	b_{155}
b_1	b_{146}	b_{156}
b_1	b_{147}	b_{157}
b_1	b_{148}	$b_{158} + b_{162} + b_{164}$
b_1	b_{149}	$b_{159} + b_{163} + b_{164}$
b_1	b_{150}	b_{165}
b_1	b_{151}	$b_{158} + b_{166}$
b_1	b_{152}	$b_{159} + b_{166} + b_{167}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{153}	$b_{160} + b_{165} + b_{167}$
b_1	b_{154}	$b_{164} + b_{166}$
b_1	b_{156}	b_{168}
b_1	b_{157}	b_{172}
b_1	b_{158}	$b_{170} + b_{173}$
b_1	b_{159}	$b_{171} + b_{173} + b_{174}$
b_1	b_{160}	b_{174}
b_1	b_{161}	b_{175}
b_1	b_{162}	$b_{170} + b_{176}$
b_1	b_{163}	$b_{171} + b_{175} + b_{176}$
b_1	b_{164}	$b_{173} + b_{176}$
b_1	b_{165}	b_{178}
b_1	b_{166}	$b_{173} + b_{179}$
b_1	b_{167}	$b_{174} + b_{178} + b_{179}$
b_1	b_{169}	b_{182}
b_1	b_{170}	$b_{181} + b_{183}$
b_1	b_{171}	b_{183}
b_1	b_{172}	$b_{180} + b_{184}$
b_1	b_{173}	$b_{183} + b_{185}$
b_1	b_{174}	b_{185}
b_1	b_{175}	b_{186}
b_1	b_{176}	$b_{183} + b_{186}$
b_1	b_{177}	$b_{180} + b_{188}$
b_1	b_{178}	b_{189}
b_1	b_{179}	$b_{185} + b_{189}$
b_1	b_{180}	b_{191}
b_1	b_{182}	$b_{190} + b_{194}$
b_1	b_{184}	$b_{191} + b_{193}$
b_1	b_{187}	$b_{194} + b_{195} + b_{197}$
b_1	b_{188}	$b_{191} + b_{196} + b_{197}$
b_1	b_{190}	b_{199}
b_1	b_{191}	$b_{198} + b_{200}$
b_1	b_{192}	b_{201}
b_1	b_{193}	b_{198}
b_1	b_{194}	$b_{199} + b_{202}$
b_1	b_{195}	$b_{199} + b_{201} + b_{203}$
b_1	b_{196}	$b_{198} + b_{203}$
b_1	b_{197}	$b_{200} + b_{202} + b_{203}$

continued on next page...

TABLE 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{198}	b_{206}
b_1	b_{199}	$b_{205} + b_{207}$
b_1	b_{200}	$b_{204} + b_{206}$
b_1	b_{201}	$b_{205} + b_{208}$
b_1	b_{202}	$b_{204} + b_{207}$
b_1	b_{203}	$b_{206} + b_{207} + b_{208}$
b_1	b_{204}	b_{209}
b_1	b_{205}	b_{211}
b_1	b_{206}	$b_{209} + b_{210}$
b_1	b_{207}	$b_{209} + b_{211}$
b_1	b_{208}	$b_{210} + b_{211}$
b_1	b_{209}	b_{212}
b_1	b_{210}	b_{212}
b_1	b_{211}	$b_{212} + b_{213}$
b_1	b_{212}	b_{214}
b_1	b_{213}	b_{214}
b_2	b_2	b_{10}
b_2	b_3	$b_7 + b_8$
b_2	b_4	$b_{14} + b_{16}$
b_2	b_5	b_{12}
b_2	b_6	$b_{12} + b_{13}$
b_2	b_7	b_{20}
b_2	b_8	$b_{20} + b_{21}$
b_2	b_9	$b_{18} + b_{19}$
b_2	b_{10}	$b_{23} + b_{25}$
b_2	b_{11}	b_{18}
b_2	b_{12}	b_{28}
b_2	b_{13}	b_{28}
b_2	b_{15}	b_{27}
b_2	b_{16}	b_{33}
b_2	b_{17}	b_{27}
b_2	b_{24}	b_{38}
b_2	b_{25}	b_{46}
b_2	b_{26}	b_{48}
b_2	b_{29}	$b_{53} + b_{54}$
b_2	b_{30}	$b_{49} + b_{56}$
b_2	b_{32}	$b_{51} + b_{52} + b_{57}$
b_2	b_{34}	b_{53}
continued on next page...		

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{36}	b_{63}
b_2	b_{37}	b_{62}
b_2	b_{39}	b_{67}
b_2	b_{41}	b_{63}
b_2	b_{42}	$b_{61} + b_{64} + b_{66}$
b_2	b_{44}	b_{66}
b_2	b_{45}	b_{67}
b_2	b_{47}	b_{69}
b_2	b_{49}	b_{76}
b_2	b_{51}	b_{77}
b_2	b_{53}	b_{89}
b_2	b_{56}	b_{76}
b_2	b_{57}	b_{77}
b_2	b_{59}	$b_{82} + b_{85}$
b_2	b_{60}	$b_{83} + b_{88}$
b_2	b_{67}	b_{97}
b_2	b_{69}	$b_{104} + b_{106}$
b_2	b_{70}	b_{100}
b_2	b_{71}	$b_{92} + b_{100}$
b_2	b_{72}	$b_{93} + b_{96} + b_{107}$
b_2	b_{73}	b_{106}
b_2	b_{74}	b_{98}
b_2	b_{75}	b_{100}
b_2	b_{79}	b_{110}
b_2	b_{80}	b_{114}
b_2	b_{81}	b_{121}
b_2	b_{82}	b_{112}
b_2	b_{83}	b_{110}
b_2	b_{84}	b_{117}
b_2	b_{87}	b_{111}
b_2	b_{88}	b_{110}
b_2	b_{89}	b_{120}
b_2	b_{91}	b_{114}
b_2	b_{94}	b_{134}
b_2	b_{95}	b_{126}
b_2	b_{98}	b_{131}
b_2	b_{101}	$b_{124} + b_{135}$
b_2	b_{103}	b_{133}
continued on next page...		

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{104}	b_{128}
b_2	b_{105}	$b_{127} + b_{132} + b_{136}$
b_2	b_{108}	b_{143}
b_2	b_{109}	$b_{142} + b_{146}$
b_2	b_{111}	b_{146}
b_2	b_{115}	$b_{140} + b_{144} + b_{145}$
b_2	b_{117}	b_{141}
b_2	b_{118}	b_{148}
b_2	b_{119}	b_{143}
b_2	b_{122}	b_{143}
b_2	b_{123}	b_{144}
b_2	b_{126}	b_{162}
b_2	b_{127}	b_{155}
b_2	b_{130}	b_{156}
b_2	b_{132}	b_{155}
b_2	b_{133}	b_{156}
b_2	b_{138}	$b_{158} + b_{164}$
b_2	b_{139}	$b_{159} + b_{166}$
b_2	b_{146}	b_{168}
b_2	b_{148}	$b_{170} + b_{176}$
b_2	b_{149}	$b_{171} + b_{173}$
b_2	b_{151}	b_{173}
b_2	b_{152}	$b_{174} + b_{179}$
b_2	b_{153}	b_{178}
b_2	b_{154}	b_{173}
b_2	b_{158}	b_{183}
b_2	b_{159}	b_{185}
b_2	b_{161}	b_{186}
b_2	b_{162}	$b_{181} + b_{186}$
b_2	b_{163}	b_{183}
b_2	b_{164}	b_{183}
b_2	b_{166}	b_{185}
b_2	b_{167}	b_{189}
b_2	b_{169}	b_{190}
b_2	b_{177}	b_{191}
b_2	b_{182}	b_{199}
b_2	b_{187}	$b_{202} + b_{203}$
b_2	b_{188}	$b_{198} + b_{200}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{190}	b_{205}
b_2	b_{192}	b_{205}
b_2	b_{194}	b_{207}
b_2	b_{195}	$b_{207} + b_{208}$
b_2	b_{196}	b_{206}
b_2	b_{197}	$b_{204} + b_{206}$
b_2	b_{199}	b_{211}
b_2	b_{201}	b_{211}
b_2	b_{202}	b_{209}
b_2	b_{203}	$b_{209} + b_{210}$
b_2	b_{205}	b_{213}
b_2	b_{207}	b_{212}
b_2	b_{208}	b_{212}
b_2	b_{211}	b_{214}
b_3	b_3	$b_7 + b_8 + 2b_9 + b_{10} + b_{11}$
b_3	b_4	$2b_{12} + b_{13} + b_{14} + b_{16}$
b_3	b_5	$b_{12} + b_{14} + b_{15} + b_{17}$
b_3	b_6	$b_{12} + b_{13} + 2b_{15} + b_{16} + b_{17}$
b_3	b_7	$b_{18} + b_{19} + b_{20} + b_{23}$
b_3	b_8	$2b_{18} + b_{19} + b_{20} + b_{21} + b_{25}$
b_3	b_9	$b_{18} + b_{19} + b_{20} + b_{22} + 2b_{24}$
b_3	b_{10}	$2b_{20} + b_{21}$
b_3	b_{11}	$b_{18} + b_{21} + b_{24}$
b_3	b_{12}	$2b_{27} + b_{28}$
b_3	b_{13}	$b_{27} + b_{28} + b_{33}$
b_3	b_{14}	b_{28}
b_3	b_{15}	$b_{27} + b_{28} + b_{31} + b_{35}$
b_3	b_{16}	$2b_{28} + b_{33}$
b_3	b_{17}	$b_{27} + 2b_{31} + b_{35}$
b_3	b_{18}	b_{38}
b_3	b_{19}	b_{38}
b_3	b_{21}	b_{46}
b_3	b_{22}	b_{43}
b_3	b_{24}	$b_{38} + 2b_{43}$
b_3	b_{26}	$b_{48} + b_{49} + b_{50}$
b_3	b_{29}	$b_{51} + 2b_{52}$
b_3	b_{30}	$2b_{48} + b_{49} + b_{51} + b_{55} + b_{56} + b_{57}$
b_3	b_{31}	b_{58}
continued on next page...		

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{32}	$b_{49} + b_{51} + b_{52} + 2b_{53} + 2b_{56} + b_{57}$
b_3	b_{34}	b_{57}
b_3	b_{35}	b_{58}
b_3	b_{36}	$b_{61} + b_{62} + b_{63} + b_{64}$
b_3	b_{37}	$b_{62} + b_{63} + b_{65}$
b_3	b_{39}	$b_{61} + 2b_{66} + b_{67}$
b_3	b_{40}	b_{66}
b_3	b_{41}	$2b_{62} + b_{63} + b_{66}$
b_3	b_{42}	$b_{61} + 2b_{63} + b_{64} + b_{66} + 2b_{67}$
b_3	b_{43}	b_{68}
b_3	b_{44}	$b_{63} + b_{66}$
b_3	b_{45}	$b_{64} + b_{67}$
b_3	b_{47}	$b_{71} + b_{75}$
b_3	b_{48}	b_{76}
b_3	b_{49}	$b_{76} + 2b_{77}$
b_3	b_{50}	b_{78}
b_3	b_{51}	$2b_{76} + b_{77} + b_{89}$
b_3	b_{52}	b_{76}
b_3	b_{53}	b_{77}
b_3	b_{56}	b_{76}
b_3	b_{57}	$b_{77} + b_{89}$
b_3	b_{59}	$b_{79} + b_{82} + b_{85} + 2b_{88}$
b_3	b_{60}	$b_{80} + b_{83} + 2b_{85} + b_{88} + b_{90} + b_{91}$
b_3	b_{61}	b_{97}
b_3	b_{64}	b_{97}
b_3	b_{67}	b_{97}
b_3	b_{69}	$b_{92} + 2b_{100}$
b_3	b_{70}	$b_{93} + b_{100} + 2b_{106}$
b_3	b_{71}	$b_{92} + 2b_{96} + b_{100} + b_{104} + b_{107}$
b_3	b_{72}	$b_{93} + b_{96} + 2b_{98} + 2b_{100} + b_{107}$
b_3	b_{74}	$b_{98} + b_{102} + b_{107}$
b_3	b_{75}	$b_{96} + b_{100} + b_{106} + b_{107}$
b_3	b_{77}	b_{120}
b_3	b_{79}	$b_{110} + b_{112} + b_{114}$
b_3	b_{80}	$2b_{110} + b_{114} + b_{121}$
b_3	b_{81}	$b_{114} + b_{121}$
b_3	b_{82}	$2b_{110} + b_{112}$
b_3	b_{83}	b_{110}

continued on next page...

TABLE 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{84}	$b_{108} + b_{113} + b_{117} + b_{119}$
b_3	b_{85}	b_{110}
b_3	b_{86}	b_{121}
b_3	b_{87}	b_{123}
b_3	b_{88}	$b_{110} + 2b_{114}$
b_3	b_{91}	$b_{114} + b_{121}$
b_3	b_{92}	b_{128}
b_3	b_{94}	$b_{124} + b_{129} + b_{134} + b_{135}$
b_3	b_{95}	b_{138}
b_3	b_{96}	b_{131}
b_3	b_{98}	b_{131}
b_3	b_{101}	$b_{124} + 2b_{127} + b_{134} + b_{135} + b_{136}$
b_3	b_{102}	b_{131}
b_3	b_{103}	$b_{133} + b_{136}$
b_3	b_{105}	$b_{127} + b_{130} + b_{132} + 2b_{133} + 2b_{135} + b_{136}$
b_3	b_{107}	b_{131}
b_3	b_{108}	$b_{140} + b_{141} + b_{143} + b_{144}$
b_3	b_{109}	$b_{140} + 2b_{145}$
b_3	b_{111}	b_{144}
b_3	b_{113}	b_{141}
b_3	b_{115}	$b_{140} + 2b_{143} + b_{144} + b_{145} + 2b_{146}$
b_3	b_{117}	$b_{141} + 2b_{143}$
b_3	b_{118}	$b_{148} + b_{151} + b_{154}$
b_3	b_{119}	$b_{140} + b_{143} + 2b_{144}$
b_3	b_{122}	$b_{143} + b_{145}$
b_3	b_{123}	$b_{144} + b_{146}$
b_3	b_{124}	b_{155}
b_3	b_{125}	b_{155}
b_3	b_{126}	$b_{158} + b_{164}$
b_3	b_{127}	$b_{155} + 2b_{156}$
b_3	b_{130}	$2b_{155} + b_{156}$
b_3	b_{132}	b_{155}
b_3	b_{133}	b_{156}
b_3	b_{135}	b_{155}
b_3	b_{136}	b_{156}
b_3	b_{137}	b_{165}
b_3	b_{138}	$b_{158} + b_{162} + b_{164} + 2b_{166}$
b_3	b_{139}	$b_{159} + b_{163} + 2b_{164} + b_{166} + b_{167}$
continued on next page...		

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{140}	b_{168}
b_3	b_{144}	b_{168}
b_3	b_{147}	b_{172}
b_3	b_{148}	$b_{170} + 2b_{173} + b_{176}$
b_3	b_{149}	$b_{171} + b_{173} + b_{174} + b_{175} + 2b_{176}$
b_3	b_{150}	b_{178}
b_3	b_{151}	$b_{170} + b_{173} + b_{179}$
b_3	b_{152}	$b_{171} + 2b_{173} + b_{174} + b_{178} + b_{179}$
b_3	b_{153}	$2b_{174} + b_{178} + b_{179}$
b_3	b_{154}	$b_{173} + b_{176} + b_{179}$
b_3	b_{157}	$b_{180} + b_{184}$
b_3	b_{158}	$b_{181} + b_{183} + b_{185}$
b_3	b_{159}	$2b_{183} + b_{185}$
b_3	b_{160}	b_{185}
b_3	b_{162}	$2b_{183}$
b_3	b_{163}	$b_{183} + 2b_{186}$
b_3	b_{164}	$b_{183} + b_{185} + b_{186}$
b_3	b_{165}	b_{189}
b_3	b_{166}	$b_{183} + b_{185} + b_{189}$
b_3	b_{167}	$2b_{185} + b_{189}$
b_3	b_{169}	b_{194}
b_3	b_{172}	$2b_{191} + b_{193}$
b_3	b_{177}	$b_{191} + b_{196} + b_{197}$
b_3	b_{180}	$b_{198} + b_{200}$
b_3	b_{182}	$b_{199} + b_{202}$
b_3	b_{184}	$2b_{198} + b_{200}$
b_3	b_{187}	$2b_{199} + b_{200} + b_{201} + b_{202} + b_{203}$
b_3	b_{188}	$b_{198} + b_{200} + b_{202} + 2b_{203}$
b_3	b_{190}	b_{207}
b_3	b_{191}	$b_{204} + 2b_{206}$
b_3	b_{192}	b_{208}
b_3	b_{193}	b_{206}
b_3	b_{194}	$b_{204} + b_{205} + b_{207}$
b_3	b_{195}	$2b_{205} + b_{206} + b_{207} + b_{208}$
b_3	b_{196}	$b_{206} + b_{207} + b_{208}$
b_3	b_{197}	$b_{204} + b_{206} + 2b_{207} + b_{208}$
b_3	b_{198}	$b_{209} + b_{210}$
b_3	b_{199}	$b_{209} + b_{211}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{200}	$2b_{209} + b_{210}$
b_3	b_{201}	$b_{210} + b_{211}$
b_3	b_{202}	$b_{209} + b_{211}$
b_3	b_{203}	$b_{209} + b_{210} + 2b_{211}$
b_3	b_{204}	b_{212}
b_3	b_{205}	b_{212}
b_3	b_{206}	$2b_{212}$
b_3	b_{207}	$b_{212} + b_{213}$
b_3	b_{208}	$b_{212} + b_{213}$
b_3	b_{209}	b_{214}
b_3	b_{210}	b_{214}
b_3	b_{211}	b_{214}
b_4	b_4	$2b_{20} + b_{21} + b_{23} + b_{25}$
b_4	b_5	$b_{18} + b_{19} + b_{20}$
b_4	b_6	$2b_{18} + b_{19} + b_{20} + b_{21}$
b_4	b_7	b_{28}
b_4	b_8	$2b_{28} + b_{33}$
b_4	b_9	$2b_{27} + b_{28}$
b_4	b_{10}	b_{33}
b_4	b_{11}	$b_{27} + b_{28}$
b_4	b_{15}	b_{38}
b_4	b_{16}	b_{46}
b_4	b_{17}	b_{38}
b_4	b_{26}	$b_{62} + b_{63}$
b_4	b_{29}	b_{67}
b_4	b_{30}	$b_{61} + 2b_{63} + b_{64} + b_{66}$
b_4	b_{32}	$b_{61} + b_{64} + 2b_{66} + 2b_{67}$
b_4	b_{34}	b_{67}
b_4	b_{36}	b_{76}
b_4	b_{39}	$b_{77} + b_{89}$
b_4	b_{41}	b_{76}
b_4	b_{42}	$2b_{76} + 2b_{77}$
b_4	b_{44}	b_{76}
b_4	b_{45}	$b_{77} + b_{89}$
b_4	b_{47}	$b_{82} + b_{85}$
b_4	b_{51}	b_{97}
b_4	b_{53}	b_{97}
b_4	b_{57}	b_{97}

continued on next page...

TABLE 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{59}	$b_{92} + 2b_{100} + b_{104} + b_{106}$
b_4	b_{60}	$b_{93} + b_{96} + 2b_{100} + b_{107}$
b_4	b_{67}	b_{120}
b_4	b_{69}	b_{112}
b_4	b_{70}	b_{110}
b_4	b_{71}	$2b_{110} + b_{112}$
b_4	b_{72}	$2b_{110} + 2b_{114}$
b_4	b_{74}	$b_{114} + b_{121}$
b_4	b_{75}	b_{110}
b_4	b_{80}	b_{131}
b_4	b_{81}	b_{131}
b_4	b_{82}	b_{128}
b_4	b_{84}	$b_{124} + b_{134} + b_{135}$
b_4	b_{87}	b_{133}
b_4	b_{91}	b_{131}
b_4	b_{94}	b_{141}
b_4	b_{95}	b_{148}
b_4	b_{101}	$b_{141} + 2b_{143}$
b_4	b_{103}	$b_{144} + b_{146}$
b_4	b_{105}	$b_{140} + 2b_{143} + 2b_{144} + b_{145}$
b_4	b_{108}	b_{155}
b_4	b_{109}	b_{156}
b_4	b_{111}	b_{156}
b_4	b_{115}	$2b_{155} + 2b_{156}$
b_4	b_{118}	$b_{158} + b_{162} + b_{164}$
b_4	b_{119}	b_{155}
b_4	b_{122}	b_{155}
b_4	b_{123}	b_{156}
b_4	b_{126}	$b_{170} + b_{176}$
b_4	b_{130}	b_{168}
b_4	b_{133}	b_{168}
b_4	b_{138}	$b_{170} + 2b_{173} + b_{176}$
b_4	b_{139}	$b_{171} + 2b_{173} + b_{174} + b_{179}$
b_4	b_{148}	$b_{181} + 2b_{183} + b_{186}$
b_4	b_{149}	$2b_{183} + b_{185}$
b_4	b_{151}	$b_{183} + b_{185}$
b_4	b_{152}	$2b_{185} + b_{189}$
b_4	b_{153}	b_{189}

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{154}	$b_{183} + b_{185}$
b_4	b_{169}	b_{199}
b_4	b_{177}	$b_{198} + b_{200}$
b_4	b_{182}	$b_{205} + b_{207}$
b_4	b_{187}	$b_{204} + b_{206} + 2b_{207} + b_{208}$
b_4	b_{188}	$b_{204} + 2b_{206}$
b_4	b_{190}	b_{211}
b_4	b_{192}	b_{211}
b_4	b_{194}	$b_{209} + b_{211}$
b_4	b_{195}	$b_{209} + b_{210} + 2b_{211}$
b_4	b_{196}	$b_{209} + b_{210}$
b_4	b_{197}	$2b_{209} + b_{210}$
b_4	b_{199}	$b_{212} + b_{213}$
b_4	b_{201}	$b_{212} + b_{213}$
b_4	b_{202}	b_{212}
b_4	b_{203}	$2b_{212}$
b_4	b_{205}	b_{214}
b_4	b_{207}	b_{214}
b_4	b_{208}	b_{214}
b_5	b_5	$b_{19} + b_{23} + b_{24}$
b_5	b_6	$b_{18} + b_{20} + b_{22} + b_{24}$
b_5	b_7	b_{27}
b_5	b_8	$b_{27} + b_{28}$
b_5	b_9	$b_{27} + b_{31} + b_{35}$
b_5	b_{10}	b_{28}
b_5	b_{11}	$b_{28} + b_{31}$
b_5	b_{12}	b_{38}
b_5	b_{15}	b_{43}
b_5	b_{17}	$b_{38} + b_{43}$
b_5	b_{24}	b_{58}
b_5	b_{26}	$b_{62} + b_{64}$
b_5	b_{29}	$b_{61} + b_{66}$
b_5	b_{30}	$b_{61} + b_{62} + b_{63} + b_{67}$
b_5	b_{32}	$b_{63} + b_{64} + b_{66} + b_{67}$
b_5	b_{35}	b_{68}
b_5	b_{36}	b_{77}
b_5	b_{39}	$b_{76} + b_{77}$
b_5	b_{40}	b_{76}

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_5	b_{41}	b_{76}
b_5	b_{42}	$b_{76} + b_{77} + b_{89}$
b_5	b_{47}	b_{88}
b_5	b_{49}	b_{97}
b_5	b_{51}	b_{97}
b_5	b_{59}	$b_{96} + b_{100} + b_{107}$
b_5	b_{60}	$b_{96} + b_{98} + b_{100} + b_{106}$
b_5	b_{61}	b_{120}
b_5	b_{69}	b_{110}
b_5	b_{70}	b_{110}
b_5	b_{71}	$b_{110} + b_{114}$
b_5	b_{72}	$b_{110} + b_{114} + b_{121}$
b_5	b_{75}	b_{114}
b_5	b_{80}	b_{131}
b_5	b_{84}	$b_{127} + b_{129} + b_{135}$
b_5	b_{86}	b_{131}
b_5	b_{88}	b_{131}
b_5	b_{94}	b_{143}
b_5	b_{95}	b_{154}
b_5	b_{101}	$b_{140} + b_{143} + b_{144}$
b_5	b_{105}	$b_{143} + b_{144} + b_{145} + b_{146}$
b_5	b_{108}	b_{156}
b_5	b_{109}	b_{155}
b_5	b_{115}	$b_{155} + b_{156}$
b_5	b_{117}	b_{155}
b_5	b_{118}	$b_{164} + b_{166}$
b_5	b_{119}	$b_{155} + b_{156}$
b_5	b_{126}	b_{173}
b_5	b_{127}	b_{168}
b_5	b_{138}	$b_{173} + b_{176} + b_{179}$
b_5	b_{139}	$b_{173} + b_{174} + b_{175} + b_{176}$
b_5	b_{147}	b_{180}
b_5	b_{148}	$b_{183} + b_{185}$
b_5	b_{149}	$b_{183} + b_{186}$
b_5	b_{151}	$b_{183} + b_{189}$
b_5	b_{152}	$b_{183} + b_{185}$
b_5	b_{153}	$b_{185} + b_{189}$
b_5	b_{154}	$b_{185} + b_{186}$

continued on next page...

TABLE 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_5	b_{157}	b_{191}
b_5	b_{172}	$b_{198} + b_{200}$
b_5	b_{177}	$b_{198} + b_{203}$
b_5	b_{180}	b_{206}
b_5	b_{184}	$b_{204} + b_{206}$
b_5	b_{187}	$b_{204} + b_{205} + b_{207}$
b_5	b_{188}	$b_{206} + b_{207} + b_{208}$
b_5	b_{191}	$b_{209} + b_{210}$
b_5	b_{192}	b_{210}
b_5	b_{193}	b_{209}
b_5	b_{195}	$b_{209} + b_{211}$
b_5	b_{196}	$b_{210} + b_{211}$
b_5	b_{197}	$b_{209} + b_{211}$
b_5	b_{198}	b_{212}
b_5	b_{200}	b_{212}
b_5	b_{201}	b_{212}
b_5	b_{203}	$b_{212} + b_{213}$
b_5	b_{206}	b_{214}
b_5	b_{208}	b_{214}
b_6	b_6	$b_{18} + b_{19} + b_{21} + 2b_{24} + b_{25}$
b_6	b_7	$b_{27} + b_{28}$
b_6	b_8	$2b_{27} + b_{28} + b_{33}$
b_6	b_9	$b_{27} + b_{28} + 2b_{31} + b_{35}$
b_6	b_{10}	$2b_{28}$
b_6	b_{11}	$b_{27} + b_{33} + b_{35}$
b_6	b_{12}	b_{38}
b_6	b_{13}	$b_{38} + b_{46}$
b_6	b_{15}	$b_{38} + b_{43}$
b_6	b_{17}	$2b_{43}$
b_6	b_{22}	b_{58}
b_6	b_{24}	b_{58}
b_6	b_{26}	$b_{61} + b_{63} + b_{65}$
b_6	b_{29}	$2b_{66}$
b_6	b_{30}	$2b_{62} + b_{63} + b_{64} + b_{66} + b_{67}$
b_6	b_{31}	b_{68}
b_6	b_{32}	$b_{61} + 2b_{63} + b_{66} + b_{67}$
b_6	b_{34}	b_{64}
b_6	b_{36}	$b_{76} + b_{77}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_6	b_{37}	$b_{76} + b_{78}$
b_6	b_{39}	$2b_{76}$
b_6	b_{42}	$b_{76} + b_{77} + b_{89}$
b_6	b_{44}	b_{76}
b_6	b_{45}	b_{77}
b_6	b_{47}	$b_{79} + b_{88}$
b_6	b_{49}	b_{97}
b_6	b_{57}	b_{97}
b_6	b_{59}	$b_{92} + 2b_{96} + b_{100} + b_{107}$
b_6	b_{60}	$b_{93} + b_{98} + b_{100} + 2b_{106} + b_{107}$
b_6	b_{64}	b_{120}
b_6	b_{69}	$2b_{110}$
b_6	b_{71}	$b_{110} + b_{112} + 2b_{114}$
b_6	b_{72}	$b_{110} + b_{114} + b_{121}$
b_6	b_{74}	$b_{114} + b_{121}$
b_6	b_{75}	$b_{110} + b_{114}$
b_6	b_{79}	$b_{128} + b_{131}$
b_6	b_{81}	b_{131}
b_6	b_{84}	$b_{124} + b_{127} + b_{134} + b_{136}$
b_6	b_{87}	b_{136}
b_6	b_{88}	b_{131}
b_6	b_{91}	b_{131}
b_6	b_{94}	$b_{141} + b_{143}$
b_6	b_{95}	b_{151}
b_6	b_{101}	$b_{140} + b_{141} + b_{143} + 2b_{144}$
b_6	b_{103}	b_{144}
b_6	b_{105}	$b_{140} + b_{143} + b_{144} + 2b_{146}$
b_6	b_{108}	$b_{155} + b_{156}$
b_6	b_{109}	$2b_{155}$
b_6	b_{115}	$b_{155} + b_{156}$
b_6	b_{117}	b_{155}
b_6	b_{118}	$b_{158} + b_{166}$
b_6	b_{119}	$2b_{156}$
b_6	b_{122}	b_{155}
b_6	b_{123}	b_{156}
b_6	b_{126}	b_{173}
b_6	b_{127}	b_{168}
b_6	b_{136}	b_{168}

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_6	b_{137}	b_{178}
b_6	b_{138}	$b_{170} + b_{173} + b_{179}$
b_6	b_{139}	$b_{171} + b_{173} + 2b_{176} + b_{178} + b_{179}$
b_6	b_{147}	b_{184}
b_6	b_{148}	$b_{183} + b_{185}$
b_6	b_{149}	$b_{183} + b_{185} + 2b_{186}$
b_6	b_{150}	b_{189}
b_6	b_{151}	$b_{181} + b_{185}$
b_6	b_{152}	$2b_{183} + b_{185} + b_{189}$
b_6	b_{153}	$2b_{185}$
b_6	b_{154}	$b_{183} + b_{189}$
b_6	b_{157}	$b_{191} + b_{193}$
b_6	b_{169}	b_{202}
b_6	b_{172}	$2b_{198} + b_{200}$
b_6	b_{177}	$b_{200} + b_{202} + b_{203}$
b_6	b_{180}	$b_{204} + b_{206}$
b_6	b_{182}	$b_{204} + b_{207}$
b_6	b_{184}	$2b_{206}$
b_6	b_{187}	$2b_{205} + b_{206} + b_{207} + b_{208}$
b_6	b_{188}	$b_{204} + b_{206} + 2b_{207} + b_{208}$
b_6	b_{190}	b_{209}
b_6	b_{191}	$2b_{209} + b_{210}$
b_6	b_{193}	b_{210}
b_6	b_{194}	$b_{209} + b_{211}$
b_6	b_{195}	$b_{210} + b_{211}$
b_6	b_{196}	$b_{209} + b_{211}$
b_6	b_{197}	$b_{209} + b_{210} + 2b_{211}$
b_6	b_{198}	b_{212}
b_6	b_{199}	b_{212}
b_6	b_{200}	$2b_{212}$
b_6	b_{202}	$b_{212} + b_{213}$
b_6	b_{203}	$b_{212} + b_{213}$
b_6	b_{204}	b_{214}
b_6	b_{206}	b_{214}
b_6	b_{207}	b_{214}
b_7	b_9	b_{38}
b_7	b_{29}	b_{77}
b_7	b_{30}	$b_{76} + b_{77}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_7	b_{32}	$b_{76} + b_{77} + b_{89}$
b_7	b_{39}	b_{97}
b_7	b_{42}	b_{97}
b_7	b_{47}	b_{100}
b_7	b_{51}	b_{120}
b_7	b_{59}	b_{110}
b_7	b_{60}	$b_{110} + b_{114}$
b_7	b_{72}	b_{131}
b_7	b_{84}	b_{143}
b_7	b_{95}	b_{164}
b_7	b_{101}	b_{155}
b_7	b_{105}	$b_{155} + b_{156}$
b_7	b_{115}	b_{168}
b_7	b_{118}	$b_{173} + b_{176}$
b_7	b_{126}	b_{183}
b_7	b_{138}	$b_{183} + b_{185} + b_{186}$
b_7	b_{139}	$b_{183} + b_{185}$
b_7	b_{177}	b_{206}
b_7	b_{187}	$b_{209} + b_{211}$
b_7	b_{188}	$b_{209} + b_{210}$
b_7	b_{192}	b_{212}
b_7	b_{195}	$b_{212} + b_{213}$
b_7	b_{196}	b_{212}
b_7	b_{197}	b_{212}
b_7	b_{201}	b_{214}
b_7	b_{203}	b_{214}
b_8	b_8	b_{46}
b_8	b_9	b_{38}
b_8	b_{11}	b_{38}
b_8	b_{26}	b_{76}
b_8	b_{30}	$b_{76} + b_{77}$
b_8	b_{32}	$2b_{76} + b_{77} + b_{89}$
b_8	b_{34}	b_{77}
b_8	b_{42}	b_{97}
b_8	b_{45}	b_{97}
b_8	b_{47}	$b_{92} + b_{100}$
b_8	b_{57}	b_{120}
b_8	b_{59}	$2b_{110} + b_{112}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_8	b_{60}	$b_{110} + b_{114}$
b_8	b_{71}	b_{128}
b_8	b_{72}	b_{131}
b_8	b_{74}	b_{131}
b_8	b_{84}	$b_{141} + b_{143}$
b_8	b_{87}	b_{144}
b_8	b_{95}	b_{158}
b_8	b_{101}	b_{155}
b_8	b_{103}	b_{156}
b_8	b_{105}	$b_{155} + 2b_{156}$
b_8	b_{115}	b_{168}
b_8	b_{118}	$b_{170} + b_{173}$
b_8	b_{123}	b_{168}
b_8	b_{126}	b_{183}
b_8	b_{138}	$b_{181} + b_{183} + b_{185}$
b_8	b_{139}	$2b_{183} + b_{185} + b_{189}$
b_8	b_{169}	b_{207}
b_8	b_{177}	$b_{204} + b_{206}$
b_8	b_{182}	$b_{209} + b_{211}$
b_8	b_{187}	$b_{209} + b_{210} + 2b_{211}$
b_8	b_{188}	$2b_{209} + b_{210}$
b_8	b_{190}	b_{212}
b_8	b_{194}	$b_{212} + b_{213}$
b_8	b_{195}	$b_{212} + b_{213}$
b_8	b_{196}	b_{212}
b_8	b_{197}	$2b_{212}$
b_8	b_{199}	b_{214}
b_8	b_{202}	b_{214}
b_8	b_{203}	b_{214}
b_9	b_9	$b_{38} + 2b_{43}$
b_9	b_{11}	b_{43}
b_9	b_{15}	b_{58}
b_9	b_{17}	b_{58}
b_9	b_{24}	b_{68}
b_9	b_{26}	b_{77}
b_9	b_{29}	$2b_{76}$
b_9	b_{30}	$b_{76} + b_{77} + b_{89}$
b_9	b_{32}	$b_{76} + b_{77}$
continued on next page...		

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_9	b_{36}	b_{97}
b_9	b_{42}	b_{97}
b_9	b_{47}	$b_{96} + b_{107}$
b_9	b_{49}	b_{120}
b_9	b_{59}	$b_{110} + 2b_{114}$
b_9	b_{60}	$b_{110} + b_{114} + b_{121}$
b_9	b_{71}	b_{131}
b_9	b_{72}	b_{131}
b_9	b_{75}	b_{131}
b_9	b_{84}	$b_{140} + b_{143} + b_{144}$
b_9	b_{94}	b_{155}
b_9	b_{95}	b_{166}
b_9	b_{101}	$b_{155} + 2b_{156}$
b_9	b_{105}	$b_{155} + b_{156}$
b_9	b_{108}	b_{168}
b_9	b_{118}	$b_{173} + b_{179}$
b_9	b_{119}	b_{168}
b_9	b_{126}	b_{185}
b_9	b_{138}	$b_{183} + b_{185} + b_{189}$
b_9	b_{139}	$b_{183} + b_{185} + 2b_{186}$
b_9	b_{147}	b_{191}
b_9	b_{157}	$b_{198} + b_{200}$
b_9	b_{172}	$b_{204} + 2b_{206}$
b_9	b_{177}	$b_{206} + b_{207} + b_{208}$
b_9	b_{180}	$b_{209} + b_{210}$
b_9	b_{184}	$2b_{209} + b_{210}$
b_9	b_{187}	$b_{209} + b_{211}$
b_9	b_{188}	$b_{209} + b_{210} + 2b_{211}$
b_9	b_{191}	$2b_{212}$
b_9	b_{193}	b_{212}
b_9	b_{195}	b_{212}
b_9	b_{196}	$b_{212} + b_{213}$
b_9	b_{197}	$b_{212} + b_{213}$
b_9	b_{198}	b_{214}
b_9	b_{200}	b_{214}
b_9	b_{203}	b_{214}
b_{10}	b_{10}	b_{46}
b_{10}	b_{29}	b_{89}

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Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{10}	b_{30}	$2b_{76}$
b_{10}	b_{32}	$2b_{77}$
b_{10}	b_{34}	b_{89}
b_{10}	b_{39}	b_{97}
b_{10}	b_{45}	b_{97}
b_{10}	b_{47}	$b_{104} + b_{106}$
b_{10}	b_{53}	b_{120}
b_{10}	b_{59}	b_{112}
b_{10}	b_{60}	$2b_{110}$
b_{10}	b_{69}	b_{128}
b_{10}	b_{74}	b_{131}
b_{10}	b_{84}	b_{141}
b_{10}	b_{87}	b_{146}
b_{10}	b_{95}	b_{162}
b_{10}	b_{103}	b_{156}
b_{10}	b_{105}	$2b_{155}$
b_{10}	b_{109}	b_{168}
b_{10}	b_{111}	b_{168}
b_{10}	b_{118}	$b_{170} + b_{176}$
b_{10}	b_{126}	$b_{181} + b_{186}$
b_{10}	b_{138}	$2b_{183}$
b_{10}	b_{139}	$2b_{185}$
b_{10}	b_{169}	b_{205}
b_{10}	b_{182}	b_{211}
b_{10}	b_{187}	$2b_{209} + b_{210}$
b_{10}	b_{190}	b_{213}
b_{10}	b_{192}	b_{213}
b_{10}	b_{194}	b_{212}
b_{10}	b_{195}	$2b_{212}$
b_{10}	b_{199}	b_{214}
b_{10}	b_{201}	b_{214}
b_{11}	b_{11}	$b_{38} + b_{46}$
b_{11}	b_{17}	b_{58}
b_{11}	b_{22}	b_{68}
b_{11}	b_{26}	$b_{76} + b_{78}$
b_{11}	b_{32}	b_{76}
b_{11}	b_{47}	b_{96}
b_{11}	b_{59}	$b_{110} + b_{114}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{11}	b_{71}	b_{131}
b_{11}	b_{74}	b_{131}
b_{11}	b_{84}	$b_{141} + b_{144}$
b_{11}	b_{101}	b_{156}
b_{11}	b_{105}	b_{156}
b_{11}	b_{119}	b_{168}
b_{11}	b_{137}	b_{189}
b_{11}	b_{139}	$b_{183} + b_{189}$
b_{11}	b_{147}	b_{193}
b_{11}	b_{157}	b_{198}
b_{11}	b_{169}	b_{204}
b_{11}	b_{172}	b_{206}
b_{11}	b_{177}	$b_{204} + b_{207}$
b_{11}	b_{180}	b_{209}
b_{11}	b_{182}	b_{209}
b_{11}	b_{184}	b_{210}
b_{11}	b_{187}	$b_{210} + b_{211}$
b_{11}	b_{188}	$b_{209} + b_{211}$
b_{11}	b_{191}	b_{212}
b_{11}	b_{194}	b_{212}
b_{11}	b_{197}	$b_{212} + b_{213}$
b_{11}	b_{200}	b_{214}
b_{11}	b_{202}	b_{214}
b_{12}	b_{30}	b_{97}
b_{12}	b_{32}	b_{97}
b_{12}	b_{42}	b_{120}
b_{12}	b_{47}	b_{110}
b_{12}	b_{60}	b_{131}
b_{12}	b_{84}	b_{155}
b_{12}	b_{95}	b_{173}
b_{12}	b_{105}	b_{168}
b_{12}	b_{118}	$b_{183} + b_{185}$
b_{12}	b_{177}	$b_{209} + b_{210}$
b_{12}	b_{187}	$b_{212} + b_{213}$
b_{12}	b_{188}	$2b_{212}$
b_{12}	b_{195}	b_{214}
b_{12}	b_{196}	b_{214}
b_{12}	b_{197}	b_{214}

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{13}	b_{47}	b_{110}
b_{13}	b_{105}	b_{168}
b_{13}	b_{169}	b_{209}
b_{13}	b_{177}	b_{209}
b_{13}	b_{182}	b_{212}
b_{13}	b_{187}	$b_{212} + b_{213}$
b_{13}	b_{188}	b_{212}
b_{13}	b_{194}	b_{214}
b_{13}	b_{197}	b_{214}
b_{14}	b_{29}	b_{97}
b_{14}	b_{32}	b_{97}
b_{14}	b_{39}	b_{120}
b_{14}	b_{95}	b_{176}
b_{14}	b_{118}	$b_{183} + b_{186}$
b_{14}	b_{187}	b_{212}
b_{14}	b_{192}	b_{214}
b_{14}	b_{195}	b_{214}
b_{15}	b_{17}	b_{68}
b_{15}	b_{47}	b_{114}
b_{15}	b_{59}	b_{131}
b_{15}	b_{84}	b_{156}
b_{15}	b_{101}	b_{168}
b_{15}	b_{147}	b_{198}
b_{15}	b_{157}	b_{206}
b_{15}	b_{172}	$b_{209} + b_{210}$
b_{15}	b_{177}	$b_{209} + b_{211}$
b_{15}	b_{180}	b_{212}
b_{15}	b_{184}	b_{212}
b_{15}	b_{187}	b_{212}
b_{15}	b_{188}	$b_{212} + b_{213}$
b_{15}	b_{191}	b_{214}
b_{15}	b_{197}	b_{214}
b_{16}	b_{32}	b_{97}
b_{16}	b_{34}	b_{97}
b_{16}	b_{45}	b_{120}
b_{16}	b_{47}	b_{112}
b_{16}	b_{59}	b_{128}
b_{16}	b_{87}	b_{156}

continued on next page...

TABLE 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{16}	b_{95}	b_{170}
b_{16}	b_{103}	b_{168}
b_{16}	b_{118}	$b_{181} + b_{183}$
b_{16}	b_{169}	b_{211}
b_{16}	b_{182}	$b_{212} + b_{213}$
b_{16}	b_{187}	$2b_{212}$
b_{16}	b_{190}	b_{214}
b_{16}	b_{194}	b_{214}
b_{16}	b_{195}	b_{214}
b_{17}	b_{26}	b_{97}
b_{17}	b_{30}	b_{97}
b_{17}	b_{36}	b_{120}
b_{17}	b_{47}	b_{114}
b_{17}	b_{59}	b_{131}
b_{17}	b_{60}	b_{131}
b_{17}	b_{84}	$b_{155} + b_{156}$
b_{17}	b_{95}	b_{179}
b_{17}	b_{101}	b_{168}
b_{17}	b_{118}	$b_{185} + b_{189}$
b_{17}	b_{147}	b_{200}
b_{17}	b_{157}	$b_{204} + b_{206}$
b_{17}	b_{172}	$2b_{209} + b_{210}$
b_{17}	b_{177}	$b_{210} + b_{211}$
b_{17}	b_{180}	b_{212}
b_{17}	b_{184}	$2b_{212}$
b_{17}	b_{188}	$b_{212} + b_{213}$
b_{17}	b_{191}	b_{214}
b_{17}	b_{193}	b_{214}
b_{17}	b_{196}	b_{214}
b_{18}	b_{177}	b_{212}
b_{18}	b_{187}	b_{214}
b_{18}	b_{188}	b_{214}
b_{19}	b_{30}	b_{120}
b_{19}	b_{95}	b_{185}
b_{19}	b_{177}	b_{212}
b_{19}	b_{188}	b_{214}
b_{20}	b_{32}	b_{120}
b_{20}	b_{95}	b_{183}

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{20}	b_{187}	b_{214}
b_{21}	b_{169}	b_{212}
b_{21}	b_{182}	b_{214}
b_{21}	b_{187}	b_{214}
b_{22}	b_{26}	b_{120}
b_{22}	b_{95}	b_{189}
b_{22}	b_{147}	b_{204}
b_{22}	b_{157}	b_{209}
b_{22}	b_{172}	b_{212}
b_{22}	b_{184}	b_{214}
b_{23}	b_{29}	b_{120}
b_{23}	b_{95}	b_{186}
b_{24}	b_{47}	b_{131}
b_{24}	b_{84}	b_{168}
b_{24}	b_{147}	b_{206}
b_{24}	b_{157}	$b_{209} + b_{210}$
b_{24}	b_{172}	$2b_{212}$
b_{24}	b_{177}	$b_{212} + b_{213}$
b_{24}	b_{180}	b_{214}
b_{24}	b_{184}	b_{214}
b_{24}	b_{188}	b_{214}
b_{25}	b_{34}	b_{120}
b_{25}	b_{47}	b_{128}
b_{25}	b_{87}	b_{168}
b_{25}	b_{95}	b_{181}
b_{25}	b_{169}	b_{213}
b_{25}	b_{182}	b_{214}
b_{26}	b_{26}	$b_{128} + b_{131}$
b_{26}	b_{32}	b_{131}
b_{26}	b_{84}	$b_{183} + b_{189}$
b_{26}	b_{87}	b_{189}
b_{26}	b_{95}	b_{193}
b_{26}	b_{118}	b_{198}
b_{26}	b_{137}	b_{204}
b_{26}	b_{138}	b_{206}
b_{26}	b_{139}	$b_{204} + b_{207}$
b_{26}	b_{150}	b_{209}
b_{26}	b_{151}	b_{210}
continued on next page...		

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{26}	b_{152}	$b_{209} + b_{211}$
b_{26}	b_{153}	$b_{210} + b_{211}$
b_{26}	b_{154}	b_{209}
b_{26}	b_{165}	b_{212}
b_{26}	b_{166}	b_{212}
b_{26}	b_{167}	$b_{212} + b_{213}$
b_{26}	b_{178}	b_{214}
b_{26}	b_{179}	b_{214}
b_{27}	b_{177}	b_{214}
b_{29}	b_{34}	$2b_{128}$
b_{29}	b_{47}	$b_{142} + b_{146}$
b_{29}	b_{59}	b_{156}
b_{29}	b_{60}	b_{155}
b_{29}	b_{69}	b_{168}
b_{29}	b_{73}	b_{168}
b_{29}	b_{87}	$2b_{181}$
b_{29}	b_{95}	b_{192}
b_{29}	b_{118}	b_{201}
b_{29}	b_{126}	b_{205}
b_{29}	b_{138}	b_{208}
b_{29}	b_{139}	$2b_{206}$
b_{29}	b_{148}	b_{211}
b_{29}	b_{149}	$2b_{209} + b_{210}$
b_{29}	b_{154}	b_{210}
b_{29}	b_{161}	b_{213}
b_{29}	b_{162}	b_{213}
b_{29}	b_{163}	$2b_{212}$
b_{29}	b_{164}	b_{212}
b_{29}	b_{175}	b_{214}
b_{29}	b_{176}	b_{214}
b_{30}	b_{30}	$2b_{128} + b_{131}$
b_{30}	b_{32}	b_{131}
b_{30}	b_{47}	b_{143}
b_{30}	b_{59}	b_{155}
b_{30}	b_{60}	$b_{155} + b_{156}$
b_{30}	b_{72}	b_{168}
b_{30}	b_{84}	$b_{183} + b_{185}$
b_{30}	b_{87}	$2b_{185}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{30}	b_{95}	b_{196}
b_{30}	b_{118}	$b_{198} + b_{203}$
b_{30}	b_{126}	b_{206}
b_{30}	b_{138}	$b_{206} + b_{207} + b_{208}$
b_{30}	b_{139}	$2b_{205} + b_{206} + b_{207} + b_{208}$
b_{30}	b_{148}	$b_{209} + b_{210}$
b_{30}	b_{149}	$b_{209} + b_{211}$
b_{30}	b_{151}	$b_{209} + b_{211}$
b_{30}	b_{152}	$b_{209} + b_{210} + 2b_{211}$
b_{30}	b_{153}	$2b_{209} + b_{210}$
b_{30}	b_{154}	$b_{210} + b_{211}$
b_{30}	b_{158}	b_{212}
b_{30}	b_{159}	$b_{212} + b_{213}$
b_{30}	b_{160}	b_{212}
b_{30}	b_{164}	b_{212}
b_{30}	b_{166}	$b_{212} + b_{213}$
b_{30}	b_{167}	$2b_{212}$
b_{30}	b_{173}	b_{214}
b_{30}	b_{174}	b_{214}
b_{30}	b_{179}	b_{214}
b_{31}	b_{147}	b_{209}
b_{31}	b_{157}	b_{212}
b_{31}	b_{172}	b_{214}
b_{32}	b_{32}	$3b_{128}$
b_{32}	b_{47}	$b_{140} + b_{144} + b_{145}$
b_{32}	b_{59}	$2b_{155} + 2b_{156}$
b_{32}	b_{60}	$2b_{155} + 2b_{156}$
b_{32}	b_{70}	b_{168}
b_{32}	b_{71}	b_{168}
b_{32}	b_{75}	b_{168}
b_{32}	b_{84}	$b_{185} + b_{189}$
b_{32}	b_{87}	$3b_{183}$
b_{32}	b_{95}	b_{195}
b_{32}	b_{118}	$b_{199} + b_{201} + b_{203}$
b_{32}	b_{126}	$b_{207} + b_{208}$
b_{32}	b_{138}	$2b_{205} + b_{206} + b_{207} + b_{208}$
b_{32}	b_{139}	$b_{204} + b_{206} + 2b_{207} + b_{208}$
b_{32}	b_{148}	$b_{209} + b_{210} + 2b_{211}$

continued on next page...

TABLE 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{32}	b_{149}	$b_{209} + b_{210} + 2b_{211}$
b_{32}	b_{151}	$b_{210} + b_{211}$
b_{32}	b_{152}	$2b_{209} + b_{210}$
b_{32}	b_{154}	$b_{209} + b_{211}$
b_{32}	b_{158}	$b_{212} + b_{213}$
b_{32}	b_{159}	$2b_{212}$
b_{32}	b_{162}	$2b_{212}$
b_{32}	b_{163}	$b_{212} + b_{213}$
b_{32}	b_{164}	$b_{212} + b_{213}$
b_{32}	b_{166}	b_{212}
b_{32}	b_{170}	b_{214}
b_{32}	b_{171}	b_{214}
b_{32}	b_{173}	b_{214}
b_{32}	b_{176}	b_{214}
b_{33}	b_{169}	b_{214}
b_{34}	b_{47}	b_{146}
b_{34}	b_{59}	b_{156}
b_{34}	b_{60}	$2b_{155}$
b_{34}	b_{69}	b_{168}
b_{34}	b_{87}	$2b_{186}$
b_{34}	b_{95}	b_{190}
b_{34}	b_{118}	b_{199}
b_{34}	b_{126}	b_{205}
b_{34}	b_{138}	b_{207}
b_{34}	b_{148}	b_{211}
b_{34}	b_{151}	b_{209}
b_{34}	b_{158}	b_{212}
b_{34}	b_{162}	b_{213}
b_{34}	b_{170}	b_{214}
b_{35}	b_{147}	b_{210}
b_{35}	b_{157}	b_{212}
b_{35}	b_{172}	b_{214}
b_{35}	b_{177}	b_{214}
b_{36}	b_{95}	b_{198}
b_{36}	b_{118}	b_{206}
b_{36}	b_{138}	$b_{209} + b_{210}$
b_{36}	b_{139}	$b_{209} + b_{211}$
b_{36}	b_{151}	b_{212}

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{36}	b_{152}	$b_{212} + b_{213}$
b_{36}	b_{153}	b_{212}
b_{36}	b_{154}	b_{212}
b_{36}	b_{166}	b_{214}
b_{36}	b_{167}	b_{214}
b_{37}	b_{137}	b_{209}
b_{37}	b_{139}	b_{209}
b_{37}	b_{150}	b_{212}
b_{37}	b_{152}	b_{212}
b_{37}	b_{153}	$b_{212} + b_{213}$
b_{37}	b_{165}	b_{214}
b_{37}	b_{167}	b_{214}
b_{39}	b_{47}	b_{156}
b_{39}	b_{59}	b_{168}
b_{39}	b_{95}	b_{201}
b_{39}	b_{118}	$b_{205} + b_{208}$
b_{39}	b_{126}	b_{211}
b_{39}	b_{138}	$b_{210} + b_{211}$
b_{39}	b_{139}	$2b_{209} + b_{210}$
b_{39}	b_{148}	$b_{212} + b_{213}$
b_{39}	b_{149}	$2b_{212}$
b_{39}	b_{154}	b_{212}
b_{39}	b_{162}	b_{214}
b_{39}	b_{163}	b_{214}
b_{39}	b_{164}	b_{214}
b_{40}	b_{139}	b_{210}
b_{40}	b_{149}	b_{212}
b_{40}	b_{161}	b_{214}
b_{40}	b_{163}	b_{214}
b_{41}	b_{139}	$b_{210} + b_{211}$
b_{41}	b_{149}	b_{212}
b_{41}	b_{152}	$b_{212} + b_{213}$
b_{41}	b_{153}	$2b_{212}$
b_{41}	b_{159}	b_{214}
b_{41}	b_{160}	b_{214}
b_{41}	b_{167}	b_{214}
b_{42}	b_{47}	b_{155}
b_{42}	b_{60}	b_{168}

continued on next page...

TABLE 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{42}	b_{95}	b_{203}
b_{42}	b_{118}	$b_{206} + b_{207} + b_{208}$
b_{42}	b_{126}	$b_{209} + b_{210}$
b_{42}	b_{138}	$b_{209} + b_{210} + 2b_{211}$
b_{42}	b_{139}	$b_{209} + b_{210} + 2b_{211}$
b_{42}	b_{148}	$2b_{212}$
b_{42}	b_{149}	$b_{212} + b_{213}$
b_{42}	b_{151}	$b_{212} + b_{213}$
b_{42}	b_{152}	$2b_{212}$
b_{42}	b_{154}	$b_{212} + b_{213}$
b_{42}	b_{158}	b_{214}
b_{42}	b_{159}	b_{214}
b_{42}	b_{164}	b_{214}
b_{42}	b_{166}	b_{214}
b_{43}	b_{147}	b_{212}
b_{43}	b_{157}	b_{214}
b_{44}	b_{47}	b_{155}
b_{44}	b_{60}	b_{168}
b_{44}	b_{139}	$b_{209} + b_{211}$
b_{44}	b_{149}	$b_{212} + b_{213}$
b_{44}	b_{152}	b_{212}
b_{44}	b_{159}	b_{214}
b_{44}	b_{163}	b_{214}
b_{45}	b_{47}	b_{156}
b_{45}	b_{59}	b_{168}
b_{45}	b_{95}	b_{199}
b_{45}	b_{118}	$b_{205} + b_{207}$
b_{45}	b_{126}	b_{211}
b_{45}	b_{138}	$b_{209} + b_{211}$
b_{45}	b_{148}	$b_{212} + b_{213}$
b_{45}	b_{151}	b_{212}
b_{45}	b_{158}	b_{214}
b_{45}	b_{162}	b_{214}
b_{47}	b_{47}	b_{162}
b_{47}	b_{53}	b_{168}
b_{47}	b_{59}	$b_{170} + b_{176}$
b_{47}	b_{60}	$b_{171} + b_{173}$
b_{47}	b_{69}	$b_{181} + b_{186}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{47}	b_{70}	b_{183}
b_{47}	b_{71}	b_{183}
b_{47}	b_{72}	b_{185}
b_{47}	b_{73}	b_{186}
b_{47}	b_{75}	b_{183}
b_{47}	b_{84}	b_{191}
b_{47}	b_{87}	b_{190}
b_{47}	b_{101}	$b_{198} + b_{200}$
b_{47}	b_{103}	b_{199}
b_{47}	b_{105}	$b_{202} + b_{203}$
b_{47}	b_{108}	b_{206}
b_{47}	b_{109}	b_{205}
b_{47}	b_{111}	b_{205}
b_{47}	b_{115}	$b_{207} + b_{208}$
b_{47}	b_{119}	$b_{204} + b_{206}$
b_{47}	b_{123}	b_{207}
b_{47}	b_{127}	$b_{209} + b_{210}$
b_{47}	b_{130}	b_{211}
b_{47}	b_{133}	b_{211}
b_{47}	b_{136}	b_{209}
b_{47}	b_{140}	b_{212}
b_{47}	b_{144}	b_{212}
b_{47}	b_{146}	b_{213}
b_{47}	b_{156}	b_{214}
b_{48}	b_{139}	b_{212}
b_{48}	b_{152}	b_{214}
b_{48}	b_{153}	b_{214}
b_{49}	b_{95}	b_{206}
b_{49}	b_{118}	$b_{209} + b_{210}$
b_{49}	b_{138}	$2b_{212}$
b_{49}	b_{139}	$b_{212} + b_{213}$
b_{49}	b_{151}	b_{214}
b_{49}	b_{152}	b_{214}
b_{49}	b_{154}	b_{214}
b_{50}	b_{137}	b_{212}
b_{50}	b_{150}	b_{214}
b_{50}	b_{153}	b_{214}
b_{51}	b_{95}	b_{208}

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{51}	b_{118}	$b_{210} + b_{211}$
b_{51}	b_{126}	b_{212}
b_{51}	b_{138}	$b_{212} + b_{213}$
b_{51}	b_{139}	$2b_{212}$
b_{51}	b_{148}	b_{214}
b_{51}	b_{149}	b_{214}
b_{51}	b_{154}	b_{214}
b_{52}	b_{139}	b_{212}
b_{52}	b_{149}	b_{214}
b_{53}	b_{95}	b_{205}
b_{53}	b_{118}	b_{211}
b_{53}	b_{126}	b_{213}
b_{53}	b_{138}	b_{212}
b_{53}	b_{148}	b_{214}
b_{55}	b_{153}	b_{214}
b_{56}	b_{139}	$b_{212} + b_{213}$
b_{56}	b_{149}	b_{214}
b_{56}	b_{152}	b_{214}
b_{57}	b_{95}	b_{207}
b_{57}	b_{118}	$b_{209} + b_{211}$
b_{57}	b_{126}	b_{212}
b_{57}	b_{138}	$b_{212} + b_{213}$
b_{57}	b_{148}	b_{214}
b_{57}	b_{151}	b_{214}
b_{58}	b_{147}	b_{214}
b_{59}	b_{59}	$b_{181} + 2b_{183} + b_{186}$
b_{59}	b_{60}	$2b_{183} + b_{185}$
b_{59}	b_{84}	$b_{198} + b_{200}$
b_{59}	b_{87}	b_{199}
b_{59}	b_{101}	$b_{204} + 2b_{206}$
b_{59}	b_{103}	$b_{205} + b_{207}$
b_{59}	b_{105}	$b_{204} + b_{206} + 2b_{207} + b_{208}$
b_{59}	b_{108}	$b_{209} + b_{210}$
b_{59}	b_{109}	b_{211}
b_{59}	b_{111}	b_{211}
b_{59}	b_{115}	$b_{209} + b_{210} + 2b_{211}$
b_{59}	b_{119}	$2b_{209} + b_{210}$
b_{59}	b_{123}	$b_{209} + b_{211}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{59}	b_{127}	$2b_{212}$
b_{59}	b_{130}	$b_{212} + b_{213}$
b_{59}	b_{133}	$b_{212} + b_{213}$
b_{59}	b_{136}	b_{212}
b_{59}	b_{140}	b_{214}
b_{59}	b_{144}	b_{214}
b_{59}	b_{146}	b_{214}
b_{60}	b_{60}	$2b_{181} + 2b_{183} + b_{185} + b_{186}$
b_{60}	b_{84}	$b_{198} + b_{203}$
b_{60}	b_{94}	b_{206}
b_{60}	b_{101}	$b_{206} + b_{207} + b_{208}$
b_{60}	b_{105}	$2b_{205} + b_{206} + b_{207} + b_{208}$
b_{60}	b_{108}	$b_{209} + b_{211}$
b_{60}	b_{109}	$2b_{209} + b_{210}$
b_{60}	b_{115}	$b_{209} + b_{210} + 2b_{211}$
b_{60}	b_{117}	$b_{209} + b_{210}$
b_{60}	b_{119}	$b_{210} + b_{211}$
b_{60}	b_{122}	$b_{209} + b_{211}$
b_{60}	b_{124}	b_{212}
b_{60}	b_{125}	b_{212}
b_{60}	b_{127}	$b_{212} + b_{213}$
b_{60}	b_{130}	$2b_{212}$
b_{60}	b_{132}	$b_{212} + b_{213}$
b_{60}	b_{135}	b_{212}
b_{60}	b_{140}	b_{214}
b_{60}	b_{143}	b_{214}
b_{60}	b_{145}	b_{214}
b_{61}	b_{95}	b_{210}
b_{61}	b_{118}	b_{212}
b_{61}	b_{138}	b_{214}
b_{61}	b_{139}	b_{214}
b_{63}	b_{139}	b_{214}
b_{64}	b_{95}	b_{209}
b_{64}	b_{118}	b_{212}
b_{64}	b_{138}	b_{214}
b_{65}	b_{137}	b_{214}
b_{66}	b_{139}	b_{214}
b_{67}	b_{95}	b_{211}

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{67}	b_{118}	$b_{212} + b_{213}$
b_{67}	b_{126}	b_{214}
b_{67}	b_{138}	b_{214}
b_{69}	b_{87}	b_{205}
b_{69}	b_{103}	b_{211}
b_{69}	b_{105}	$2b_{209} + b_{210}$
b_{69}	b_{109}	b_{213}
b_{69}	b_{111}	b_{213}
b_{69}	b_{115}	$2b_{212}$
b_{69}	b_{123}	b_{212}
b_{69}	b_{130}	b_{214}
b_{69}	b_{133}	b_{214}
b_{70}	b_{105}	$b_{210} + b_{211}$
b_{70}	b_{109}	$2b_{212}$
b_{70}	b_{115}	$b_{212} + b_{213}$
b_{70}	b_{122}	b_{212}
b_{70}	b_{125}	b_{214}
b_{70}	b_{130}	b_{214}
b_{70}	b_{132}	b_{214}
b_{71}	b_{84}	$b_{204} + b_{206}$
b_{71}	b_{87}	b_{207}
b_{71}	b_{101}	$2b_{209} + b_{210}$
b_{71}	b_{103}	$b_{209} + b_{211}$
b_{71}	b_{105}	$b_{209} + b_{210} + 2b_{211}$
b_{71}	b_{108}	b_{212}
b_{71}	b_{111}	b_{212}
b_{71}	b_{115}	$b_{212} + b_{213}$
b_{71}	b_{119}	$2b_{212}$
b_{71}	b_{123}	$b_{212} + b_{213}$
b_{71}	b_{127}	b_{214}
b_{71}	b_{133}	b_{214}
b_{71}	b_{136}	b_{214}
b_{72}	b_{84}	$b_{206} + b_{207} + b_{208}$
b_{72}	b_{94}	$b_{209} + b_{210}$
b_{72}	b_{101}	$b_{209} + b_{210} + 2b_{211}$
b_{72}	b_{105}	$b_{209} + b_{210} + 2b_{211}$
b_{72}	b_{108}	$b_{212} + b_{213}$
b_{72}	b_{115}	$2b_{212}$
continued on next page...		

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{72}	b_{117}	$2b_{212}$
b_{72}	b_{119}	$b_{212} + b_{213}$
b_{72}	b_{122}	$b_{212} + b_{213}$
b_{72}	b_{124}	b_{214}
b_{72}	b_{127}	b_{214}
b_{72}	b_{132}	b_{214}
b_{72}	b_{135}	b_{214}
b_{73}	b_{109}	b_{213}
b_{73}	b_{125}	b_{214}
b_{74}	b_{84}	$b_{204} + b_{205} + b_{207}$
b_{74}	b_{94}	$b_{209} + b_{211}$
b_{74}	b_{101}	$b_{209} + b_{211}$
b_{74}	b_{108}	b_{212}
b_{74}	b_{113}	b_{212}
b_{74}	b_{117}	$b_{212} + b_{213}$
b_{74}	b_{124}	b_{214}
b_{74}	b_{134}	b_{214}
b_{75}	b_{84}	b_{206}
b_{75}	b_{101}	$b_{209} + b_{210}$
b_{75}	b_{105}	$b_{209} + b_{211}$
b_{75}	b_{108}	b_{212}
b_{75}	b_{109}	b_{212}
b_{75}	b_{115}	$b_{212} + b_{213}$
b_{75}	b_{119}	b_{212}
b_{75}	b_{127}	b_{214}
b_{75}	b_{130}	b_{214}
b_{77}	b_{95}	b_{212}
b_{77}	b_{118}	b_{214}
b_{79}	b_{84}	b_{209}
b_{79}	b_{87}	b_{209}
b_{79}	b_{101}	b_{212}
b_{79}	b_{103}	b_{212}
b_{79}	b_{105}	$b_{212} + b_{213}$
b_{79}	b_{119}	b_{214}
b_{79}	b_{123}	b_{214}
b_{80}	b_{84}	$b_{210} + b_{211}$
b_{80}	b_{94}	b_{212}
b_{80}	b_{101}	$b_{212} + b_{213}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{80}	b_{105}	$2b_{212}$
b_{80}	b_{117}	b_{214}
b_{80}	b_{119}	b_{214}
b_{80}	b_{122}	b_{214}
b_{81}	b_{84}	$b_{209} + b_{211}$
b_{81}	b_{94}	$b_{212} + b_{213}$
b_{81}	b_{101}	b_{212}
b_{81}	b_{113}	b_{214}
b_{81}	b_{117}	b_{214}
b_{82}	b_{87}	b_{211}
b_{82}	b_{103}	$b_{212} + b_{213}$
b_{82}	b_{105}	$2b_{212}$
b_{82}	b_{111}	b_{214}
b_{82}	b_{115}	b_{214}
b_{82}	b_{123}	b_{214}
b_{83}	b_{105}	$b_{212} + b_{213}$
b_{83}	b_{115}	b_{214}
b_{83}	b_{122}	b_{214}
b_{84}	b_{86}	b_{210}
b_{84}	b_{88}	$b_{209} + b_{210}$
b_{84}	b_{91}	$b_{209} + b_{211}$
b_{84}	b_{96}	b_{212}
b_{84}	b_{98}	$b_{212} + b_{213}$
b_{84}	b_{102}	b_{212}
b_{84}	b_{107}	b_{212}
b_{84}	b_{114}	b_{214}
b_{84}	b_{121}	b_{214}
b_{85}	b_{105}	b_{212}
b_{85}	b_{109}	b_{214}
b_{85}	b_{115}	b_{214}
b_{86}	b_{94}	b_{212}
b_{86}	b_{113}	b_{214}
b_{86}	b_{116}	b_{214}
b_{87}	b_{92}	b_{212}
b_{87}	b_{104}	b_{213}
b_{87}	b_{112}	b_{214}
b_{88}	b_{101}	$2b_{212}$
b_{88}	b_{105}	$b_{212} + b_{213}$

continued on next page...

Table 33. Multiplication table for E_6/P_3 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{88}	b_{108}	b_{214}
b_{88}	b_{115}	b_{214}
b_{88}	b_{119}	b_{214}
b_{89}	b_{95}	b_{213}
b_{89}	b_{118}	b_{214}
b_{90}	b_{109}	b_{214}
b_{91}	b_{94}	b_{212}
b_{91}	b_{101}	$b_{212} + b_{213}$
b_{91}	b_{108}	b_{214}
b_{91}	b_{117}	b_{214}
b_{92}	b_{103}	b_{214}
b_{92}	b_{105}	b_{214}
b_{93}	b_{105}	b_{214}
b_{94}	b_{98}	b_{214}
b_{94}	b_{102}	b_{214}
b_{95}	b_{97}	b_{214}
b_{96}	b_{101}	b_{214}
b_{96}	b_{105}	b_{214}
b_{98}	b_{101}	b_{214}
b_{100}	b_{105}	b_{214}
b_{101}	b_{107}	b_{214}
b_{103}	b_{104}	b_{214}

Table 34. Schubert classes for E_6/P_4

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_{719}	$(1,1,1,1,1,1)$
4	b_1	1	0	b_{718}	$(1,2,2,-1,2,1)$
24	b_2	2	0	b_{717}	$(1,-2,2,1,2,1)$
34	b_3	2	0	b_{716}	$(3,2,-2,1,2,1)$
54	b_4	2	0	b_{715}	$(1,2,2,1,-2,3)$
134	b_5	3	0	b_{714}	$(-3,2,1,1,2,1)$
234	b_6	3	0	b_{713}	$(3,-2,-2,3,2,1)$
254	b_7	3	0	b_{712}	$(1,-2,2,3,-2,3)$
354	b_8	3	0	b_{711}	$(3,2,-2,3,-2,3)$
654	b_9	3	0	b_{710}	$(1,2,2,1,1,-3)$
1234	b_{10}	4	0	b_{709}	$(-3,-2,1,3,2,1)$
1354	b_{11}	4	0	b_{708}	$(-3,2,1,3,-2,3)$

continued on next page...

TABLE 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
2354	b_{12}	4	0	b_{707}	$(3,-2,-2,5,-2,3)$
2654	b_{13}	4	0	b_{706}	$(1,-2,2,3,1,-3)$
3654	b_{14}	4	0	b_{705}	$(3,2,-2,3,1,-3)$
4234	b_{15}	4	0	b_{704}	$(3,1,1,-3,5,1)$
4254	b_{16}	4	0	b_{703}	$(1,1,5,-3,1,3)$
4354	b_{17}	4	0	b_{702}	$(3,5,1,-3,1,3)$
12354	b_{18}	5	0	b_{701}	$(-3,-2,1,5,-2,3)$
13654	b_{19}	5	0	b_{700}	$(-3,2,1,3,1,-3)$
14234	b_{20}	5	0	b_{699}	$(-3,1,4,-3,5,1)$
14354	b_{21}	5	0	b_{698}	$(-3,5,4,-3,1,3)$
23654	b_{22}	5	0	b_{697}	$(3,-2,-2,5,1,-3)$
24354	b_{23}	5	1	b_{696}	$(3,-5,1,2,1,3)$
34254	b_{24}	5	1	b_{695}	$(6,1,-5,2,1,3)$
42354	b_{25}	5	1	b_{694}	$(3,3,3,-5,3,3)$
42654	b_{26}	5	0	b_{693}	$(1,1,5,-3,4,-3)$
43654	b_{27}	5	0	b_{692}	$(3,5,1,-3,4,-3)$
54234	b_{28}	5	1	b_{691}	$(3,1,1,2,-5,6)$
123654	b_{29}	6	0	b_{690}	$(-3,-2,1,5,1,-3)$
124354	b_{30}	6	1	b_{689}	$(-3,-5,4,2,1,3)$
134254	b_{31}	6	2	b_{688}	$(-6,1,1,2,1,3)$
142354	b_{32}	6	1	b_{687}	$(-3,3,6,-5,3,3)$
143654	b_{33}	6	0	b_{686}	$(-3,5,4,-3,4,-3)$
154234	b_{34}	6	1	b_{685}	$(-3,1,4,2,-5,6)$
242354	b_{35}	6	1	b_{684}	$(3,-3,3,-2,3,3)$
243654	b_{36}	6	1	b_{683}	$(3,-5,1,2,4,-3)$
314234	b_{37}	6	0	b_{682}	$(1,1,-4,1,5,1)$
314354	b_{38}	6	0	b_{681}	$(1,5,-4,1,1,3)$
342354	b_{39}	6	1	b_{680}	$(6,3,-3,-2,3,3)$
342654	b_{40}	6	1	b_{679}	$(6,1,-5,2,4,-3)$
423654	b_{41}	6	1	b_{678}	$(3,3,3,-5,6,-3)$
454234	b_{42}	6	1	b_{677}	$(3,3,3,-2,-3,6)$
542654	b_{43}	6	0	b_{676}	$(1,1,5,1,-4,1)$
543654	b_{44}	6	0	b_{675}	$(3,5,1,1,-4,1)$
654234	b_{45}	6	2	b_{674}	$(3,1,1,2,1,-6)$
1242354	b_{46}	7	1	b_{673}	$(-3,-3,6,-2,3,3)$
1243654	b_{47}	7	1	b_{672}	$(-3,-5,4,2,4,-3)$
1342354	b_{48}	7	2	b_{671}	$(-6,3,3,-2,3,3)$
1342654	b_{49}	7	2	b_{670}	$(-6,1,1,2,4,-3)$

continued on next page...

Table 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
1423654	b_{50}	7	1	b_{669}	$(-3,3,6,-5,6,-3)$
1454234	b_{51}	7	1	b_{668}	$(-3,3,6,-2,-3,6)$
1543654	b_{52}	7	0	b_{667}	$(-3,5,4,1,-4,1)$
1654234	b_{53}	7	2	b_{666}	$(-3,1,4,2,1,-6)$
2314354	b_{54}	7	1	b_{665}	$(1,-5,-4,6,1,3)$
2342354	b_{55}	7	1	b_{664}	$(6,-3,-3,1,3,3)$
2423654	b_{56}	7	1	b_{663}	$(3,-3,3,-2,6,-3)$
2454234	b_{57}	7	1	b_{662}	$(3,-3,3,1,-3,6)$
2543654	b_{58}	7	1	b_{661}	$(3,-5,1,6,-4,1)$
3142354	b_{59}	7	2	b_{660}	$(3,3,-6,1,3,3)$
3143654	b_{60}	7	0	b_{659}	$(1,5,-4,1,4,-3)$
3154234	b_{61}	7	1	b_{658}	$(1,1,-4,6,-5,6)$
3423654	b_{62}	7	1	b_{657}	$(6,3,-3,-2,6,-3)$
3454234	b_{63}	7	1	b_{656}	$(6,3,-3,1,-3,6)$
3542654	b_{64}	7	1	b_{655}	$(6,1,-5,6,-4,1)$
4654234	b_{65}	7	2	b_{654}	$(3,3,3,-2,3,-6)$
5423654	b_{66}	7	2	b_{653}	$(3,3,3,1,-6,3)$
12342354	b_{67}	8	2	b_{652}	$(-6,-3,3,1,3,3)$
12423654	b_{68}	8	1	b_{651}	$(-3,-3,6,-2,6,-3)$
12454234	b_{69}	8	1	b_{650}	$(-3,-3,6,1,-3,6)$
12543654	b_{70}	8	1	b_{649}	$(-3,-5,4,6,-4,1)$
13142354	b_{71}	8	2	b_{648}	$(-3,3,-3,1,3,3)$
13423654	b_{72}	8	2	b_{647}	$(-6,3,3,-2,6,-3)$
13454234	b_{73}	8	2	b_{646}	$(-6,3,3,1,-3,6)$
13542654	b_{74}	8	2	b_{645}	$(-6,1,1,6,-4,1)$
14654234	b_{75}	8	2	b_{644}	$(-3,3,6,-2,3,-6)$
15423654	b_{76}	8	2	b_{643}	$(-3,3,6,1,-6,3)$
23142354	b_{77}	8	2	b_{642}	$(3,-3,-6,4,3,3)$
23143654	b_{78}	8	1	b_{641}	$(1,-5,-4,6,4,-3)$
23423654	b_{79}	8	1	b_{640}	$(6,-3,-3,1,6,-3)$
23454234	b_{80}	8	1	b_{639}	$(6,-3,-3,4,-3,6)$
24654234	b_{81}	8	2	b_{638}	$(3,-3,3,1,3,-6)$
25423654	b_{82}	8	2	b_{637}	$(3,-3,3,4,-6,3)$
31423654	b_{83}	8	2	b_{636}	$(3,3,-6,1,6,-3)$
31454234	b_{84}	8	2	b_{635}	$(3,3,-6,4,-3,6)$
31543654	b_{85}	8	0	b_{634}	$(1,5,-4,5,-4,1)$
31654234	b_{86}	8	2	b_{633}	$(1,1,-4,6,1,-6)$
34654234	b_{87}	8	2	b_{632}	$(6,3,-3,1,3,-6)$

continued on next page...

TABLE 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
35423654	b_{88}	8	2	b_{631}	$(6, 3, -3, 4, -6, 3)$
42314354	b_{89}	8	2	b_{630}	$(1, 1, 2, -6, 7, 3)$
42543654	b_{90}	8	2	b_{629}	$(3, 1, 7, -6, 2, 1)$
43154234	b_{91}	8	2	b_{628}	$(1, 7, 2, -6, 1, 6)$
43542654	b_{92}	8	2	b_{627}	$(6, 7, 1, -6, 2, 1)$
54654234	b_{93}	8	2	b_{626}	$(3, 3, 3, 1, -3, -3)$
123142354	b_{94}	9	2	b_{625}	$(-3, -3, -3, 4, 3, 3)$
123423654	b_{95}	9	2	b_{624}	$(-6, -3, 3, 1, 6, -3)$
123454234	b_{96}	9	2	b_{623}	$(-6, -3, 3, 4, -3, 6)$
124654234	b_{97}	9	2	b_{622}	$(-3, -3, 6, 1, 3, -6)$
125423654	b_{98}	9	2	b_{621}	$(-3, -3, 6, 4, -6, 3)$
131423654	b_{99}	9	2	b_{620}	$(-3, 3, -3, 1, 6, -3)$
131454234	b_{100}	9	2	b_{619}	$(-3, 3, -3, 4, -3, 6)$
134654234	b_{101}	9	3	b_{618}	$(-6, 3, 3, 1, 3, -6)$
135423654	b_{102}	9	3	b_{617}	$(-6, 3, 3, 4, -6, 3)$
142543654	b_{103}	9	2	b_{616}	$(-3, 1, 10, -6, 2, 1)$
143542654	b_{104}	9	3	b_{615}	$(-6, 7, 7, -6, 2, 1)$
154654234	b_{105}	9	2	b_{614}	$(-3, 3, 6, 1, -3, -3)$
231423654	b_{106}	9	2	b_{613}	$(3, -3, -6, 4, 6, -3)$
231454234	b_{107}	9	2	b_{612}	$(3, -3, -6, 7, -3, 6)$
231543654	b_{108}	9	1	b_{611}	$(1, -5, -4, 10, -4, 1)$
234654234	b_{109}	9	2	b_{610}	$(6, -3, -3, 4, 3, -6)$
235423654	b_{110}	9	2	b_{609}	$(6, -3, -3, 7, -6, 3)$
243154234	b_{111}	9	3	b_{608}	$(1, -7, 2, 1, 1, 6)$
243542654	b_{112}	9	3	b_{607}	$(6, -7, 1, 1, 2, 1)$
254654234	b_{113}	9	2	b_{606}	$(3, -3, 3, 4, -3, -3)$
314654234	b_{114}	9	3	b_{605}	$(3, 3, -6, 4, 3, -6)$
315423654	b_{115}	9	3	b_{604}	$(3, 3, -6, 7, -6, 3)$
342314354	b_{116}	9	2	b_{603}	$(3, 1, -2, -4, 7, 3)$
342543654	b_{117}	9	3	b_{602}	$(10, 1, -7, 1, 2, 1)$
343154234	b_{118}	9	2	b_{601}	$(3, 7, -2, -4, 1, 6)$
354654234	b_{119}	9	2	b_{600}	$(6, 3, -3, 4, -3, -3)$
423143654	b_{120}	9	2	b_{599}	$(1, 1, 2, -6, 10, -3)$
423454234	b_{121}	9	1	b_{598}	$(6, 1, 1, -4, 1, 6)$
425423654	b_{122}	9	2	b_{597}	$(3, 1, 7, -4, -2, 3)$
431543654	b_{123}	9	0	b_{596}	$(1, 10, 1, -5, 1, 1)$
431654234	b_{124}	9	3	b_{595}	$(1, 7, 2, -6, 7, -6)$
435423654	b_{125}	9	2	b_{594}	$(6, 7, 1, -4, -2, 3)$

continued on next page...

Table 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
542314354	b_{126}	9	3	b_{593}	$(1, 1, 2, 1, -7, 10)$
1231423654	b_{127}	10	2	b_{592}	$(-3, -3, -3, 4, 6, -3)$
1231454234	b_{128}	10	2	b_{591}	$(-3, -3, -3, 7, -3, 6)$
1234654234	b_{129}	10	3	b_{590}	$(-6, -3, 3, 4, 3, -6)$
1235423654	b_{130}	10	3	b_{589}	$(-6, -3, 3, 7, -6, 3)$
1243542654	b_{131}	10	4	b_{588}	$(-6, -7, 7, 1, 2, 1)$
1254654234	b_{132}	10	2	b_{587}	$(-3, -3, 6, 4, -3, -3)$
1314654234	b_{133}	10	3	b_{586}	$(-3, 3, -3, 4, 3, -6)$
1315423654	b_{134}	10	3	b_{585}	$(-3, 3, -3, 7, -6, 3)$
1342314354	b_{135}	10	2	b_{584}	$(-3, 1, 1, -4, 7, 3)$
1342543654	b_{136}	10	5	b_{583}	$(-10, 1, 3, 1, 2, 1)$
1343154234	b_{137}	10	2	b_{582}	$(-3, 7, 1, -4, 1, 6)$
1354654234	b_{138}	10	3	b_{581}	$(-6, 3, 3, 4, -3, -3)$
1423454234	b_{139}	10	2	b_{580}	$(-6, 1, 7, -4, 1, 6)$
1425423654	b_{140}	10	2	b_{579}	$(-3, 1, 10, -4, -2, 3)$
1435423654	b_{141}	10	3	b_{578}	$(-6, 7, 7, -4, -2, 3)$
2314654234	b_{142}	10	3	b_{577}	$(3, -3, -6, 7, 3, -6)$
2315423654	b_{143}	10	3	b_{576}	$(3, -3, -6, 10, -6, 3)$
2343154234	b_{144}	10	3	b_{575}	$(3, -7, -2, 3, 1, 6)$
2354654234	b_{145}	10	2	b_{574}	$(6, -3, -3, 7, -3, -3)$
2431543654	b_{146}	10	2	b_{573}	$(1, -10, 1, 5, 1, 1)$
2431654234	b_{147}	10	4	b_{572}	$(1, -7, 2, 1, 7, -6)$
2435423654	b_{148}	10	3	b_{571}	$(6, -7, 1, 3, -2, 3)$
3142543654	b_{149}	10	4	b_{570}	$(7, 1, -10, 4, 2, 1)$
3143542654	b_{150}	10	4	b_{569}	$(1, 7, -7, 1, 2, 1)$
3154654234	b_{151}	10	3	b_{568}	$(3, 3, -6, 7, -3, -3)$
3423143654	b_{152}	10	2	b_{567}	$(3, 1, -2, -4, 10, -3)$
3425423654	b_{153}	10	3	b_{566}	$(10, 1, -7, 3, -2, 3)$
3431654234	b_{154}	10	3	b_{565}	$(3, 7, -2, -4, 7, -6)$
3542314354	b_{155}	10	3	b_{564}	$(3, 1, -2, 3, -7, 10)$
4231454234	b_{156}	10	3	b_{563}	$(3, 4, 1, -7, 4, 6)$
4231543654	b_{157}	10	3	b_{562}	$(1, 5, 6, -10, 6, 1)$
4234654234	b_{158}	10	2	b_{561}	$(6, 1, 1, -4, 7, -6)$
4235423654	b_{159}	10	3	b_{560}	$(6, 4, 4, -7, 1, 3)$
4254654234	b_{160}	10	2	b_{559}	$(3, 1, 7, -4, 1, -3)$
4315423654	b_{161}	10	4	b_{558}	$(3, 10, 1, -7, 1, 3)$
4354654234	b_{162}	10	2	b_{557}	$(6, 7, 1, -4, 1, -3)$
5423143654	b_{163}	10	4	b_{556}	$(1, 1, 2, 4, -10, 7)$

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Table 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
5431654234	b_{164}	10	4	b_{555}	$(1,7,2,1,-7,1)$
6542314354	b_{165}	10	5	b_{554}	$(1,1,2,1,3,-10)$
12314654234	b_{166}	11	3	b_{553}	$(-3,-3,-3,7,3,-6)$
12315423654	b_{167}	11	3	b_{552}	$(-3,-3,-3,10,-6,3)$
12343154234	b_{168}	11	3	b_{551}	$(-3,-7,1,3,1,6)$
12354654234	b_{169}	11	3	b_{550}	$(-6,-3,3,7,-3,-3)$
12435423654	b_{170}	11	4	b_{549}	$(-6,-7,7,3,-2,3)$
13142543654	b_{171}	11	5	b_{548}	$(-7,1,-3,4,2,1)$
13154654234	b_{172}	11	3	b_{547}	$(-3,3,-3,7,-3,-3)$
13423143654	b_{173}	11	2	b_{546}	$(-3,1,1,-4,10,-3)$
13425423654	b_{174}	11	5	b_{545}	$(-10,1,3,3,-2,3)$
13431654234	b_{175}	11	3	b_{544}	$(-3,7,1,-4,7,-6)$
13542314354	b_{176}	11	3	b_{543}	$(-3,1,1,3,-7,10)$
14231454234	b_{177}	11	3	b_{542}	$(-3,4,4,-7,4,6)$
14234654234	b_{178}	11	3	b_{541}	$(-6,1,7,-4,7,-6)$
14235423654	b_{179}	11	4	b_{540}	$(-6,4,10,-7,1,3)$
14254654234	b_{180}	11	2	b_{539}	$(-3,1,10,-4,1,-3)$
14315423654	b_{181}	11	4	b_{538}	$(-3,10,4,-7,1,3)$
14354654234	b_{182}	11	3	b_{537}	$(-6,7,7,-4,1,-3)$
23143542654	b_{183}	11	5	b_{536}	$(1,-7,-7,8,2,1)$
23154654234	b_{184}	11	3	b_{535}	$(3,-3,-6,10,-3,-3)$
23431654234	b_{185}	11	4	b_{534}	$(3,-7,-2,3,7,-6)$
24231454234	b_{186}	11	3	b_{533}	$(3,-4,1,-3,4,6)$
24231543654	b_{187}	11	3	b_{532}	$(1,-5,6,-5,6,1)$
24235423654	b_{188}	11	3	b_{531}	$(6,-4,4,-3,1,3)$
24315423654	b_{189}	11	6	b_{530}	$(3,-10,1,3,1,3)$
24354654234	b_{190}	11	3	b_{529}	$(6,-7,1,3,1,-3)$
25431654234	b_{191}	11	5	b_{528}	$(1,-7,2,8,-7,1)$
31423454234	b_{192}	11	3	b_{527}	$(1,1,-7,3,1,6)$
31425423654	b_{193}	11	4	b_{526}	$(7,1,-10,6,-2,3)$
31435423654	b_{194}	11	4	b_{525}	$(1,7,-7,3,-2,3)$
34231543654	b_{195}	11	4	b_{524}	$(7,5,-6,-4,6,1)$
34235423654	b_{196}	11	3	b_{523}	$(10,4,-4,-3,1,3)$
34254654234	b_{197}	11	3	b_{522}	$(10,1,-7,3,1,-3)$
35423143654	b_{198}	11	4	b_{521}	$(3,1,-2,6,-10,7)$
35431654234	b_{199}	11	4	b_{520}	$(3,7,-2,3,-7,1)$
36542314354	b_{200}	11	5	b_{519}	$(3,1,-2,3,3,-10)$
42314654234	b_{201}	11	4	b_{518}	$(3,4,1,-7,10,-6)$

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Table 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
42315423654	b_{202}	11	5	b_{517}	$(3, 7, 4, -10, 4, 3)$
42354654234	b_{203}	11	3	b_{516}	$(6, 4, 4, -7, 4, -3)$
43154654234	b_{204}	11	4	b_{515}	$(3, 10, 1, -7, 4, -3)$
43542314354	b_{205}	11	3	b_{514}	$(3, 4, 1, -3, -4, 10)$
45423143654	b_{206}	11	4	b_{513}	$(1, 5, 6, -4, -6, 7)$
54234654234	b_{207}	11	3	b_{512}	$(6, 1, 1, 3, -7, 1)$
56542314354	b_{208}	11	5	b_{511}	$(1, 1, 2, 4, -3, -7)$
123154654234	b_{209}	12	3	b_{510}	$(-3, -3, -3, 10, -3, -3)$
123431654234	b_{210}	12	4	b_{509}	$(-3, -7, 1, 3, 7, -6)$
124231454234	b_{211}	12	3	b_{508}	$(-3, -4, 4, -3, 4, 6)$
124235423654	b_{212}	12	4	b_{507}	$(-6, -4, 10, -3, 1, 3)$
124315423654	b_{213}	12	6	b_{506}	$(-3, -10, 4, 3, 1, 3)$
124354654234	b_{214}	12	4	b_{505}	$(-6, -7, 7, 3, 1, -3)$
131425423654	b_{215}	12	5	b_{504}	$(-7, 1, -3, 6, -2, 3)$
134231543654	b_{216}	12	5	b_{503}	$(-7, 5, 1, -4, 6, 1)$
134235423654	b_{217}	12	5	b_{502}	$(-10, 4, 6, -3, 1, 3)$
134254654234	b_{218}	12	5	b_{501}	$(-10, 1, 3, 3, 1, -3)$
135423143654	b_{219}	12	4	b_{500}	$(-3, 1, 1, 6, -10, 7)$
135431654234	b_{220}	12	4	b_{499}	$(-3, 7, 1, 3, -7, 1)$
136542314354	b_{221}	12	5	b_{498}	$(-3, 1, 1, 3, 3, -10)$
142314654234	b_{222}	12	4	b_{497}	$(-3, 4, 4, -7, 10, -6)$
142315423654	b_{223}	12	5	b_{496}	$(-3, 7, 7, -10, 4, 3)$
142354654234	b_{224}	12	4	b_{495}	$(-6, 4, 10, -7, 4, -3)$
143154654234	b_{225}	12	4	b_{494}	$(-3, 10, 4, -7, 4, -3)$
143542314354	b_{226}	12	3	b_{493}	$(-3, 4, 4, -3, -4, 10)$
154234654234	b_{227}	12	4	b_{492}	$(-6, 1, 7, 3, -7, 1)$
231435423654	b_{228}	12	5	b_{491}	$(1, -7, -7, 10, -2, 3)$
234231543654	b_{229}	12	4	b_{490}	$(7, -5, -6, 1, 6, 1)$
234235423654	b_{230}	12	3	b_{489}	$(10, -4, -4, 1, 1, 3)$
235431654234	b_{231}	12	5	b_{488}	$(3, -7, -2, 10, -7, 1)$
242314654234	b_{232}	12	4	b_{487}	$(3, -4, 1, -3, 10, -6)$
242315423654	b_{233}	12	6	b_{486}	$(3, -7, 4, -3, 4, 3)$
242354654234	b_{234}	12	3	b_{485}	$(6, -4, 4, -3, 4, -3)$
243154654234	b_{235}	12	6	b_{484}	$(3, -10, 1, 3, 4, -3)$
243542314354	b_{236}	12	3	b_{483}	$(3, -4, 1, 1, -4, 10)$
245423143654	b_{237}	12	4	b_{482}	$(1, -5, 6, 1, -6, 7)$
314231454234	b_{238}	12	3	b_{481}	$(1, 4, -4, -3, 4, 6)$
314234654234	b_{239}	12	4	b_{480}	$(1, 1, -7, 3, 7, -6)$

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Table 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
314235423654	b_{240}	12	6	b_{479}	$(4, 4, -10, 3, 1, 3)$
314254654234	b_{241}	12	4	b_{478}	$(7, 1, -10, 6, 1, -3)$
314315423654	b_{242}	12	4	b_{477}	$(1, 10, -4, -3, 1, 3)$
314354654234	b_{243}	12	4	b_{476}	$(1, 7, -7, 3, 1, -3)$
342315423654	b_{244}	12	5	b_{475}	$(7, 7, -4, -6, 4, 3)$
342354654234	b_{245}	12	3	b_{474}	$(10, 4, -4, -3, 4, -3)$
345423143654	b_{246}	12	5	b_{473}	$(7, 5, -6, 2, -6, 7)$
356542314354	b_{247}	12	5	b_{472}	$(3, 1, -2, 6, -3, -7)$
423143542654	b_{248}	12	6	b_{471}	$(1, 1, 1, -8, 10, 1)$
423154654234	b_{249}	12	5	b_{470}	$(3, 7, 4, -10, 7, -3)$
425431654234	b_{250}	12	6	b_{469}	$(1, 1, 10, -8, 1, 1)$
435423143654	b_{251}	12	5	b_{468}	$(3, 7, 4, -6, -4, 7)$
435431654234	b_{252}	12	4	b_{467}	$(3, 10, 1, -3, -4, 1)$
436542314354	b_{253}	12	5	b_{466}	$(3, 4, 1, -3, 6, -10)$
454234654234	b_{254}	12	3	b_{465}	$(6, 4, 4, -3, -4, 1)$
456542314354	b_{255}	12	5	b_{464}	$(1, 5, 6, -4, 1, -7)$
542314654234	b_{256}	12	6	b_{463}	$(3, 4, 1, 3, -10, 4)$
1234231543654	b_{257}	13	5	b_{462}	$(-7, -5, 1, 1, 6, 1)$
1234235423654	b_{258}	13	5	b_{461}	$(-10, -4, 6, 1, 1, 3)$
1235431654234	b_{259}	13	5	b_{460}	$(-3, -7, 1, 10, -7, 1)$
1242314654234	b_{260}	13	4	b_{459}	$(-3, -4, 4, -3, 10, -6)$
1242315423654	b_{261}	13	6	b_{458}	$(-3, -7, 7, -3, 4, 3)$
1242354654234	b_{262}	13	4	b_{457}	$(-6, -4, 10, -3, 4, -3)$
1243154654234	b_{263}	13	6	b_{456}	$(-3, -10, 4, 3, 4, -3)$
1243542314354	b_{264}	13	3	b_{455}	$(-3, -4, 4, 1, -4, 10)$
1314235423654	b_{265}	13	6	b_{454}	$(-4, 4, -6, 3, 1, 3)$
1314254654234	b_{266}	13	5	b_{453}	$(-7, 1, -3, 6, 1, -3)$
1342315423654	b_{267}	13	6	b_{452}	$(-7, 7, 3, -6, 4, 3)$
1342354654234	b_{268}	13	5	b_{451}	$(-10, 4, 6, -3, 4, -3)$
1345423143654	b_{269}	13	6	b_{450}	$(-7, 5, 1, 2, -6, 7)$
1356542314354	b_{270}	13	5	b_{449}	$(-3, 1, 1, 6, -3, -7)$
1423154654234	b_{271}	13	5	b_{448}	$(-3, 7, 7, -10, 7, -3)$
1435423143654	b_{272}	13	5	b_{447}	$(-3, 7, 7, -6, -4, 7)$
1435431654234	b_{273}	13	4	b_{446}	$(-3, 10, 4, -3, -4, 1)$
1436542314354	b_{274}	13	5	b_{445}	$(-3, 4, 4, -3, 6, -10)$
1454234654234	b_{275}	13	4	b_{444}	$(-6, 4, 10, -3, -4, 1)$
1542314654234	b_{276}	13	6	b_{443}	$(-3, 4, 4, 3, -10, 4)$
2314231454234	b_{277}	13	3	b_{442}	$(1, -4, -4, 1, 4, 6)$

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Table 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
2314235423654	b_{278}	13	6	b_{441}	$(4,-4,-10,7,1,3)$
2314315423654	b_{279}	13	6	b_{440}	$(1,-10,-4,7,1,3)$
2314354654234	b_{280}	13	5	b_{439}	$(1,-7,-7,10,1,-3)$
2342315423654	b_{281}	13	6	b_{438}	$(7,-7,-4,1,4,3)$
2342354654234	b_{282}	13	3	b_{437}	$(10,-4,-4,1,4,-3)$
2345423143654	b_{283}	13	5	b_{436}	$(7,-5,-6,7,-6,7)$
2423154654234	b_{284}	13	6	b_{435}	$(3,-7,4,-3,7,-3)$
2435423143654	b_{285}	13	6	b_{434}	$(3,-7,4,1,-4,7)$
2435431654234	b_{286}	13	6	b_{433}	$(3,-10,1,7,-4,1)$
2436542314354	b_{287}	13	5	b_{432}	$(3,-4,1,1,6,-10)$
2454234654234	b_{288}	13	3	b_{431}	$(6,-4,4,1,-4,1)$
2456542314354	b_{289}	13	5	b_{430}	$(1,-5,6,1,1,-7)$
2542314654234	b_{290}	13	6	b_{429}	$(3,-4,1,7,-10,4)$
3142314654234	b_{291}	13	4	b_{428}	$(1,4,-4,-3,10,-6)$
3142315423654	b_{292}	13	6	b_{427}	$(4,7,-7,-3,4,3)$
3142354654234	b_{293}	13	6	b_{426}	$(4,4,-10,3,4,-3)$
3143154654234	b_{294}	13	4	b_{425}	$(1,10,-4,-3,4,-3)$
3143542314354	b_{295}	13	3	b_{424}	$(1,4,-4,1,-4,10)$
3154234654234	b_{296}	13	5	b_{423}	$(1,1,-7,10,-7,1)$
3423154654234	b_{297}	13	5	b_{422}	$(7,7,-4,-6,7,-3)$
3425431654234	b_{298}	13	8	b_{421}	$(11,1,-10,2,1,1)$
3435423143654	b_{299}	13	5	b_{420}	$(7,7,-4,-2,-4,7)$
3454234654234	b_{300}	13	3	b_{419}	$(10,4,-4,1,-4,1)$
3456542314354	b_{301}	13	6	b_{418}	$(7,5,-6,2,1,-7)$
4231435423654	b_{302}	13	7	b_{417}	$(1,3,3,-10,8,3)$
4235431654234	b_{303}	13	7	b_{416}	$(3,3,8,-10,3,1)$
4356542314354	b_{304}	13	6	b_{415}	$(3,7,4,-6,3,-7)$
4542314654234	b_{305}	13	6	b_{414}	$(3,7,4,-3,-7,4)$
5423143542654	b_{306}	13	8	b_{413}	$(1,1,1,2,-10,11)$
5436542314354	b_{307}	13	6	b_{412}	$(3,4,1,3,-6,-4)$
12314235423654	b_{308}	14	6	b_{411}	$(-4,-4,-6,7,1,3)$
12342315423654	b_{309}	14	7	b_{410}	$(-7,-7,3,1,4,3)$
12342354654234	b_{310}	14	5	b_{409}	$(-10,-4,6,1,4,-3)$
12345423143654	b_{311}	14	6	b_{408}	$(-7,-5,1,7,-6,7)$
12423154654234	b_{312}	14	6	b_{407}	$(-3,-7,7,-3,7,-3)$
12435423143654	b_{313}	14	6	b_{406}	$(-3,-7,7,1,-4,7)$
12435431654234	b_{314}	14	6	b_{405}	$(-3,-10,4,7,-4,1)$
12436542314354	b_{315}	14	5	b_{404}	$(-3,-4,4,1,6,-10)$

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Table 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
12454234654234	b_{316}	14	4	b_{403}	$(-6,-4,10,1,-4,1)$
12542314654234	b_{317}	14	6	b_{402}	$(-3,-4,4,7,-10,4)$
13142315423654	b_{318}	14	6	b_{401}	$(-4,7,-3,-3,4,3)$
13142354654234	b_{319}	14	6	b_{400}	$(-4,4,-6,3,4,-3)$
13423154654234	b_{320}	14	6	b_{399}	$(-7,7,3,-6,7,-3)$
13425431654234	b_{321}	14	10	b_{398}	$(-11,1,1,2,1,1)$
13435423143654	b_{322}	14	6	b_{397}	$(-7,7,3,-2,-4,7)$
13454234654234	b_{323}	14	5	b_{396}	$(-10,4,6,1,-4,1)$
13456542314354	b_{324}	14	7	b_{395}	$(-7,5,1,2,1,-7)$
14235431654234	b_{325}	14	7	b_{394}	$(-3,3,11,-10,3,1)$
14356542314354	b_{326}	14	6	b_{393}	$(-3,7,7,-6,3,-7)$
14542314654234	b_{327}	14	6	b_{392}	$(-3,7,7,-3,-7,4)$
15436542314354	b_{328}	14	6	b_{391}	$(-3,4,4,3,-6,-4)$
23142314654234	b_{329}	14	4	b_{390}	$(1,-4,-4,1,10,-6)$
23142315423654	b_{330}	14	7	b_{389}	$(4,-7,-7,4,4,3)$
23142354654234	b_{331}	14	6	b_{388}	$(4,-4,-10,7,4,-3)$
23143154654234	b_{332}	14	6	b_{387}	$(1,-10,-4,7,4,-3)$
23143542314354	b_{333}	14	3	b_{386}	$(1,-4,-4,5,-4,10)$
23423154654234	b_{334}	14	6	b_{385}	$(7,-7,-4,1,7,-3)$
23435423143654	b_{335}	14	6	b_{384}	$(7,-7,-4,5,-4,7)$
23454234654234	b_{336}	14	3	b_{383}	$(10,-4,-4,5,-4,1)$
23456542314354	b_{337}	14	6	b_{382}	$(7,-5,-6,7,1,-7)$
24231435423654	b_{338}	14	7	b_{381}	$(1,-3,3,-7,8,3)$
24235431654234	b_{339}	14	7	b_{380}	$(3,-3,8,-7,3,1)$
24356542314354	b_{340}	14	7	b_{379}	$(3,-7,4,1,3,-7)$
24542314654234	b_{341}	14	7	b_{378}	$(3,-7,4,4,-7,4)$
25436542314354	b_{342}	14	6	b_{377}	$(3,-4,1,7,-6,-4)$
31423154654234	b_{343}	14	6	b_{376}	$(4,7,-7,-3,7,-3)$
31435423143654	b_{344}	14	6	b_{375}	$(4,7,-7,1,-4,7)$
31435431654234	b_{345}	14	4	b_{374}	$(1,10,-4,1,-4,1)$
31436542314354	b_{346}	14	5	b_{373}	$(1,4,-4,1,6,-10)$
31454234654234	b_{347}	14	6	b_{372}	$(4,4,-10,7,-4,1)$
31542314654234	b_{348}	14	6	b_{371}	$(1,4,-4,7,-10,4)$
34231435423654	b_{349}	14	7	b_{370}	$(4,3,-3,-7,8,3)$
34235431654234	b_{350}	14	8	b_{369}	$(11,3,-8,-2,3,1)$
34356542314354	b_{351}	14	6	b_{368}	$(7,7,-4,-2,3,-7)$
34542314654234	b_{352}	14	6	b_{367}	$(7,7,-4,1,-7,4)$
42314354654234	b_{353}	14	7	b_{366}	$(1,3,3,-10,11,-3)$

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TABLE 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
42345423143654	b_{354}	14	6	b_{365}	$(7,2,1,-7,1,7)$
42542314654234	b_{355}	14	7	b_{364}	$(3,3,8,-7,-3,4)$
43154234654234	b_{356}	14	7	b_{363}	$(1,11,3,-10,3,1)$
45423143542654	b_{357}	14	8	b_{362}	$(1,3,3,-2,-8,11)$
45436542314354	b_{358}	14	6	b_{361}	$(3,7,4,-3,-3,-4)$
65423143542654	b_{359}	14	10	b_{360}	$(1,1,1,2,1,-11)$
423454234654234	b_{360}	15	3	b_{359}	$(10,1,1,-5,1,1)$
245436542314354	b_{361}	15	7	b_{358}	$(3,-7,4,4,-3,-4)$
123454234654234	b_{362}	15	5	b_{357}	$(-10,-4,6,5,-4,1)$
231435431654234	b_{363}	15	6	b_{356}	$(1,-10,-4,11,-4,1)$
125436542314354	b_{364}	15	6	b_{355}	$(-3,-4,4,7,-6,-4)$
123456542314354	b_{365}	15	7	b_{354}	$(-7,-5,1,7,1,-7)$
231454234654234	b_{366}	15	6	b_{353}	$(4,-4,-10,11,-4,1)$
124356542314354	b_{367}	15	7	b_{352}	$(-3,-7,7,1,3,-7)$
234356542314354	b_{368}	15	7	b_{351}	$(7,-7,-4,5,3,-7)$
231436542314354	b_{369}	15	5	b_{350}	$(1,-4,-4,5,6,-10)$
123142354654234	b_{370}	15	6	b_{349}	$(-4,-4,-6,7,4,-3)$
124235431654234	b_{371}	15	7	b_{348}	$(-3,-3,11,-7,3,1)$
242314354654234	b_{372}	15	7	b_{347}	$(1,-3,3,-7,11,-3)$
234235431654234	b_{373}	15	8	b_{346}	$(11,-3,-8,1,3,1)$
243154234654234	b_{374}	15	9	b_{345}	$(1,-11,3,1,3,1)$
123423154654234	b_{375}	15	7	b_{344}	$(-7,-7,3,1,7,-3)$
231423154654234	b_{376}	15	7	b_{343}	$(4,-7,-7,4,7,-3)$
425436542314354	b_{377}	15	7	b_{342}	$(3,3,8,-7,1,-4)$
145436542314354	b_{378}	15	6	b_{341}	$(-3,7,7,-3,-3,-4)$
345436542314354	b_{379}	15	6	b_{340}	$(7,7,-4,1,-3,-4)$
315436542314354	b_{380}	15	6	b_{339}	$(1,4,-4,7,-6,-4)$
131454234654234	b_{381}	15	6	b_{338}	$(-4,4,-6,7,-4,1)$
423456542314354	b_{382}	15	7	b_{337}	$(7,2,1,-7,8,-7)$
465423143542654	b_{383}	15	10	b_{336}	$(1,3,3,-2,3,-11)$
134356542314354	b_{384}	15	7	b_{335}	$(-7,7,3,-2,3,-7)$
314356542314354	b_{385}	15	7	b_{334}	$(4,7,-7,1,3,-7)$
134235431654234	b_{386}	15	10	b_{333}	$(-11,3,3,-2,3,1)$
343154234654234	b_{387}	15	7	b_{332}	$(4,11,-3,-7,3,1)$
342314354654234	b_{388}	15	7	b_{331}	$(4,3,-3,-7,11,-3)$
131423154654234	b_{389}	15	6	b_{330}	$(-4,7,-3,-3,7,-3)$
314235431654234	b_{390}	15	9	b_{329}	$(8,3,-11,1,3,1)$
242542314654234	b_{391}	15	7	b_{328}	$(3,-3,8,-4,-3,4)$

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TABLE 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
124542314654234	b_{392}	15	7	b_{327}	$(-3,-7,7,4,-7,4)$
234542314654234	b_{393}	15	7	b_{326}	$(7,-7,-4,8,-7,4)$
231542314654234	b_{394}	15	6	b_{325}	$(1,-4,-4,11,-10,4)$
242345423143654	b_{395}	15	6	b_{324}	$(7,-2,1,-5,1,7)$
245423143542654	b_{396}	15	8	b_{323}	$(1,-3,3,1,-8,11)$
123435423143654	b_{397}	15	7	b_{322}	$(-7,-7,3,5,-4,7)$
423143542314354	b_{398}	15	3	b_{321}	$(1,1,1,-5,1,10)$
231435423143654	b_{399}	15	7	b_{320}	$(4,-7,-7,8,-4,7)$
234231435423654	b_{400}	15	7	b_{319}	$(4,-3,-3,-4,8,3)$
123142315423654	b_{401}	15	7	b_{318}	$(-4,-7,-3,4,4,3)$
142542314654234	b_{402}	15	7	b_{317}	$(-3,3,11,-7,-3,4)$
542314354654234	b_{403}	15	9	b_{316}	$(1,3,3,1,-11,8)$
342542314654234	b_{404}	15	8	b_{315}	$(11,3,-8,1,-3,4)$
431542314654234	b_{405}	15	7	b_{314}	$(1,11,3,-7,-3,4)$
134542314654234	b_{406}	15	7	b_{313}	$(-7,7,3,1,-7,4)$
314542314654234	b_{407}	15	7	b_{312}	$(4,7,-7,4,-7,4)$
142345423143654	b_{408}	15	7	b_{311}	$(-7,2,8,-7,1,7)$
345423143542654	b_{409}	15	8	b_{310}	$(4,3,-3,1,-8,11)$
131435423143654	b_{410}	15	6	b_{309}	$(-4,7,-3,1,-4,7)$
134231435423654	b_{411}	15	7	b_{308}	$(-4,3,1,-7,8,3)$
2425436542314354	b_{412}	16	7	b_{307}	$(3,-3,8,-4,1,-4)$
1423454234654234	b_{413}	16	5	b_{306}	$(-10,1,11,-5,1,1)$
1245436542314354	b_{414}	16	7	b_{305}	$(-3,-7,7,4,-3,-4)$
2345436542314354	b_{415}	16	7	b_{304}	$(7,-7,-4,8,-3,-4)$
2315436542314354	b_{416}	16	6	b_{303}	$(1,-4,-4,11,-6,-4)$
1231454234654234	b_{417}	16	6	b_{302}	$(-4,-4,-6,11,-4,1)$
2423456542314354	b_{418}	16	7	b_{301}	$(7,-2,1,-5,8,-7)$
2465423143542654	b_{419}	16	10	b_{300}	$(1,-3,3,1,3,-11)$
1234356542314354	b_{420}	16	8	b_{299}	$(-7,-7,3,5,3,-7)$
4231436542314354	b_{421}	16	5	b_{298}	$(1,1,1,-5,11,-10)$
2314356542314354	b_{422}	16	8	b_{297}	$(4,-7,-7,8,3,-7)$
4231435431654234	b_{423}	16	8	b_{296}	$(1,1,7,-11,7,1)$
1234235431654234	b_{424}	16	10	b_{295}	$(-11,-3,3,1,3,1)$
2343154234654234	b_{425}	16	9	b_{294}	$(4,-11,-3,4,3,1)$
2342314354654234	b_{426}	16	7	b_{293}	$(4,-3,-3,-4,11,-3)$
1231423154654234	b_{427}	16	7	b_{292}	$(-4,-7,-3,4,7,-3)$
2314235431654234	b_{428}	16	9	b_{291}	$(8,-3,-11,4,3,1)$
1425436542314354	b_{429}	16	7	b_{290}	$(-3,3,11,-7,1,-4)$

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Table 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
5423456542314354	b_{430}	16	8	b_{289}	$(7,2,1,1,-8,1)$
5465423143542654	b_{431}	16	10	b_{288}	$(1,3,3,1,-3,-8)$
3425436542314354	b_{432}	16	8	b_{287}	$(11,3,-8,1,1,-4)$
4315436542314354	b_{433}	16	7	b_{286}	$(1,11,3,-7,1,-4)$
1345436542314354	b_{434}	16	7	b_{285}	$(-7,7,3,1,-3,-4)$
3145436542314354	b_{435}	16	7	b_{284}	$(4,7,-7,4,-3,-4)$
1423456542314354	b_{436}	16	8	b_{283}	$(-7,2,8,-7,8,-7)$
3465423143542654	b_{437}	16	10	b_{282}	$(4,3,-3,1,3,-11)$
1314356542314354	b_{438}	16	7	b_{281}	$(-4,7,-3,1,3,-7)$
4231454234654234	b_{439}	16	8	b_{280}	$(4,7,1,-11,7,1)$
1343154234654234	b_{440}	16	7	b_{279}	$(-4,11,1,-7,3,1)$
1342314354654234	b_{441}	16	7	b_{278}	$(-4,3,1,-7,11,-3)$
1314235431654234	b_{442}	16	10	b_{277}	$(-8,3,-3,1,3,1)$
1242542314654234	b_{443}	16	7	b_{276}	$(-3,-3,11,-4,-3,4)$
2542314354654234	b_{444}	16	9	b_{275}	$(1,-3,3,4,-11,8)$
2342542314654234	b_{445}	16	8	b_{274}	$(11,-3,-8,4,-3,4)$
2431542314654234	b_{446}	16	9	b_{273}	$(1,-11,3,4,-3,4)$
1234542314654234	b_{447}	16	8	b_{272}	$(-7,-7,3,8,-7,4)$
2314542314654234	b_{448}	16	8	b_{271}	$(4,-7,-7,11,-7,4)$
4234542314654234	b_{449}	16	8	b_{270}	$(7,1,4,-8,1,4)$
1242345423143654	b_{450}	16	7	b_{269}	$(-7,-2,8,-5,1,7)$
2345423143542654	b_{451}	16	8	b_{268}	$(4,-3,-3,4,-8,11)$
1231435423143654	b_{452}	16	7	b_{267}	$(-4,-7,-3,8,-4,7)$
4231435423143654	b_{453}	16	8	b_{266}	$(4,1,1,-8,4,7)$
1234231435423654	b_{454}	16	7	b_{265}	$(-4,-3,1,-4,8,3)$
1342542314654234	b_{455}	16	10	b_{264}	$(-11,3,3,1,-3,4)$
3431542314654234	b_{456}	16	7	b_{263}	$(4,11,-3,-4,-3,4)$
3542314354654234	b_{457}	16	9	b_{262}	$(4,3,-3,4,-11,8)$
1314542314654234	b_{458}	16	7	b_{261}	$(-4,7,-3,4,-7,4)$
3142542314654234	b_{459}	16	9	b_{260}	$(8,3,-11,4,-3,4)$
4231542314654234	b_{460}	16	8	b_{259}	$(1,7,7,-11,1,4)$
1345423143542654	b_{461}	16	8	b_{258}	$(-4,3,1,1,-8,11)$
3142345423143654	b_{462}	16	8	b_{257}	$(1,2,-8,1,1,7)$
12425436542314354	b_{463}	17	7	b_{256}	$(-3,-3,11,-4,1,-4)$
25423456542314354	b_{464}	17	8	b_{255}	$(7,-2,1,3,-8,1)$
25465423143542654	b_{465}	17	10	b_{254}	$(1,-3,3,4,-3,-8)$
23425436542314354	b_{466}	17	8	b_{253}	$(11,-3,-8,4,1,-4)$
24315436542314354	b_{467}	17	9	b_{252}	$(1,-11,3,4,1,-4)$

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TABLE 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
12345436542314354	b_{468}	17	8	b_{251}	$(-7,-7,3,8,-3,-4)$
54231436542314354	b_{469}	17	7	b_{250}	$(1,1,1,6,-11,1)$
23145436542314354	b_{470}	17	8	b_{249}	$(4,-7,-7,11,-3,-4)$
31423454234654234	b_{471}	17	7	b_{248}	$(1,1,-11,6,1,1)$
42345436542314354	b_{472}	17	8	b_{247}	$(7,1,4,-8,5,-4)$
12423456542314354	b_{473}	17	8	b_{246}	$(-7,-2,8,-5,8,-7)$
23465423143542654	b_{474}	17	10	b_{245}	$(4,-3,-3,4,3,-11)$
12314356542314354	b_{475}	17	8	b_{244}	$(-4,-7,-3,8,3,-7)$
24231454234654234	b_{476}	17	9	b_{243}	$(4,-7,1,-4,7,1)$
12343154234654234	b_{477}	17	9	b_{242}	$(-4,-11,1,4,3,1)$
42314356542314354	b_{478}	17	9	b_{241}	$(4,1,1,-8,11,-7)$
12342314354654234	b_{479}	17	7	b_{240}	$(-4,-3,1,-4,11,-3)$
34231435431654234	b_{480}	17	9	b_{239}	$(8,1,-7,-4,7,1)$
12314235431654234	b_{481}	17	10	b_{238}	$(-8,-3,-3,4,3,1)$
15423456542314354	b_{482}	17	9	b_{237}	$(-7,2,8,1,-8,1)$
13425436542314354	b_{483}	17	10	b_{236}	$(-11,3,3,1,1,-4)$
34315436542314354	b_{484}	17	7	b_{235}	$(4,11,-3,-4,1,-4)$
35465423143542654	b_{485}	17	10	b_{234}	$(4,3,-3,4,-3,-8)$
13145436542314354	b_{486}	17	7	b_{233}	$(-4,7,-3,4,-3,-4)$
31425436542314354	b_{487}	17	9	b_{232}	$(8,3,-11,4,1,-4)$
42315436542314354	b_{488}	17	8	b_{231}	$(1,7,7,-11,5,-4)$
13465423143542654	b_{489}	17	10	b_{230}	$(-4,3,1,1,3,-11)$
31423456542314354	b_{490}	17	9	b_{229}	$(1,2,-8,1,8,-7)$
14231454234654234	b_{491}	17	8	b_{228}	$(-4,7,5,-11,7,1)$
42542314354654234	b_{492}	17	9	b_{227}	$(1,1,7,-4,-7,8)$
12342542314654234	b_{493}	17	10	b_{226}	$(-11,-3,3,4,-3,4)$
23431542314654234	b_{494}	17	9	b_{225}	$(4,-11,-3,7,-3,4)$
23542314354654234	b_{495}	17	9	b_{224}	$(4,-3,-3,7,-11,8)$
12314542314654234	b_{496}	17	8	b_{223}	$(-4,-7,-3,11,-7,4)$
23142542314654234	b_{497}	17	9	b_{222}	$(8,-3,-11,7,-3,4)$
34234542314654234	b_{498}	17	8	b_{221}	$(11,1,-4,-4,1,4)$
24231542314654234	b_{499}	17	9	b_{220}	$(1,-7,7,-4,1,4)$
14234542314654234	b_{500}	17	9	b_{219}	$(-7,1,11,-8,1,4)$
42345423143542654	b_{501}	17	8	b_{218}	$(4,1,1,-4,-4,11)$
12345423143542654	b_{502}	17	8	b_{217}	$(-4,-3,1,4,-8,11)$
23142345423143654	b_{503}	17	8	b_{216}	$(1,-2,-8,3,1,7)$
14231435423143654	b_{504}	17	8	b_{215}	$(-4,1,5,-8,4,7)$
43542314354654234	b_{505}	17	9	b_{214}	$(4,7,1,-4,-7,8)$

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TABLE 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
13431542314654234	b_{506}	17	7	b_{213}	$(-4,11,1,-4,-3,4)$
13542314354654234	b_{507}	17	9	b_{212}	$(-4,3,1,4,-11,8)$
13142542314654234	b_{508}	17	10	b_{211}	$(-8,3,-3,4,-3,4)$
34231542314654234	b_{509}	17	9	b_{210}	$(8,7,-7,-4,1,4)$
42314542314654234	b_{510}	17	10	b_{209}	$(4,4,4,-11,4,4)$
425423456542314354	b_{511}	18	8	b_{208}	$(7,1,4,-3,-5,1)$
425465423143542654	b_{512}	18	10	b_{207}	$(1,1,7,-4,1,-8)$
125423456542314354	b_{513}	18	9	b_{206}	$(-7,-2,8,3,-8,1)$
123425436542314354	b_{514}	18	10	b_{205}	$(-11,-3,3,4,1,-4)$
234315436542314354	b_{515}	18	9	b_{204}	$(4,-11,-3,7,1,-4)$
235465423143542654	b_{516}	18	10	b_{203}	$(4,-3,-3,7,-3,-8)$
123145436542314354	b_{517}	18	8	b_{202}	$(-4,-7,-3,11,-3,-4)$
231425436542314354	b_{518}	18	9	b_{201}	$(8,-3,-11,7,1,-4)$
342345436542314354	b_{519}	18	8	b_{200}	$(11,1,-4,-4,5,-4)$
242315436542314354	b_{520}	18	9	b_{199}	$(1,-7,7,-4,5,-4)$
142345436542314354	b_{521}	18	9	b_{198}	$(-7,1,11,-8,5,-4)$
423465423143542654	b_{522}	18	10	b_{197}	$(4,1,1,-4,7,-11)$
123465423143542654	b_{523}	18	10	b_{196}	$(-4,-3,1,4,3,-11)$
231423456542314354	b_{524}	18	9	b_{195}	$(1,-2,-8,3,8,-7)$
124231454234654234	b_{525}	18	9	b_{194}	$(-4,-7,5,-4,7,1)$
142314356542314354	b_{526}	18	9	b_{193}	$(-4,1,5,-8,11,-7)$
134231435431654234	b_{527}	18	10	b_{192}	$(-8,1,1,-4,7,1)$
454231436542314354	b_{528}	18	8	b_{191}	$(1,7,7,-6,-5,1)$
435465423143542654	b_{529}	18	10	b_{190}	$(4,7,1,-4,1,-8)$
134315436542314354	b_{530}	18	7	b_{189}	$(-4,11,1,-4,1,-4)$
135465423143542654	b_{531}	18	10	b_{188}	$(-4,3,1,4,-3,-8)$
315423456542314354	b_{532}	18	10	b_{187}	$(1,2,-8,9,-8,1)$
131425436542314354	b_{533}	18	10	b_{186}	$(-8,3,-3,4,1,-4)$
342315436542314354	b_{534}	18	9	b_{185}	$(8,7,-7,-4,5,-4)$
423145436542314354	b_{535}	18	10	b_{184}	$(4,4,4,-11,8,-4)$
314231454234654234	b_{536}	18	8	b_{183}	$(1,7,-5,-6,7,1)$
243542314354654234	b_{537}	18	10	b_{182}	$(4,-7,1,3,-7,8)$
123431542314654234	b_{538}	18	9	b_{181}	$(-4,-11,1,7,-3,4)$
542314356542314354	b_{539}	18	11	b_{180}	$(4,1,1,3,-11,4)$
123542314354654234	b_{540}	18	9	b_{179}	$(-4,-3,1,7,-11,8)$
342542314354654234	b_{541}	18	10	b_{178}	$(8,1,-7,3,-7,8)$
123142542314654234	b_{542}	18	10	b_{177}	$(-8,-3,-3,7,-3,4)$
134234542314654234	b_{543}	18	10	b_{176}	$(-11,1,7,-4,1,4)$

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TABLE 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
234231542314654234	b_{544}	18	10	b_{175}	$(8,-7,-7,3,1,4)$
142345423143542654	b_{545}	18	8	b_{174}	$(-4,1,5,-4,-4,11)$
314234542314654234	b_{546}	18	11	b_{173}	$(4,1,-11,3,1,4)$
242314542314654234	b_{547}	18	10	b_{172}	$(4,-4,4,-7,4,4)$
314231435423143654	b_{548}	18	8	b_{171}	$(1,1,-5,-3,4,7)$
143542314354654234	b_{549}	18	9	b_{170}	$(-4,7,5,-4,-7,8)$
423542314354654234	b_{550}	18	10	b_{169}	$(4,4,4,-7,-4,8)$
134231542314654234	b_{551}	18	10	b_{168}	$(-8,7,1,-4,1,4)$
142314542314654234	b_{552}	18	10	b_{167}	$(-4,4,8,-11,4,4)$
342314542314654234	b_{553}	18	10	b_{166}	$(8,4,-4,-7,4,4)$
3425423456542314354	b_{554}	19	8	b_{165}	$(11,1,-4,1,-5,1)$
2454231436542314354	b_{555}	19	9	b_{164}	$(1,-7,7,1,-5,1)$
1425423456542314354	b_{556}	19	9	b_{163}	$(-7,1,11,-3,-5,1)$
2435465423143542654	b_{557}	19	11	b_{162}	$(4,-7,1,3,1,-8)$
1234315436542314354	b_{558}	19	9	b_{161}	$(-4,-11,1,7,1,-4)$
5423465423143542654	b_{559}	19	11	b_{160}	$(4,1,1,3,-7,-4)$
1235465423143542654	b_{560}	19	10	b_{159}	$(-4,-3,1,7,-3,-8)$
3425465423143542654	b_{561}	19	11	b_{158}	$(8,1,-7,3,1,-8)$
2315423456542314354	b_{562}	19	10	b_{157}	$(1,-2,-8,11,-8,1)$
1231425436542314354	b_{563}	19	10	b_{156}	$(-8,-3,-3,7,1,-4)$
1342345436542314354	b_{564}	19	10	b_{155}	$(-11,1,7,-4,5,-4)$
2342315436542314354	b_{565}	19	10	b_{154}	$(8,-7,-7,3,5,-4)$
1423465423143542654	b_{566}	19	10	b_{153}	$(-4,1,5,-4,7,-11)$
3142345436542314354	b_{567}	19	11	b_{152}	$(4,1,-11,3,5,-4)$
2423145436542314354	b_{568}	19	10	b_{151}	$(4,-4,4,-7,8,-4)$
2314231454234654234	b_{569}	19	9	b_{150}	$(1,-7,-5,1,7,1)$
3142314356542314354	b_{570}	19	9	b_{149}	$(1,1,-5,-3,11,-7)$
1435465423143542654	b_{571}	19	10	b_{148}	$(-4,7,5,-4,1,-8)$
3454231436542314354	b_{572}	19	9	b_{147}	$(8,7,-7,1,-5,1)$
4315423456542314354	b_{573}	19	11	b_{146}	$(1,11,1,-9,1,1)$
4235465423143542654	b_{574}	19	11	b_{145}	$(4,4,4,-7,4,-8)$
1342315436542314354	b_{575}	19	10	b_{144}	$(-8,7,1,-4,5,-4)$
1423145436542314354	b_{576}	19	10	b_{143}	$(-4,4,8,-11,8,-4)$
3423145436542314354	b_{577}	19	10	b_{142}	$(8,4,-4,-7,8,-4)$
1243542314354654234	b_{578}	19	10	b_{141}	$(-4,-7,5,3,-7,8)$
1542314356542314354	b_{579}	19	11	b_{140}	$(-4,1,5,3,-11,4)$
1342542314354654234	b_{580}	19	11	b_{139}	$(-8,1,1,3,-7,8)$
2423542314354654234	b_{581}	19	10	b_{138}	$(4,-4,4,-3,-4,8)$

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TABLE 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
1234231542314654234	b_{582}	19	11	b_{137}	$(-8,-7,1,3,1,4)$
3142345423143542654	b_{583}	19	8	b_{136}	$(1,1,-5,1,-4,11)$
1314234542314654234	b_{584}	19	11	b_{135}	$(-4,1,-7,3,1,4)$
1242314542314654234	b_{585}	19	10	b_{134}	$(-4,-4,8,-7,4,4)$
2342314542314654234	b_{586}	19	10	b_{133}	$(8,-4,-4,-3,4,4)$
4542314356542314354	b_{587}	19	11	b_{132}	$(4,4,4,-3,-8,4)$
3143542314354654234	b_{588}	19	9	b_{131}	$(1,7,-5,1,-7,8)$
1423542314354654234	b_{589}	19	10	b_{130}	$(-4,4,8,-7,-4,8)$
3423542314354654234	b_{590}	19	10	b_{129}	$(8,4,-4,-3,-4,8)$
1342314542314654234	b_{591}	19	11	b_{128}	$(-8,4,4,-7,4,4)$
3142314542314654234	b_{592}	19	11	b_{127}	$(4,4,-8,-3,4,4)$
13425423456542314354	b_{593}	20	10	b_{126}	$(-11,1,7,1,-5,1)$
12435465423143542654	b_{594}	20	11	b_{125}	$(-4,-7,5,3,1,-8)$
23454231436542314354	b_{595}	20	10	b_{124}	$(8,-7,-7,8,-5,1)$
24315423456542314354	b_{596}	20	13	b_{123}	$(1,-11,1,2,1,1)$
15423465423143542654	b_{597}	20	11	b_{122}	$(-4,1,5,3,-7,-4)$
13425465423143542654	b_{598}	20	12	b_{121}	$(-8,1,1,3,1,-8)$
31425423456542314354	b_{599}	20	11	b_{120}	$(4,1,-11,8,-5,1)$
24235465423143542654	b_{600}	20	11	b_{119}	$(4,-4,4,-3,4,-8)$
12342315436542314354	b_{601}	20	11	b_{118}	$(-8,-7,1,3,5,-4)$
31423465423143542654	b_{602}	20	10	b_{117}	$(1,1,-5,1,7,-11)$
13142345436542314354	b_{603}	20	11	b_{116}	$(-4,1,-7,3,5,-4)$
12423145436542314354	b_{604}	20	10	b_{115}	$(-4,-4,8,-7,8,-4)$
23423145436542314354	b_{605}	20	10	b_{114}	$(8,-4,-4,-3,8,-4)$
45423465423143542654	b_{606}	20	11	b_{113}	$(4,4,4,-3,-4,-4)$
31435465423143542654	b_{607}	20	10	b_{112}	$(1,7,-5,1,1,-8)$
13454231436542314354	b_{608}	20	10	b_{111}	$(-8,7,1,1,-5,1)$
14235465423143542654	b_{609}	20	11	b_{110}	$(-4,4,8,-7,4,-8)$
34235465423143542654	b_{610}	20	11	b_{109}	$(8,4,-4,-3,4,-8)$
42315423456542314354	b_{611}	20	12	b_{108}	$(1,9,3,-11,3,1)$
13423145436542314354	b_{612}	20	11	b_{107}	$(-8,4,4,-7,8,-4)$
31423145436542314354	b_{613}	20	11	b_{106}	$(4,4,-8,-3,8,-4)$
24542314356542314354	b_{614}	20	11	b_{105}	$(4,-4,4,1,-8,4)$
23143542314354654234	b_{615}	20	10	b_{104}	$(1,-7,-5,8,-7,8)$
31542314356542314354	b_{616}	20	11	b_{103}	$(1,1,-5,8,-11,4)$
12423542314354654234	b_{617}	20	10	b_{102}	$(-4,-4,8,-3,-4,8)$
23423542314354654234	b_{618}	20	10	b_{101}	$(8,-4,-4,1,-4,8)$
12342314542314654234	b_{619}	20	11	b_{100}	$(-8,-4,4,-3,4,4)$

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TABLE 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
23142314542314654234	b_{620}	20	11	b_{99}	$(4,-4,-8,1,4,4)$
14542314356542314354	b_{621}	20	11	b_{98}	$(-4,4,8,-3,-8,4)$
34542314356542314354	b_{622}	20	11	b_{97}	$(8,4,-4,1,-8,4)$
13423542314354654234	b_{623}	20	11	b_{96}	$(-8,4,4,-3,-4,8)$
31423542314354654234	b_{624}	20	11	b_{95}	$(4,4,-8,1,-4,8)$
13142314542314654234	b_{625}	20	11	b_{94}	$(-4,4,-4,-3,4,4)$
245423465423143542654	b_{626}	21	11	b_{93}	$(4,-4,4,1,-4,-4)$
231435465423143542654	b_{627}	21	11	b_{92}	$(1,-7,-5,8,1,-8)$
123454231436542314354	b_{628}	21	11	b_{91}	$(-8,-7,1,8,-5,1)$
315423465423143542654	b_{629}	21	11	b_{90}	$(1,1,-5,8,-7,-4)$
131425423456542314354	b_{630}	21	11	b_{89}	$(-4,1,-7,8,-5,1)$
124235465423143542654	b_{631}	21	11	b_{88}	$(-4,-4,8,-3,4,-8)$
234235465423143542654	b_{632}	21	11	b_{87}	$(8,-4,-4,1,4,-8)$
423454231436542314354	b_{633}	21	11	b_{86}	$(8,1,1,-8,3,1)$
242315423456542314354	b_{634}	21	13	b_{85}	$(1,-9,3,-2,3,1)$
123423145436542314354	b_{635}	21	11	b_{84}	$(-8,-4,4,-3,8,-4)$
231423145436542314354	b_{636}	21	11	b_{83}	$(4,-4,-8,1,8,-4)$
145423465423143542654	b_{637}	21	11	b_{82}	$(-4,4,8,-3,-4,-4)$
345423465423143542654	b_{638}	21	11	b_{81}	$(8,4,-4,1,-4,-4)$
134235465423143542654	b_{639}	21	12	b_{80}	$(-8,4,4,-3,4,-8)$
314235465423143542654	b_{640}	21	12	b_{79}	$(4,4,-8,1,4,-8)$
342315423456542314354	b_{641}	21	12	b_{78}	$(4,9,-3,-8,3,1)$
131423145436542314354	b_{642}	21	11	b_{77}	$(-4,4,-4,-3,8,-4)$
124542314356542314354	b_{643}	21	11	b_{76}	$(-4,-4,8,1,-8,4)$
234542314356542314354	b_{644}	21	11	b_{75}	$(8,-4,-4,5,-8,4)$
423143542314354654234	b_{645}	21	11	b_{74}	$(1,1,3,-8,1,8)$
123423542314354654234	b_{646}	21	11	b_{73}	$(-8,-4,4,1,-4,8)$
231423542314354654234	b_{647}	21	11	b_{72}	$(4,-4,-8,5,-4,8)$
123142314542314654234	b_{648}	21	11	b_{71}	$(-4,-4,-4,1,4,4)$
431542314356542314354	b_{649}	21	12	b_{70}	$(1,9,3,-8,-3,4)$
134542314356542314354	b_{650}	21	12	b_{69}	$(-8,4,4,1,-8,4)$
314542314356542314354	b_{651}	21	12	b_{68}	$(4,4,-8,5,-8,4)$
131423542314354654234	b_{652}	21	11	b_{67}	$(-4,4,-4,1,-4,8)$
1245423465423143542654	b_{653}	22	11	b_{66}	$(-4,-4,8,1,-4,-4)$
2345423465423143542654	b_{654}	22	11	b_{65}	$(8,-4,-4,5,-4,-4)$
4231435465423143542654	b_{655}	22	12	b_{64}	$(1,1,3,-8,9,-8)$
1234235465423143542654	b_{656}	22	12	b_{63}	$(-8,-4,4,1,4,-8)$
2314235465423143542654	b_{657}	22	12	b_{62}	$(4,-4,-8,5,4,-8)$
continued on next page...					

TABLE 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
142345423143654231 4354	b_{658}	22	12	b_{61}	$(-8, 1, 9, -8, 3, 1)$
2342315423456542314354	b_{659}	22	13	b_{60}	$(4, -9, -3, 1, 3, 1)$
1231423145436542314354	b_{660}	22	11	b_{59}	$(-4, -4, -4, 1, 8, -4)$
4315423465423143542654	b_{661}	22	12	b_{58}	$(1, 9, 3, -8, 1, -4)$
1345423465423143542654	b_{662}	22	12	b_{57}	$(-8, 4, 4, 1, -4, -4)$
3145423465423143542654	b_{663}	22	12	b_{56}	$(4, 4, -8, 5, -4, -4)$
1314235465423143542654	b_{664}	22	12	b_{55}	$(-4, 4, -4, 1, 4, -8)$
1342315423456542314354	b_{665}	22	12	b_{54}	$(-4, 9, 1, -8, 3, 1)$
4234542314356542314354	b_{666}	22	11	b_{53}	$(8, 1, 1, -5, -3, 4)$
2431542314356542314354	b_{667}	22	13	b_{52}	$(1, -9, 3, 1, -3, 4)$
1234542314356542314354	b_{668}	22	12	b_{51}	$(-8, -4, 4, 5, -8, 4)$
2314542314356542314354	b_{669}	22	12	b_{50}	$(4, -4, -8, 9, -8, 4)$
3423143542314354654234	b_{670}	22	11	b_{49}	$(4, 1, -3, -5, 1, 8)$
1231423542314354654234	b_{671}	22	11	b_{48}	$(-4, -4, -4, 5, -4, 8)$
3431542314356542314354	b_{672}	22	12	b_{47}	$(4, 9, -3, -5, -3, 4)$
1314542314356542314354	b_{673}	22	12	b_{46}	$(-4, 4, -4, 5, -8, 4)$
42345423465423143542654	b_{674}	23	11	b_{45}	$(8, 1, 1, -5, 1, -4)$
24315423465423143542654	b_{675}	23	13	b_{44}	$(1, -9, 3, 1, 1, -4)$
54231435465423143542654	b_{676}	23	13	b_{43}	$(1, 1, 3, 1, -9, 1)$
12345423465423143542654	b_{677}	23	12	b_{42}	$(-8, -4, 4, 5, -4, -4)$
23145423465423143542654	b_{678}	23	12	b_{41}	$(4, -4, -8, 9, -4, -4)$
34231435465423143542654	b_{679}	23	12	b_{40}	$(4, 1, -3, -5, 9, -8)$
12314235465423143542654	b_{680}	23	12	b_{39}	$(-4, -4, -4, 5, 4, -8)$
12342315423456542314354	b_{681}	23	13	b_{38}	$(-4, -9, 1, 1, 3, 1)$
31423454231436542314354	b_{682}	23	13	b_{37}	$(1, 1, -9, 1, 3, 1)$
34315423465423143542654	b_{683}	23	12	b_{36}	$(4, 9, -3, -5, 1, -4)$
13145423465423143542654	b_{684}	23	12	b_{35}	$(-4, 4, -4, 5, -4, -4)$
14234542314356542314354	b_{685}	23	12	b_{34}	$(-8, 1, 9, -5, -3, 4)$
23431542314356542314354	b_{686}	23	13	b_{33}	$(4, -9, -3, 4, -3, 4)$
12314542314356542314354	b_{687}	23	12	b_{32}	$(-4, -4, -4, 9, -8, 4)$
13423143542314354654234	b_{688}	23	11	b_{31}	$(-4, 1, 1, -5, 1, 8)$
13431542314356542314354	b_{689}	23	12	b_{30}	$(-4, 9, 1, -5, -3, 4)$
42314542314356542314354	b_{690}	23	13	b_{29}	$(4, 5, 1, -9, 1, 4)$
142345423465423143542654	b_{691}	24	12	b_{28}	$(-8, 1, 9, -5, 1, -4)$
234315423465423143542654	b_{692}	24	13	b_{27}	$(4, -9, -3, 4, 1, -4)$
354231435465423143542654	b_{693}	24	13	b_{26}	$(4, 1, -3, 4, -9, 1)$
123145423465423143542654	b_{694}	24	12	b_{25}	$(-4, -4, -4, 9, -4, -4)$
134231435465423143542654	b_{695}	24	12	b_{24}	$(-4, 1, 1, -5, 9, -8)$

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Table 34. Schubert classes for E_6/P_4 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
134315423465423143542654	b_{696}	24	12	b_{23}	$(-4,9,1,-5,1,-4)$
423145423465423143542654	b_{697}	24	13	b_{22}	$(4,5,1,-9,5,-4)$
123431542314356542314354	b_{698}	24	13	b_{21}	$(-4,-9,1,4,-3,4)$
314234542314356542314354	b_{699}	24	13	b_{20}	$(1,1,-9,4,-3,4)$
242314542314356542314354	b_{700}	24	13	b_{19}	$(4,-5,1,-4,1,4)$
142314542314356542314354	b_{701}	24	13	b_{18}	$(-4,5,5,-9,1,4)$
1234315423465423143542654	b_{702}	25	13	b_{17}	$(-4,-9,1,4,1,-4)$
1354231435465423143542654	b_{703}	25	13	b_{16}	$(-4,1,1,4,-9,1)$
3142345423465423143542654	b_{704}	25	13	b_{15}	$(1,1,-9,4,1,-4)$
2423145423465423143542654	b_{705}	25	13	b_{14}	$(4,-5,1,-4,5,-4)$
4354231435465423143542654	b_{706}	25	13	b_{13}	$(4,5,1,-4,-5,1)$
1423145423465423143542654	b_{707}	25	13	b_{12}	$(-4,5,5,-9,5,-4)$
1242314542314356542314354	b_{708}	25	13	b_{11}	$(-4,-5,5,-4,1,4)$
3142314542314356542314354	b_{709}	25	13	b_{10}	$(1,5,-5,-4,1,4)$
24354231435465423143542654	b_{710}	26	13	b_9	$(4,-5,1,1,-5,1)$
12423145423465423143542654	b_{711}	26	13	b_8	$(-4,-5,5,-4,5,-4)$
14354231435465423143542654	b_{712}	26	13	b_7	$(-4,5,5,-4,-5,1)$
31423145423465423143542654	b_{713}	26	13	b_6	$(1,5,-5,-4,5,-4)$
23142314542314356542314354	b_{714}	26	13	b_5	$(1,-5,-5,1,1,4)$
124354231435465423143542654	b_{715}	27	13	b_4	$(-4,-5,5,1,-5,1)$
231423145423465423143542654	b_{716}	27	13	b_3	$(1,-5,-5,1,5,-4)$
314354231435465423143542654	b_{717}	27	13	b_2	$(1,5,-5,1,-5,1)$
2314354231435465423143542654	b_{718}	28	13	b_1	$(1,-5,-5,6,-5,1)$
42314354231435465423143542654	b_{719}	29	13	b_0	$(1,1,1,-6,1,1)$

Table 35. Multiplication table for E_6/P_4

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	$b_2 + b_3 + b_4$
b_1	b_2	$b_6 + b_7$
b_1	b_3	$b_5 + b_6 + b_8$
b_1	b_4	$b_7 + b_8 + b_9$
b_1	b_5	$b_{10} + b_{11}$
b_1	b_6	$b_{10} + b_{12} + b_{15}$
b_1	b_7	$b_{12} + b_{13} + b_{16}$
b_1	b_8	$b_{11} + b_{12} + b_{14} + b_{17}$
b_1	b_9	$b_{13} + b_{14}$
b_1	b_{10}	$b_{18} + b_{20}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{11}	$b_{18} + b_{19} + b_{21}$
b_1	b_{12}	$b_{18} + b_{22}$
b_1	b_{13}	$b_{22} + b_{26}$
b_1	b_{14}	$b_{19} + b_{22} + b_{27}$
b_1	b_{15}	b_{20}
b_1	b_{16}	b_{26}
b_1	b_{17}	$b_{21} + b_{27}$
b_1	b_{18}	b_{29}
b_1	b_{19}	$b_{29} + b_{33}$
b_1	b_{20}	b_{37}
b_1	b_{21}	$b_{33} + b_{38}$
b_1	b_{22}	b_{29}
b_1	b_{23}	$b_{30} + b_{35} + b_{36}$
b_1	b_{24}	$b_{39} + b_{40}$
b_1	b_{25}	$b_{32} + b_{35} + b_{39} + b_{41} + b_{42}$
b_1	b_{26}	b_{43}
b_1	b_{27}	$b_{33} + b_{44}$
b_1	b_{28}	$b_{34} + b_{42}$
b_1	b_{30}	$b_{46} + b_{47} + b_{54}$
b_1	b_{31}	$b_{48} + b_{49}$
b_1	b_{32}	$b_{46} + b_{50} + b_{51}$
b_1	b_{33}	$b_{52} + b_{60}$
b_1	b_{34}	$b_{51} + b_{61}$
b_1	b_{35}	$b_{46} + b_{55} + b_{56} + b_{57}$
b_1	b_{36}	$b_{47} + b_{56} + b_{58}$
b_1	b_{38}	b_{60}
b_1	b_{39}	$b_{55} + b_{62} + b_{63}$
b_1	b_{40}	$b_{62} + b_{64}$
b_1	b_{41}	$b_{50} + b_{56} + b_{62}$
b_1	b_{42}	$b_{51} + b_{57} + b_{63}$
b_1	b_{44}	b_{52}
b_1	b_{45}	$b_{53} + b_{65}$
b_1	b_{46}	$b_{68} + b_{69}$
b_1	b_{47}	$b_{68} + b_{70} + b_{78}$
b_1	b_{48}	$b_{67} + b_{71} + b_{72} + b_{73}$
b_1	b_{49}	$b_{72} + b_{74}$
b_1	b_{50}	b_{68}
b_1	b_{51}	b_{69}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{52}	b_{85}
b_1	b_{53}	$b_{75} + b_{86}$
b_1	b_{54}	b_{78}
b_1	b_{55}	$b_{79} + b_{80}$
b_1	b_{56}	$b_{68} + b_{79}$
b_1	b_{57}	$b_{69} + b_{80}$
b_1	b_{58}	b_{70}
b_1	b_{59}	$b_{71} + b_{77} + b_{83} + b_{84}$
b_1	b_{60}	b_{85}
b_1	b_{62}	b_{79}
b_1	b_{63}	b_{80}
b_1	b_{65}	$b_{75} + b_{81} + b_{87} + b_{93}$
b_1	b_{66}	$b_{76} + b_{82} + b_{88} + b_{93}$
b_1	b_{67}	$b_{94} + b_{95} + b_{96}$
b_1	b_{70}	b_{108}
b_1	b_{71}	$b_{94} + b_{99} + b_{100}$
b_1	b_{72}	$b_{95} + b_{99}$
b_1	b_{73}	$b_{96} + b_{100}$
b_1	b_{75}	$b_{97} + b_{105}$
b_1	b_{76}	$b_{98} + b_{105}$
b_1	b_{77}	$b_{94} + b_{106} + b_{107} + b_{116}$
b_1	b_{78}	b_{108}
b_1	b_{80}	b_{121}
b_1	b_{81}	$b_{97} + b_{109} + b_{113}$
b_1	b_{82}	$b_{98} + b_{110} + b_{113} + b_{122}$
b_1	b_{83}	$b_{99} + b_{106}$
b_1	b_{84}	$b_{100} + b_{107} + b_{118}$
b_1	b_{85}	b_{123}
b_1	b_{87}	$b_{109} + b_{119}$
b_1	b_{88}	$b_{110} + b_{119} + b_{125}$
b_1	b_{89}	$b_{116} + b_{120}$
b_1	b_{90}	$b_{103} + b_{122}$
b_1	b_{91}	b_{118}
b_1	b_{92}	b_{125}
b_1	b_{93}	$b_{105} + b_{113} + b_{119}$
b_1	b_{94}	$b_{127} + b_{128} + b_{135}$
b_1	b_{95}	b_{127}
b_1	b_{96}	$b_{128} + b_{139}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{97}	b_{132}
b_1	b_{98}	$b_{132} + b_{140}$
b_1	b_{99}	b_{127}
b_1	b_{100}	$b_{128} + b_{137}$
b_1	b_{101}	$b_{129} + b_{133} + b_{138}$
b_1	b_{102}	$b_{130} + b_{134} + b_{138} + b_{141}$
b_1	b_{103}	b_{140}
b_1	b_{104}	b_{141}
b_1	b_{105}	b_{132}
b_1	b_{106}	$b_{127} + b_{152}$
b_1	b_{107}	b_{128}
b_1	b_{109}	$b_{145} + b_{158}$
b_1	b_{110}	b_{145}
b_1	b_{111}	b_{144}
b_1	b_{112}	b_{148}
b_1	b_{113}	$b_{132} + b_{145} + b_{160}$
b_1	b_{114}	$b_{133} + b_{142} + b_{151} + b_{154}$
b_1	b_{115}	$b_{134} + b_{143} + b_{151}$
b_1	b_{116}	$b_{135} + b_{152}$
b_1	b_{117}	b_{153}
b_1	b_{118}	b_{137}
b_1	b_{119}	$b_{145} + b_{162}$
b_1	b_{120}	b_{152}
b_1	b_{122}	$b_{140} + b_{160}$
b_1	b_{124}	b_{154}
b_1	b_{125}	b_{162}
b_1	b_{126}	b_{155}
b_1	b_{127}	b_{173}
b_1	b_{129}	$b_{166} + b_{169} + b_{178}$
b_1	b_{130}	$b_{167} + b_{169}$
b_1	b_{131}	b_{170}
b_1	b_{132}	b_{180}
b_1	b_{133}	$b_{166} + b_{172} + b_{175}$
b_1	b_{134}	$b_{167} + b_{172}$
b_1	b_{135}	b_{173}
b_1	b_{136}	$b_{171} + b_{174}$
b_1	b_{138}	$b_{169} + b_{172} + b_{182}$
b_1	b_{140}	b_{180}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{141}	b_{182}
b_1	b_{142}	$b_{166} + b_{184}$
b_1	b_{143}	$b_{167} + b_{184}$
b_1	b_{144}	$b_{168} + b_{186}$
b_1	b_{147}	b_{185}
b_1	b_{148}	$b_{188} + b_{190}$
b_1	b_{149}	$b_{193} + b_{195}$
b_1	b_{150}	b_{194}
b_1	b_{151}	$b_{172} + b_{184}$
b_1	b_{152}	b_{173}
b_1	b_{153}	$b_{196} + b_{197}$
b_1	b_{154}	b_{175}
b_1	b_{155}	$b_{176} + b_{205}$
b_1	b_{156}	$b_{177} + b_{186} + b_{205}$
b_1	b_{157}	b_{187}
b_1	b_{159}	$b_{188} + b_{196} + b_{203}$
b_1	b_{160}	b_{180}
b_1	b_{161}	$b_{181} + b_{204}$
b_1	b_{163}	$b_{198} + b_{206}$
b_1	b_{164}	b_{199}
b_1	b_{165}	$b_{200} + b_{208}$
b_1	b_{166}	b_{209}
b_1	b_{167}	b_{209}
b_1	b_{168}	b_{211}
b_1	b_{169}	b_{209}
b_1	b_{170}	$b_{212} + b_{214}$
b_1	b_{171}	$b_{215} + b_{216}$
b_1	b_{172}	b_{209}
b_1	b_{174}	$b_{215} + b_{217} + b_{218}$
b_1	b_{176}	b_{226}
b_1	b_{177}	$b_{211} + b_{226} + b_{238}$
b_1	b_{179}	$b_{212} + b_{224}$
b_1	b_{181}	$b_{225} + b_{242}$
b_1	b_{183}	b_{228}
b_1	b_{184}	b_{209}
b_1	b_{185}	$b_{210} + b_{232}$
b_1	b_{186}	$b_{211} + b_{236}$
b_1	b_{188}	$b_{230} + b_{234}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{189}	$b_{213} + b_{233} + b_{235}$
b_1	b_{190}	b_{234}
b_1	b_{191}	b_{231}
b_1	b_{192}	b_{238}
b_1	b_{193}	b_{241}
b_1	b_{194}	$b_{242} + b_{243}$
b_1	b_{195}	b_{229}
b_1	b_{196}	$b_{230} + b_{245}$
b_1	b_{197}	b_{245}
b_1	b_{198}	b_{219}
b_1	b_{199}	$b_{220} + b_{252}$
b_1	b_{200}	$b_{221} + b_{247} + b_{253}$
b_1	b_{201}	$b_{222} + b_{232}$
b_1	b_{202}	$b_{223} + b_{244} + b_{249} + b_{251}$
b_1	b_{203}	$b_{234} + b_{245} + b_{254}$
b_1	b_{204}	$b_{225} + b_{252}$
b_1	b_{205}	$b_{226} + b_{236}$
b_1	b_{206}	b_{237}
b_1	b_{207}	b_{254}
b_1	b_{208}	$b_{247} + b_{255}$
b_1	b_{210}	b_{260}
b_1	b_{211}	$b_{264} + b_{277}$
b_1	b_{212}	b_{262}
b_1	b_{213}	$b_{261} + b_{263} + b_{279}$
b_1	b_{214}	b_{262}
b_1	b_{215}	b_{266}
b_1	b_{216}	b_{257}
b_1	b_{217}	$b_{258} + b_{268}$
b_1	b_{218}	$b_{266} + b_{268}$
b_1	b_{220}	b_{273}
b_1	b_{221}	$b_{270} + b_{274}$
b_1	b_{222}	$b_{260} + b_{291}$
b_1	b_{223}	$b_{271} + b_{272}$
b_1	b_{224}	$b_{262} + b_{275}$
b_1	b_{225}	$b_{273} + b_{294}$
b_1	b_{226}	$b_{264} + b_{295}$
b_1	b_{227}	b_{275}
b_1	b_{228}	b_{280}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{230}	b_{282}
b_1	b_{231}	b_{259}
b_1	b_{232}	b_{260}
b_1	b_{233}	$b_{261} + b_{281} + b_{284} + b_{285}$
b_1	b_{234}	$b_{282} + b_{288}$
b_1	b_{235}	$b_{263} + b_{284} + b_{286}$
b_1	b_{236}	b_{264}
b_1	b_{238}	$b_{277} + b_{295}$
b_1	b_{239}	b_{291}
b_1	b_{240}	$b_{265} + b_{278} + b_{292} + b_{293}$
b_1	b_{242}	b_{294}
b_1	b_{243}	b_{294}
b_1	b_{244}	$b_{297} + b_{299}$
b_1	b_{245}	$b_{282} + b_{300}$
b_1	b_{246}	$b_{283} + b_{299}$
b_1	b_{247}	b_{270}
b_1	b_{249}	$b_{271} + b_{297}$
b_1	b_{251}	$b_{272} + b_{299}$
b_1	b_{252}	b_{273}
b_1	b_{253}	$b_{274} + b_{287}$
b_1	b_{254}	$b_{288} + b_{300}$
b_1	b_{255}	b_{289}
b_1	b_{256}	$b_{276} + b_{290} + b_{305} + b_{307}$
b_1	b_{258}	b_{310}
b_1	b_{260}	b_{329}
b_1	b_{261}	$b_{312} + b_{313}$
b_1	b_{262}	b_{316}
b_1	b_{263}	$b_{312} + b_{314} + b_{332}$
b_1	b_{264}	b_{333}
b_1	b_{265}	$b_{308} + b_{318} + b_{319}$
b_1	b_{267}	$b_{318} + b_{320} + b_{322}$
b_1	b_{268}	$b_{310} + b_{323}$
b_1	b_{269}	$b_{311} + b_{322}$
b_1	b_{273}	b_{345}
b_1	b_{274}	$b_{315} + b_{346}$
b_1	b_{275}	b_{316}
b_1	b_{276}	$b_{317} + b_{327} + b_{328} + b_{348}$
b_1	b_{277}	b_{333}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{278}	$b_{308} + b_{331}$
b_1	b_{279}	b_{332}
b_1	b_{281}	$b_{334} + b_{335}$
b_1	b_{282}	b_{336}
b_1	b_{284}	$b_{312} + b_{334}$
b_1	b_{285}	$b_{313} + b_{335}$
b_1	b_{286}	b_{314}
b_1	b_{287}	b_{315}
b_1	b_{288}	b_{336}
b_1	b_{290}	$b_{317} + b_{342}$
b_1	b_{291}	b_{329}
b_1	b_{292}	$b_{318} + b_{343} + b_{344}$
b_1	b_{293}	$b_{319} + b_{331} + b_{343} + b_{347}$
b_1	b_{294}	b_{345}
b_1	b_{295}	b_{333}
b_1	b_{298}	b_{350}
b_1	b_{300}	b_{336}
b_1	b_{301}	$b_{337} + b_{351}$
b_1	b_{302}	$b_{338} + b_{349} + b_{353}$
b_1	b_{303}	$b_{325} + b_{339} + b_{355}$
b_1	b_{304}	$b_{326} + b_{351} + b_{358}$
b_1	b_{305}	$b_{327} + b_{352} + b_{358}$
b_1	b_{306}	b_{357}
b_1	b_{307}	$b_{328} + b_{342} + b_{358}$
b_1	b_{308}	b_{370}
b_1	b_{309}	$b_{375} + b_{397} + b_{401}$
b_1	b_{310}	b_{362}
b_1	b_{314}	b_{363}
b_1	b_{315}	b_{369}
b_1	b_{317}	$b_{364} + b_{394}$
b_1	b_{318}	$b_{389} + b_{410}$
b_1	b_{319}	$b_{370} + b_{381} + b_{389}$
b_1	b_{320}	b_{389}
b_1	b_{321}	b_{386}
b_1	b_{322}	b_{410}
b_1	b_{323}	b_{362}
b_1	b_{324}	$b_{365} + b_{384}$
b_1	b_{325}	$b_{371} + b_{402}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{326}	b_{378}
b_1	b_{327}	b_{378}
b_1	b_{328}	$b_{364} + b_{378} + b_{380}$
b_1	b_{330}	$b_{376} + b_{399} + b_{400} + b_{401}$
b_1	b_{331}	$b_{366} + b_{370}$
b_1	b_{332}	b_{363}
b_1	b_{333}	b_{398}
b_1	b_{335}	b_{395}
b_1	b_{336}	b_{360}
b_1	b_{338}	$b_{372} + b_{400}$
b_1	b_{339}	$b_{371} + b_{391}$
b_1	b_{340}	$b_{361} + b_{367} + b_{368}$
b_1	b_{341}	$b_{361} + b_{391} + b_{392} + b_{393}$
b_1	b_{342}	b_{364}
b_1	b_{343}	b_{389}
b_1	b_{344}	b_{410}
b_1	b_{346}	b_{369}
b_1	b_{347}	$b_{366} + b_{381}$
b_1	b_{348}	$b_{380} + b_{394}$
b_1	b_{349}	$b_{388} + b_{400} + b_{411}$
b_1	b_{350}	$b_{373} + b_{404}$
b_1	b_{351}	b_{379}
b_1	b_{352}	b_{379}
b_1	b_{353}	$b_{372} + b_{388}$
b_1	b_{354}	b_{395}
b_1	b_{355}	$b_{377} + b_{391} + b_{402}$
b_1	b_{356}	$b_{387} + b_{405}$
b_1	b_{357}	$b_{396} + b_{409}$
b_1	b_{358}	$b_{378} + b_{379}$
b_1	b_{359}	b_{383}
b_1	b_{361}	$b_{412} + b_{414} + b_{415}$
b_1	b_{362}	b_{413}
b_1	b_{364}	b_{416}
b_1	b_{366}	b_{417}
b_1	b_{367}	b_{414}
b_1	b_{368}	$b_{415} + b_{418}$
b_1	b_{369}	b_{421}
b_1	b_{370}	b_{417}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{371}	b_{443}
b_1	b_{372}	b_{426}
b_1	b_{373}	b_{445}
b_1	b_{374}	$b_{425} + b_{446}$
b_1	b_{375}	b_{427}
b_1	b_{376}	$b_{426} + b_{427}$
b_1	b_{377}	$b_{412} + b_{429}$
b_1	b_{380}	b_{416}
b_1	b_{381}	b_{417}
b_1	b_{382}	b_{418}
b_1	b_{383}	$b_{419} + b_{431} + b_{437}$
b_1	b_{384}	$b_{434} + b_{438}$
b_1	b_{385}	$b_{435} + b_{438}$
b_1	b_{386}	$b_{424} + b_{442} + b_{455}$
b_1	b_{387}	$b_{440} + b_{456}$
b_1	b_{388}	$b_{426} + b_{441}$
b_1	b_{390}	$b_{428} + b_{459}$
b_1	b_{391}	$b_{412} + b_{443}$
b_1	b_{392}	$b_{414} + b_{443}$
b_1	b_{393}	b_{415}
b_1	b_{394}	b_{416}
b_1	b_{396}	b_{451}
b_1	b_{397}	$b_{450} + b_{452}$
b_1	b_{399}	b_{452}
b_1	b_{400}	$b_{426} + b_{454}$
b_1	b_{401}	$b_{427} + b_{452} + b_{454}$
b_1	b_{402}	$b_{429} + b_{443}$
b_1	b_{403}	$b_{444} + b_{457}$
b_1	b_{404}	$b_{432} + b_{445}$
b_1	b_{405}	$b_{433} + b_{456}$
b_1	b_{406}	$b_{434} + b_{458}$
b_1	b_{407}	$b_{435} + b_{456} + b_{458}$
b_1	b_{408}	b_{450}
b_1	b_{409}	$b_{451} + b_{461}$
b_1	b_{411}	$b_{441} + b_{454}$
b_1	b_{412}	b_{463}
b_1	b_{414}	b_{463}
b_1	b_{419}	$b_{465} + b_{474}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{420}	$b_{468} + b_{473} + b_{475}$
b_1	b_{422}	$b_{470} + b_{475}$
b_1	b_{424}	$b_{481} + b_{493}$
b_1	b_{425}	$b_{476} + b_{477} + b_{494}$
b_1	b_{426}	b_{479}
b_1	b_{427}	b_{479}
b_1	b_{428}	$b_{480} + b_{497}$
b_1	b_{429}	b_{463}
b_1	b_{430}	b_{464}
b_1	b_{431}	$b_{465} + b_{485}$
b_1	b_{432}	b_{466}
b_1	b_{433}	b_{484}
b_1	b_{434}	b_{486}
b_1	b_{435}	$b_{484} + b_{486}$
b_1	b_{436}	b_{473}
b_1	b_{437}	$b_{474} + b_{485} + b_{489}$
b_1	b_{438}	b_{486}
b_1	b_{439}	b_{491}
b_1	b_{440}	b_{506}
b_1	b_{441}	b_{479}
b_1	b_{442}	$b_{481} + b_{508}$
b_1	b_{443}	b_{463}
b_1	b_{444}	$b_{492} + b_{495}$
b_1	b_{445}	$b_{466} + b_{498}$
b_1	b_{446}	$b_{467} + b_{494} + b_{499}$
b_1	b_{447}	$b_{468} + b_{496}$
b_1	b_{448}	$b_{470} + b_{496}$
b_1	b_{449}	$b_{472} + b_{498}$
b_1	b_{451}	$b_{501} + b_{502}$
b_1	b_{453}	$b_{501} + b_{504}$
b_1	b_{454}	b_{479}
b_1	b_{455}	$b_{483} + b_{493} + b_{508}$
b_1	b_{456}	$b_{484} + b_{506}$
b_1	b_{457}	$b_{495} + b_{505} + b_{507}$
b_1	b_{458}	$b_{486} + b_{506}$
b_1	b_{459}	$b_{487} + b_{497} + b_{509}$
b_1	b_{460}	b_{488}
b_1	b_{461}	b_{502}

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{462}	b_{503}
b_1	b_{464}	b_{511}
b_1	b_{465}	$b_{512} + b_{516}$
b_1	b_{466}	b_{519}
b_1	b_{467}	$b_{515} + b_{520}$
b_1	b_{468}	b_{517}
b_1	b_{470}	b_{517}
b_1	b_{472}	$b_{511} + b_{519}$
b_1	b_{474}	$b_{516} + b_{522} + b_{523}$
b_1	b_{475}	b_{517}
b_1	b_{476}	b_{525}
b_1	b_{477}	$b_{525} + b_{538}$
b_1	b_{478}	b_{526}
b_1	b_{481}	$b_{527} + b_{542}$
b_1	b_{482}	b_{513}
b_1	b_{483}	$b_{514} + b_{533}$
b_1	b_{484}	b_{530}
b_1	b_{485}	$b_{516} + b_{529} + b_{531}$
b_1	b_{486}	b_{530}
b_1	b_{487}	$b_{518} + b_{534}$
b_1	b_{488}	b_{528}
b_1	b_{489}	$b_{523} + b_{531}$
b_1	b_{490}	b_{524}
b_1	b_{491}	b_{536}
b_1	b_{493}	$b_{514} + b_{542} + b_{543}$
b_1	b_{494}	$b_{515} + b_{538}$
b_1	b_{495}	b_{540}
b_1	b_{496}	b_{517}
b_1	b_{497}	b_{518}
b_1	b_{498}	b_{519}
b_1	b_{499}	b_{520}
b_1	b_{500}	b_{521}
b_1	b_{501}	b_{545}
b_1	b_{502}	b_{545}
b_1	b_{503}	b_{548}
b_1	b_{504}	$b_{545} + b_{548}$
b_1	b_{505}	b_{549}
b_1	b_{506}	b_{530}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{507}	$b_{540} + b_{549}$
b_1	b_{508}	$b_{533} + b_{542} + b_{551}$
b_1	b_{509}	b_{534}
b_1	b_{510}	$b_{535} + b_{547} + b_{550} + b_{552} + b_{553}$
b_1	b_{511}	b_{554}
b_1	b_{513}	b_{556}
b_1	b_{514}	$b_{563} + b_{564}$
b_1	b_{515}	b_{558}
b_1	b_{516}	b_{560}
b_1	b_{519}	b_{554}
b_1	b_{520}	b_{555}
b_1	b_{521}	b_{556}
b_1	b_{522}	b_{566}
b_1	b_{523}	$b_{560} + b_{566}$
b_1	b_{524}	b_{570}
b_1	b_{525}	b_{569}
b_1	b_{526}	b_{570}
b_1	b_{529}	b_{571}
b_1	b_{531}	$b_{560} + b_{571}$
b_1	b_{532}	b_{562}
b_1	b_{533}	$b_{563} + b_{575}$
b_1	b_{534}	b_{572}
b_1	b_{535}	$b_{568} + b_{576} + b_{577}$
b_1	b_{537}	$b_{578} + b_{581}$
b_1	b_{538}	b_{558}
b_1	b_{539}	$b_{559} + b_{579} + b_{587}$
b_1	b_{541}	b_{590}
b_1	b_{542}	b_{563}
b_1	b_{543}	b_{564}
b_1	b_{544}	$b_{565} + b_{586}$
b_1	b_{545}	b_{583}
b_1	b_{546}	$b_{567} + b_{584} + b_{592}$
b_1	b_{547}	$b_{568} + b_{581} + b_{585} + b_{586}$
b_1	b_{548}	b_{583}
b_1	b_{549}	b_{588}
b_1	b_{550}	$b_{581} + b_{589} + b_{590}$
b_1	b_{551}	b_{575}
b_1	b_{552}	$b_{576} + b_{585} + b_{589}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{553}	$b_{577} + b_{586} + b_{590}$
b_1	b_{557}	$b_{594} + b_{600}$
b_1	b_{559}	$b_{597} + b_{606}$
b_1	b_{561}	b_{610}
b_1	b_{564}	b_{593}
b_1	b_{565}	$b_{595} + b_{605}$
b_1	b_{566}	b_{602}
b_1	b_{567}	$b_{599} + b_{603} + b_{613}$
b_1	b_{568}	$b_{604} + b_{605}$
b_1	b_{571}	b_{607}
b_1	b_{574}	$b_{600} + b_{606} + b_{609} + b_{610}$
b_1	b_{575}	b_{608}
b_1	b_{576}	b_{604}
b_1	b_{577}	b_{605}
b_1	b_{578}	$b_{615} + b_{617}$
b_1	b_{579}	$b_{597} + b_{616} + b_{621}$
b_1	b_{580}	b_{623}
b_1	b_{581}	$b_{617} + b_{618}$
b_1	b_{582}	$b_{601} + b_{619}$
b_1	b_{584}	$b_{603} + b_{625}$
b_1	b_{585}	$b_{604} + b_{617}$
b_1	b_{586}	$b_{605} + b_{618}$
b_1	b_{587}	$b_{606} + b_{614} + b_{621} + b_{622}$
b_1	b_{589}	b_{617}
b_1	b_{590}	b_{618}
b_1	b_{591}	$b_{612} + b_{619} + b_{623} + b_{625}$
b_1	b_{592}	$b_{613} + b_{620} + b_{624} + b_{625}$
b_1	b_{594}	$b_{627} + b_{631}$
b_1	b_{596}	b_{634}
b_1	b_{597}	$b_{629} + b_{637}$
b_1	b_{598}	b_{639}
b_1	b_{599}	b_{630}
b_1	b_{600}	$b_{626} + b_{631} + b_{632}$
b_1	b_{601}	$b_{628} + b_{635}$
b_1	b_{603}	$b_{630} + b_{642}$
b_1	b_{606}	$b_{626} + b_{637} + b_{638}$
b_1	b_{609}	$b_{631} + b_{637}$
b_1	b_{610}	$b_{632} + b_{638}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{611}	$b_{641} + b_{649}$
b_1	b_{612}	$b_{635} + b_{642}$
b_1	b_{613}	$b_{636} + b_{642}$
b_1	b_{614}	$b_{626} + b_{643} + b_{644}$
b_1	b_{616}	b_{629}
b_1	b_{619}	$b_{635} + b_{646} + b_{648}$
b_1	b_{620}	$b_{636} + b_{647} + b_{648}$
b_1	b_{621}	$b_{637} + b_{643}$
b_1	b_{622}	$b_{638} + b_{644}$
b_1	b_{623}	$b_{646} + b_{652}$
b_1	b_{624}	$b_{647} + b_{652}$
b_1	b_{625}	$b_{642} + b_{648} + b_{652}$
b_1	b_{626}	$b_{653} + b_{654}$
b_1	b_{631}	b_{653}
b_1	b_{632}	b_{654}
b_1	b_{633}	b_{666}
b_1	b_{634}	$b_{659} + b_{667}$
b_1	b_{635}	b_{660}
b_1	b_{636}	b_{660}
b_1	b_{637}	b_{653}
b_1	b_{638}	b_{654}
b_1	b_{639}	$b_{656} + b_{662} + b_{664}$
b_1	b_{640}	$b_{657} + b_{663} + b_{664}$
b_1	b_{641}	$b_{665} + b_{672}$
b_1	b_{642}	b_{660}
b_1	b_{643}	b_{653}
b_1	b_{644}	$b_{654} + b_{666}$
b_1	b_{645}	b_{670}
b_1	b_{646}	b_{671}
b_1	b_{647}	$b_{670} + b_{671}$
b_1	b_{648}	$b_{660} + b_{671}$
b_1	b_{649}	$b_{661} + b_{672}$
b_1	b_{650}	$b_{662} + b_{668} + b_{673}$
b_1	b_{651}	$b_{663} + b_{669} + b_{672} + b_{673}$
b_1	b_{652}	b_{671}
b_1	b_{654}	b_{674}
b_1	b_{655}	b_{679}
b_1	b_{656}	$b_{677} + b_{680}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{657}	$b_{678} + b_{679} + b_{680}$
b_1	b_{658}	b_{685}
b_1	b_{659}	$b_{681} + b_{686}$
b_1	b_{661}	b_{683}
b_1	b_{662}	$b_{677} + b_{684}$
b_1	b_{663}	$b_{678} + b_{683} + b_{684}$
b_1	b_{664}	$b_{680} + b_{684}$
b_1	b_{665}	b_{689}
b_1	b_{666}	b_{674}
b_1	b_{667}	$b_{675} + b_{686}$
b_1	b_{668}	$b_{677} + b_{685} + b_{687}$
b_1	b_{669}	$b_{678} + b_{687}$
b_1	b_{670}	b_{688}
b_1	b_{671}	b_{688}
b_1	b_{672}	$b_{683} + b_{689}$
b_1	b_{673}	$b_{684} + b_{687} + b_{689}$
b_1	b_{675}	b_{692}
b_1	b_{676}	b_{693}
b_1	b_{677}	$b_{691} + b_{694}$
b_1	b_{678}	b_{694}
b_1	b_{679}	b_{695}
b_1	b_{680}	$b_{694} + b_{695}$
b_1	b_{681}	b_{698}
b_1	b_{682}	b_{699}
b_1	b_{683}	b_{696}
b_1	b_{684}	$b_{694} + b_{696}$
b_1	b_{685}	b_{691}
b_1	b_{686}	$b_{692} + b_{698} + b_{700}$
b_1	b_{687}	b_{694}
b_1	b_{689}	b_{696}
b_1	b_{690}	$b_{697} + b_{700} + b_{701}$
b_1	b_{692}	$b_{702} + b_{705}$
b_1	b_{693}	$b_{703} + b_{706}$
b_1	b_{697}	$b_{705} + b_{706} + b_{707}$
b_1	b_{698}	$b_{702} + b_{708}$
b_1	b_{699}	$b_{704} + b_{709}$
b_1	b_{700}	$b_{705} + b_{708}$
b_1	b_{701}	$b_{707} + b_{708} + b_{709}$

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TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{702}	b_{711}
b_1	b_{703}	b_{712}
b_1	b_{704}	b_{713}
b_1	b_{705}	$b_{710} + b_{711}$
b_1	b_{706}	$b_{710} + b_{712}$
b_1	b_{707}	$b_{711} + b_{712} + b_{713}$
b_1	b_{708}	$b_{711} + b_{714}$
b_1	b_{709}	$b_{713} + b_{714}$
b_1	b_{710}	b_{715}
b_1	b_{711}	$b_{715} + b_{716}$
b_1	b_{712}	$b_{715} + b_{717}$
b_1	b_{713}	$b_{716} + b_{717}$
b_1	b_{714}	b_{716}
b_1	b_{715}	b_{718}
b_1	b_{716}	b_{718}
b_1	b_{717}	b_{718}
b_2	b_2	$b_{15} + b_{16}$
b_2	b_3	$b_{10} + b_{12}$
b_2	b_4	$b_{12} + b_{13}$
b_2	b_5	b_{18}
b_2	b_6	b_{20}
b_2	b_7	b_{26}
b_2	b_8	$b_{18} + b_{22}$
b_2	b_9	b_{22}
b_2	b_{11}	b_{29}
b_2	b_{14}	b_{29}
b_2	b_{15}	b_{37}
b_2	b_{16}	b_{43}
b_2	b_{23}	$b_{46} + b_{56}$
b_2	b_{24}	$b_{63} + b_{64}$
b_2	b_{25}	$b_{51} + b_{55} + b_{57} + b_{62}$
b_2	b_{28}	$b_{61} + b_{63}$
b_2	b_{30}	b_{68}
b_2	b_{31}	$b_{73} + b_{74}$
b_2	b_{32}	b_{69}
b_2	b_{35}	$b_{69} + b_{79}$
b_2	b_{36}	b_{68}
b_2	b_{39}	b_{80}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{41}	b_{79}
b_2	b_{42}	b_{80}
b_2	b_{45}	$b_{86} + b_{87}$
b_2	b_{48}	$b_{96} + b_{100}$
b_2	b_{59}	$b_{94} + b_{99} + b_{107}$
b_2	b_{63}	b_{121}
b_2	b_{65}	$b_{109} + b_{119}$
b_2	b_{66}	$b_{105} + b_{110} + b_{113}$
b_2	b_{67}	b_{128}
b_2	b_{71}	b_{128}
b_2	b_{73}	$b_{137} + b_{139}$
b_2	b_{76}	b_{132}
b_2	b_{77}	$b_{127} + b_{135}$
b_2	b_{81}	b_{145}
b_2	b_{82}	$b_{132} + b_{160}$
b_2	b_{83}	b_{127}
b_2	b_{84}	b_{128}
b_2	b_{87}	$b_{158} + b_{162}$
b_2	b_{88}	b_{145}
b_2	b_{89}	b_{152}
b_2	b_{90}	b_{140}
b_2	b_{91}	b_{137}
b_2	b_{92}	b_{162}
b_2	b_{93}	b_{145}
b_2	b_{98}	b_{180}
b_2	b_{101}	$b_{175} + b_{178} + b_{182}$
b_2	b_{102}	$b_{169} + b_{172}$
b_2	b_{104}	b_{182}
b_2	b_{106}	b_{173}
b_2	b_{111}	b_{168}
b_2	b_{112}	b_{190}
b_2	b_{114}	$b_{166} + b_{172}$
b_2	b_{115}	$b_{167} + b_{184}$
b_2	b_{116}	b_{173}
b_2	b_{122}	b_{180}
b_2	b_{124}	b_{175}
b_2	b_{130}	b_{209}
b_2	b_{131}	b_{214}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{134}	b_{209}
b_2	b_{136}	b_{215}
b_2	b_{142}	b_{209}
b_2	b_{144}	b_{211}
b_2	b_{147}	b_{210}
b_2	b_{148}	b_{234}
b_2	b_{150}	b_{243}
b_2	b_{151}	b_{209}
b_2	b_{156}	$b_{226} + b_{236}$
b_2	b_{159}	$b_{230} + b_{245}$
b_2	b_{164}	b_{220}
b_2	b_{165}	b_{247}
b_2	b_{168}	b_{277}
b_2	b_{170}	b_{262}
b_2	b_{174}	b_{266}
b_2	b_{177}	$b_{264} + b_{295}$
b_2	b_{183}	b_{280}
b_2	b_{185}	b_{260}
b_2	b_{186}	b_{264}
b_2	b_{188}	b_{282}
b_2	b_{189}	$b_{261} + b_{284}$
b_2	b_{190}	b_{288}
b_2	b_{191}	b_{259}
b_2	b_{192}	b_{277}
b_2	b_{194}	b_{294}
b_2	b_{199}	b_{273}
b_2	b_{200}	b_{270}
b_2	b_{202}	$b_{272} + b_{297}$
b_2	b_{203}	$b_{282} + b_{300}$
b_2	b_{207}	b_{288}
b_2	b_{210}	b_{329}
b_2	b_{211}	b_{333}
b_2	b_{213}	b_{312}
b_2	b_{214}	b_{316}
b_2	b_{220}	b_{345}
b_2	b_{227}	b_{316}
b_2	b_{233}	$b_{313} + b_{334}$
b_2	b_{234}	b_{336}
continued on next page...		

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{235}	b_{312}
b_2	b_{238}	b_{333}
b_2	b_{239}	b_{329}
b_2	b_{240}	$b_{308} + b_{319} + b_{343}$
b_2	b_{243}	b_{345}
b_2	b_{254}	b_{336}
b_2	b_{256}	$b_{327} + b_{328} + b_{342}$
b_2	b_{265}	b_{389}
b_2	b_{267}	b_{410}
b_2	b_{276}	$b_{364} + b_{380}$
b_2	b_{277}	b_{398}
b_2	b_{278}	b_{370}
b_2	b_{288}	b_{360}
b_2	b_{290}	b_{364}
b_2	b_{292}	b_{389}
b_2	b_{293}	$b_{370} + b_{381}$
b_2	b_{302}	$b_{372} + b_{388}$
b_2	b_{303}	$b_{371} + b_{402}$
b_2	b_{304}	b_{379}
b_2	b_{305}	b_{378}
b_2	b_{307}	b_{378}
b_2	b_{309}	b_{452}
b_2	b_{317}	b_{416}
b_2	b_{321}	b_{442}
b_2	b_{330}	$b_{427} + b_{454}$
b_2	b_{331}	b_{417}
b_2	b_{338}	b_{426}
b_2	b_{339}	b_{443}
b_2	b_{340}	b_{415}
b_2	b_{341}	$b_{412} + b_{414}$
b_2	b_{347}	b_{417}
b_2	b_{348}	b_{416}
b_2	b_{349}	$b_{426} + b_{441}$
b_2	b_{355}	$b_{429} + b_{443}$
b_2	b_{359}	b_{431}
b_2	b_{374}	$b_{476} + b_{499}$
b_2	b_{376}	b_{479}
b_2	b_{377}	b_{463}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{383}	$b_{465} + b_{485}$
b_2	b_{385}	b_{486}
b_2	b_{386}	$b_{481} + b_{508}$
b_2	b_{390}	$b_{480} + b_{509}$
b_2	b_{391}	b_{463}
b_2	b_{392}	b_{463}
b_2	b_{400}	b_{479}
b_2	b_{403}	$b_{492} + b_{505}$
b_2	b_{406}	b_{486}
b_2	b_{407}	$b_{484} + b_{506}$
b_2	b_{411}	b_{479}
b_2	b_{419}	b_{516}
b_2	b_{422}	b_{517}
b_2	b_{424}	b_{542}
b_2	b_{425}	b_{525}
b_2	b_{431}	$b_{512} + b_{529}$
b_2	b_{435}	b_{530}
b_2	b_{437}	$b_{516} + b_{531}$
b_2	b_{439}	b_{536}
b_2	b_{442}	$b_{527} + b_{551}$
b_2	b_{446}	b_{520}
b_2	b_{447}	b_{517}
b_2	b_{449}	b_{519}
b_2	b_{453}	b_{545}
b_2	b_{455}	$b_{533} + b_{542}$
b_2	b_{457}	b_{549}
b_2	b_{458}	b_{530}
b_2	b_{459}	b_{534}
b_2	b_{460}	b_{528}
b_2	b_{472}	b_{554}
b_2	b_{474}	b_{560}
b_2	b_{476}	b_{569}
b_2	b_{483}	b_{563}
b_2	b_{485}	b_{571}
b_2	b_{489}	b_{560}
b_2	b_{493}	b_{563}
b_2	b_{499}	b_{555}
b_2	b_{504}	b_{583}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{505}	b_{588}
b_2	b_{508}	b_{575}
b_2	b_{509}	b_{572}
b_2	b_{510}	$b_{568} + b_{577} + b_{585} + b_{589}$
b_2	b_{529}	b_{607}
b_2	b_{535}	b_{604}
b_2	b_{537}	$b_{615} + b_{618}$
b_2	b_{539}	$b_{597} + b_{621}$
b_2	b_{541}	b_{618}
b_2	b_{544}	$b_{595} + b_{618}$
b_2	b_{546}	$b_{603} + b_{613}$
b_2	b_{547}	$b_{605} + b_{617}$
b_2	b_{550}	b_{617}
b_2	b_{551}	b_{608}
b_2	b_{552}	b_{604}
b_2	b_{553}	b_{605}
b_2	b_{557}	$b_{627} + b_{632}$
b_2	b_{559}	b_{637}
b_2	b_{561}	b_{632}
b_2	b_{567}	b_{630}
b_2	b_{574}	$b_{626} + b_{631} + b_{638}$
b_2	b_{579}	b_{629}
b_2	b_{580}	b_{646}
b_2	b_{582}	$b_{628} + b_{646}$
b_2	b_{584}	b_{642}
b_2	b_{587}	$b_{637} + b_{643}$
b_2	b_{591}	$b_{635} + b_{648} + b_{652}$
b_2	b_{592}	$b_{636} + b_{642}$
b_2	b_{598}	b_{656}
b_2	b_{600}	b_{654}
b_2	b_{606}	b_{653}
b_2	b_{609}	b_{653}
b_2	b_{610}	b_{654}
b_2	b_{612}	b_{660}
b_2	b_{614}	b_{653}
b_2	b_{619}	b_{671}
b_2	b_{620}	b_{660}
b_2	b_{623}	b_{671}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{625}	b_{660}
b_2	b_{632}	b_{674}
b_2	b_{633}	b_{674}
b_2	b_{639}	$b_{677} + b_{680}$
b_2	b_{640}	$b_{678} + b_{684}$
b_2	b_{645}	b_{688}
b_2	b_{646}	b_{688}
b_2	b_{650}	$b_{684} + b_{687}$
b_2	b_{651}	$b_{683} + b_{689}$
b_2	b_{655}	b_{695}
b_2	b_{656}	$b_{691} + b_{695}$
b_2	b_{657}	b_{694}
b_2	b_{658}	b_{691}
b_2	b_{662}	b_{694}
b_2	b_{663}	b_{696}
b_2	b_{664}	b_{694}
b_2	b_{668}	b_{694}
b_2	b_{673}	b_{696}
b_2	b_{676}	b_{703}
b_2	b_{682}	b_{704}
b_2	b_{690}	$b_{705} + b_{708}$
b_2	b_{693}	b_{712}
b_2	b_{697}	$b_{710} + b_{711}$
b_2	b_{699}	b_{713}
b_2	b_{701}	$b_{711} + b_{714}$
b_2	b_{703}	b_{717}
b_2	b_{704}	b_{717}
b_2	b_{706}	b_{715}
b_2	b_{707}	$b_{715} + b_{716}$
b_2	b_{709}	b_{716}
b_2	b_{712}	b_{718}
b_2	b_{713}	b_{718}
b_3	b_3	$b_{10} + b_{11} + b_{15} + b_{17}$
b_3	b_4	$b_{11} + b_{12} + b_{14}$
b_3	b_5	$b_{20} + b_{21}$
b_3	b_6	$b_{18} + b_{20}$
b_3	b_7	$b_{18} + b_{22}$
b_3	b_8	$b_{18} + b_{19} + b_{21} + b_{27}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_9	$b_{19} + b_{22}$
b_3	b_{10}	b_{37}
b_3	b_{11}	$b_{33} + b_{38}$
b_3	b_{12}	b_{29}
b_3	b_{13}	b_{29}
b_3	b_{14}	$b_{29} + b_{33}$
b_3	b_{17}	$b_{33} + b_{44}$
b_3	b_{19}	b_{60}
b_3	b_{21}	$b_{52} + b_{60}$
b_3	b_{23}	$b_{46} + b_{47} + b_{57} + b_{58}$
b_3	b_{24}	b_{62}
b_3	b_{25}	$b_{46} + b_{50} + b_{51} + b_{55} + b_{56} + b_{63}$
b_3	b_{27}	b_{52}
b_3	b_{28}	$b_{51} + b_{57}$
b_3	b_{30}	$b_{69} + b_{70} + b_{78}$
b_3	b_{31}	$b_{71} + b_{72}$
b_3	b_{32}	b_{68}
b_3	b_{33}	b_{85}
b_3	b_{34}	b_{69}
b_3	b_{35}	$b_{68} + b_{69} + b_{80}$
b_3	b_{36}	$b_{68} + b_{70}$
b_3	b_{38}	b_{85}
b_3	b_{39}	b_{79}
b_3	b_{41}	$b_{68} + b_{79}$
b_3	b_{42}	$b_{69} + b_{80}$
b_3	b_{45}	$b_{75} + b_{81}$
b_3	b_{47}	b_{108}
b_3	b_{48}	$b_{94} + b_{95} + b_{99} + b_{100}$
b_3	b_{49}	b_{99}
b_3	b_{53}	b_{97}
b_3	b_{54}	b_{108}
b_3	b_{57}	b_{121}
b_3	b_{59}	$b_{94} + b_{100} + b_{106} + b_{116} + b_{118}$
b_3	b_{60}	b_{123}
b_3	b_{65}	$b_{97} + b_{105} + b_{109} + b_{113}$
b_3	b_{66}	$b_{98} + b_{105} + b_{110} + b_{119}$
b_3	b_{67}	$b_{127} + b_{128}$
b_3	b_{71}	$b_{127} + b_{135} + b_{137}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{72}	b_{127}
b_3	b_{73}	b_{128}
b_3	b_{75}	b_{132}
b_3	b_{77}	$b_{128} + b_{135} + b_{152}$
b_3	b_{81}	$b_{132} + b_{158} + b_{160}$
b_3	b_{82}	$b_{132} + b_{140} + b_{145}$
b_3	b_{83}	$b_{127} + b_{152}$
b_3	b_{84}	$b_{128} + b_{137}$
b_3	b_{87}	b_{145}
b_3	b_{88}	b_{162}
b_3	b_{90}	$b_{140} + b_{160}$
b_3	b_{93}	$b_{132} + b_{145}$
b_3	b_{94}	b_{173}
b_3	b_{97}	b_{180}
b_3	b_{99}	b_{173}
b_3	b_{101}	$b_{166} + b_{169} + b_{172}$
b_3	b_{102}	$b_{167} + b_{172} + b_{182}$
b_3	b_{103}	b_{180}
b_3	b_{106}	b_{173}
b_3	b_{111}	b_{186}
b_3	b_{113}	b_{180}
b_3	b_{114}	$b_{166} + b_{175} + b_{184}$
b_3	b_{115}	$b_{167} + b_{172}$
b_3	b_{117}	b_{197}
b_3	b_{122}	b_{180}
b_3	b_{126}	b_{205}
b_3	b_{129}	b_{209}
b_3	b_{130}	b_{209}
b_3	b_{133}	b_{209}
b_3	b_{136}	$b_{215} + b_{218}$
b_3	b_{138}	b_{209}
b_3	b_{143}	b_{209}
b_3	b_{144}	$b_{211} + b_{236}$
b_3	b_{147}	b_{232}
b_3	b_{149}	b_{241}
b_3	b_{150}	b_{242}
b_3	b_{151}	b_{209}
b_3	b_{153}	b_{245}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{155}	$b_{226} + b_{236}$
b_3	b_{156}	$b_{211} + b_{226} + b_{238}$
b_3	b_{159}	$b_{230} + b_{234}$
b_3	b_{161}	$b_{225} + b_{252}$
b_3	b_{163}	b_{237}
b_3	b_{165}	$b_{253} + b_{255}$
b_3	b_{168}	b_{264}
b_3	b_{171}	b_{266}
b_3	b_{174}	$b_{266} + b_{268}$
b_3	b_{176}	b_{264}
b_3	b_{177}	$b_{277} + b_{295}$
b_3	b_{179}	b_{262}
b_3	b_{181}	$b_{273} + b_{294}$
b_3	b_{185}	b_{260}
b_3	b_{186}	$b_{264} + b_{277}$
b_3	b_{189}	$b_{261} + b_{263} + b_{285} + b_{286}$
b_3	b_{194}	b_{294}
b_3	b_{196}	b_{282}
b_3	b_{197}	b_{300}
b_3	b_{200}	$b_{274} + b_{287}$
b_3	b_{201}	$b_{260} + b_{291}$
b_3	b_{202}	$b_{271} + b_{272} + b_{299}$
b_3	b_{203}	$b_{282} + b_{288}$
b_3	b_{204}	b_{273}
b_3	b_{205}	$b_{264} + b_{295}$
b_3	b_{207}	b_{300}
b_3	b_{208}	b_{289}
b_3	b_{211}	b_{333}
b_3	b_{213}	$b_{313} + b_{314} + b_{332}$
b_3	b_{217}	b_{310}
b_3	b_{218}	b_{323}
b_3	b_{221}	b_{315}
b_3	b_{222}	b_{329}
b_3	b_{224}	b_{316}
b_3	b_{225}	b_{345}
b_3	b_{226}	b_{333}
b_3	b_{232}	b_{329}
b_3	b_{233}	$b_{312} + b_{313} + b_{335}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{235}	$b_{312} + b_{314}$
b_3	b_{236}	b_{333}
b_3	b_{240}	$b_{308} + b_{318} + b_{331} + b_{343}$
b_3	b_{242}	b_{345}
b_3	b_{245}	b_{336}
b_3	b_{253}	$b_{315} + b_{346}$
b_3	b_{254}	b_{336}
b_3	b_{256}	$b_{317} + b_{328} + b_{348} + b_{352} + b_{358}$
b_3	b_{263}	b_{363}
b_3	b_{264}	b_{398}
b_3	b_{265}	$b_{370} + b_{389}$
b_3	b_{267}	$b_{389} + b_{410}$
b_3	b_{268}	b_{362}
b_3	b_{274}	b_{369}
b_3	b_{276}	$b_{378} + b_{380} + b_{394}$
b_3	b_{279}	b_{363}
b_3	b_{285}	b_{395}
b_3	b_{287}	b_{369}
b_3	b_{290}	$b_{364} + b_{394}$
b_3	b_{292}	b_{410}
b_3	b_{293}	$b_{366} + b_{370} + b_{389}$
b_3	b_{298}	b_{404}
b_3	b_{300}	b_{360}
b_3	b_{301}	b_{379}
b_3	b_{302}	$b_{372} + b_{400}$
b_3	b_{303}	$b_{377} + b_{391} + b_{402}$
b_3	b_{304}	b_{378}
b_3	b_{305}	$b_{378} + b_{379}$
b_3	b_{306}	b_{396}
b_3	b_{307}	$b_{364} + b_{379} + b_{380}$
b_3	b_{309}	$b_{427} + b_{452}$
b_3	b_{315}	b_{421}
b_3	b_{317}	b_{416}
b_3	b_{319}	b_{417}
b_3	b_{321}	b_{455}
b_3	b_{323}	b_{413}
b_3	b_{324}	b_{434}
b_3	b_{325}	$b_{429} + b_{443}$

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Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{328}	b_{416}
b_3	b_{330}	$b_{426} + b_{452} + b_{454}$
b_3	b_{339}	$b_{412} + b_{443}$
b_3	b_{340}	$b_{412} + b_{414} + b_{418}$
b_3	b_{341}	$b_{414} + b_{415} + b_{443}$
b_3	b_{342}	b_{416}
b_3	b_{347}	b_{417}
b_3	b_{349}	$b_{426} + b_{454}$
b_3	b_{350}	$b_{432} + b_{445}$
b_3	b_{353}	b_{426}
b_3	b_{355}	$b_{412} + b_{429}$
b_3	b_{356}	$b_{440} + b_{456}$
b_3	b_{357}	b_{451}
b_3	b_{359}	b_{419}
b_3	b_{361}	b_{463}
b_3	b_{367}	b_{463}
b_3	b_{371}	b_{463}
b_3	b_{373}	b_{466}
b_3	b_{374}	$b_{477} + b_{494}$
b_3	b_{376}	b_{479}
b_3	b_{383}	$b_{465} + b_{474}$
b_3	b_{384}	b_{486}
b_3	b_{386}	$b_{483} + b_{493} + b_{508}$
b_3	b_{387}	b_{506}
b_3	b_{388}	b_{479}
b_3	b_{390}	$b_{487} + b_{497}$
b_3	b_{391}	b_{463}
b_3	b_{396}	b_{501}
b_3	b_{401}	b_{479}
b_3	b_{402}	b_{463}
b_3	b_{403}	b_{495}
b_3	b_{404}	$b_{466} + b_{498}$
b_3	b_{405}	$b_{484} + b_{506}$
b_3	b_{406}	$b_{486} + b_{506}$
b_3	b_{407}	$b_{484} + b_{486}$
b_3	b_{409}	b_{502}
b_3	b_{411}	b_{479}
b_3	b_{419}	$b_{512} + b_{522}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{420}	b_{517}
b_3	b_{424}	$b_{514} + b_{542}$
b_3	b_{425}	$b_{525} + b_{538}$
b_3	b_{428}	b_{518}
b_3	b_{430}	b_{511}
b_3	b_{431}	b_{516}
b_3	b_{432}	b_{519}
b_3	b_{433}	b_{530}
b_3	b_{434}	b_{530}
b_3	b_{437}	$b_{516} + b_{523}$
b_3	b_{442}	$b_{533} + b_{542}$
b_3	b_{445}	b_{519}
b_3	b_{446}	$b_{515} + b_{538}$
b_3	b_{447}	b_{517}
b_3	b_{448}	b_{517}
b_3	b_{451}	b_{545}
b_3	b_{453}	$b_{545} + b_{548}$
b_3	b_{455}	$b_{514} + b_{533} + b_{543} + b_{551}$
b_3	b_{456}	b_{530}
b_3	b_{457}	b_{540}
b_3	b_{458}	b_{530}
b_3	b_{459}	$b_{518} + b_{534}$
b_3	b_{464}	b_{554}
b_3	b_{466}	b_{554}
b_3	b_{467}	b_{558}
b_3	b_{474}	b_{566}
b_3	b_{477}	b_{569}
b_3	b_{478}	b_{570}
b_3	b_{481}	b_{563}
b_3	b_{482}	b_{556}
b_3	b_{483}	$b_{564} + b_{575}$
b_3	b_{485}	b_{560}
b_3	b_{487}	b_{572}
b_3	b_{489}	b_{560}
b_3	b_{493}	$b_{563} + b_{564}$
b_3	b_{494}	b_{558}
b_3	b_{501}	b_{583}
b_3	b_{504}	b_{583}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{508}	$b_{563} + b_{575}$
b_3	b_{510}	$b_{568} + b_{576} + b_{581} + b_{586} + b_{589} + b_{590}$
b_3	b_{514}	b_{593}
b_3	b_{522}	b_{602}
b_3	b_{533}	b_{608}
b_3	b_{535}	b_{605}
b_3	b_{537}	b_{617}
b_3	b_{539}	$b_{597} + b_{606} + b_{616} + b_{622}$
b_3	b_{544}	b_{605}
b_3	b_{546}	$b_{613} + b_{620} + b_{625}$
b_3	b_{547}	$b_{604} + b_{617} + b_{618}$
b_3	b_{550}	b_{618}
b_3	b_{552}	$b_{604} + b_{617}$
b_3	b_{553}	$b_{605} + b_{618}$
b_3	b_{557}	b_{631}
b_3	b_{559}	$b_{629} + b_{638}$
b_3	b_{561}	b_{638}
b_3	b_{567}	$b_{636} + b_{642}$
b_3	b_{574}	$b_{626} + b_{632} + b_{637}$
b_3	b_{579}	$b_{629} + b_{637}$
b_3	b_{582}	$b_{635} + b_{648}$
b_3	b_{584}	$b_{642} + b_{648}$
b_3	b_{587}	$b_{626} + b_{637} + b_{638} + b_{644}$
b_3	b_{591}	$b_{635} + b_{642} + b_{646} + b_{652}$
b_3	b_{592}	$b_{636} + b_{647} + b_{648} + b_{652}$
b_3	b_{596}	b_{659}
b_3	b_{598}	b_{662}
b_3	b_{600}	b_{653}
b_3	b_{601}	b_{660}
b_3	b_{603}	b_{660}
b_3	b_{606}	b_{654}
b_3	b_{609}	b_{653}
b_3	b_{610}	b_{654}
b_3	b_{611}	$b_{665} + b_{672}$
b_3	b_{613}	b_{660}
b_3	b_{614}	$b_{653} + b_{654}$
b_3	b_{619}	$b_{660} + b_{671}$
b_3	b_{620}	$b_{670} + b_{671}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{621}	b_{653}
b_3	b_{622}	$b_{654} + b_{666}$
b_3	b_{624}	b_{671}
b_3	b_{625}	$b_{660} + b_{671}$
b_3	b_{634}	$b_{681} + b_{686}$
b_3	b_{638}	b_{674}
b_3	b_{639}	$b_{677} + b_{684}$
b_3	b_{640}	$b_{678} + b_{680}$
b_3	b_{641}	b_{689}
b_3	b_{644}	b_{674}
b_3	b_{647}	b_{688}
b_3	b_{648}	b_{688}
b_3	b_{649}	$b_{683} + b_{689}$
b_3	b_{650}	$b_{677} + b_{684} + b_{685} + b_{689}$
b_3	b_{651}	$b_{678} + b_{683} + b_{684} + b_{687}$
b_3	b_{656}	b_{694}
b_3	b_{657}	b_{695}
b_3	b_{659}	$b_{698} + b_{700}$
b_3	b_{661}	b_{696}
b_3	b_{662}	$b_{691} + b_{696}$
b_3	b_{663}	b_{694}
b_3	b_{664}	b_{694}
b_3	b_{667}	$b_{692} + b_{698}$
b_3	b_{668}	$b_{691} + b_{694}$
b_3	b_{669}	b_{694}
b_3	b_{672}	b_{696}
b_3	b_{673}	$b_{694} + b_{696}$
b_3	b_{675}	b_{702}
b_3	b_{681}	b_{708}
b_3	b_{682}	b_{709}
b_3	b_{686}	$b_{702} + b_{705} + b_{708}$
b_3	b_{690}	$b_{705} + b_{706} + b_{707}$
b_3	b_{692}	b_{711}
b_3	b_{697}	$b_{710} + b_{712}$
b_3	b_{698}	$b_{711} + b_{714}$
b_3	b_{699}	$b_{713} + b_{714}$
b_3	b_{700}	$b_{710} + b_{711}$
b_3	b_{701}	$b_{711} + b_{712} + b_{713}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{702}	b_{716}
b_3	b_{704}	b_{716}
b_3	b_{705}	b_{715}
b_3	b_{707}	$b_{715} + b_{717}$
b_3	b_{708}	$b_{715} + b_{716}$
b_3	b_{709}	$b_{716} + b_{717}$
b_3	b_{711}	b_{718}
b_3	b_{713}	b_{718}
b_3	b_{714}	b_{718}
b_4	b_4	$b_{13} + b_{14} + b_{16} + b_{17}$
b_4	b_5	$b_{18} + b_{19}$
b_4	b_6	$b_{18} + b_{22}$
b_4	b_7	$b_{22} + b_{26}$
b_4	b_8	$b_{19} + b_{21} + b_{22} + b_{27}$
b_4	b_9	$b_{26} + b_{27}$
b_4	b_{10}	b_{29}
b_4	b_{11}	$b_{29} + b_{33}$
b_4	b_{12}	b_{29}
b_4	b_{13}	b_{43}
b_4	b_{14}	$b_{33} + b_{44}$
b_4	b_{17}	$b_{33} + b_{38}$
b_4	b_{19}	b_{52}
b_4	b_{21}	b_{60}
b_4	b_{23}	$b_{47} + b_{54} + b_{55} + b_{56}$
b_4	b_{24}	$b_{55} + b_{62}$
b_4	b_{25}	$b_{46} + b_{50} + b_{56} + b_{57} + b_{62} + b_{63}$
b_4	b_{27}	$b_{52} + b_{60}$
b_4	b_{28}	b_{51}
b_4	b_{30}	$b_{68} + b_{78}$
b_4	b_{31}	$b_{67} + b_{72}$
b_4	b_{32}	$b_{68} + b_{69}$
b_4	b_{33}	b_{85}
b_4	b_{35}	$b_{68} + b_{79} + b_{80}$
b_4	b_{36}	$b_{70} + b_{78} + b_{79}$
b_4	b_{39}	$b_{79} + b_{80}$
b_4	b_{40}	b_{79}
b_4	b_{41}	b_{68}
b_4	b_{42}	b_{69}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{44}	b_{85}
b_4	b_{45}	$b_{75} + b_{93}$
b_4	b_{47}	b_{108}
b_4	b_{48}	$b_{94} + b_{95} + b_{96} + b_{99}$
b_4	b_{49}	b_{95}
b_4	b_{52}	b_{123}
b_4	b_{53}	b_{105}
b_4	b_{55}	b_{121}
b_4	b_{58}	b_{108}
b_4	b_{59}	$b_{99} + b_{100} + b_{106} + b_{107}$
b_4	b_{65}	$b_{97} + b_{105} + b_{113} + b_{119}$
b_4	b_{66}	$b_{98} + b_{113} + b_{119} + b_{122} + b_{125}$
b_4	b_{67}	$b_{127} + b_{135} + b_{139}$
b_4	b_{71}	$b_{127} + b_{128}$
b_4	b_{72}	b_{127}
b_4	b_{73}	b_{128}
b_4	b_{75}	b_{132}
b_4	b_{76}	$b_{132} + b_{140}$
b_4	b_{77}	$b_{127} + b_{128} + b_{152}$
b_4	b_{81}	$b_{132} + b_{145}$
b_4	b_{82}	$b_{140} + b_{145} + b_{160}$
b_4	b_{84}	b_{137}
b_4	b_{87}	b_{145}
b_4	b_{88}	$b_{145} + b_{162}$
b_4	b_{89}	$b_{135} + b_{152}$
b_4	b_{93}	$b_{132} + b_{160} + b_{162}$
b_4	b_{94}	b_{173}
b_4	b_{95}	b_{173}
b_4	b_{98}	b_{180}
b_4	b_{101}	$b_{166} + b_{169} + b_{172}$
b_4	b_{102}	$b_{167} + b_{169} + b_{182}$
b_4	b_{105}	b_{180}
b_4	b_{112}	b_{188}
b_4	b_{113}	b_{180}
b_4	b_{114}	$b_{172} + b_{175} + b_{184}$
b_4	b_{115}	$b_{172} + b_{184}$
b_4	b_{116}	b_{173}
b_4	b_{117}	b_{196}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{120}	b_{173}
b_4	b_{126}	b_{176}
b_4	b_{129}	b_{209}
b_4	b_{131}	b_{212}
b_4	b_{133}	b_{209}
b_4	b_{134}	b_{209}
b_4	b_{136}	$b_{216} + b_{217}$
b_4	b_{138}	b_{209}
b_4	b_{142}	b_{209}
b_4	b_{143}	b_{209}
b_4	b_{148}	$b_{230} + b_{234}$
b_4	b_{149}	b_{229}
b_4	b_{153}	$b_{230} + b_{245}$
b_4	b_{155}	b_{226}
b_4	b_{156}	$b_{211} + b_{236}$
b_4	b_{159}	$b_{234} + b_{245} + b_{254}$
b_4	b_{161}	$b_{225} + b_{242}$
b_4	b_{163}	b_{219}
b_4	b_{164}	b_{252}
b_4	b_{165}	$b_{221} + b_{247}$
b_4	b_{170}	b_{262}
b_4	b_{171}	b_{257}
b_4	b_{174}	$b_{258} + b_{268}$
b_4	b_{176}	b_{295}
b_4	b_{177}	$b_{264} + b_{277}$
b_4	b_{179}	$b_{262} + b_{275}$
b_4	b_{181}	b_{294}
b_4	b_{188}	$b_{282} + b_{288}$
b_4	b_{189}	$b_{263} + b_{279} + b_{281} + b_{284}$
b_4	b_{190}	b_{282}
b_4	b_{192}	b_{295}
b_4	b_{196}	$b_{282} + b_{300}$
b_4	b_{197}	b_{282}
b_4	b_{199}	b_{273}
b_4	b_{200}	$b_{270} + b_{274}$
b_4	b_{201}	b_{260}
b_4	b_{202}	$b_{271} + b_{297} + b_{299}$
b_4	b_{203}	$b_{288} + b_{300}$

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{204}	$b_{273} + b_{294}$
b_4	b_{205}	b_{264}
b_4	b_{208}	b_{270}
b_4	b_{212}	b_{316}
b_4	b_{213}	$b_{312} + b_{332}$
b_4	b_{217}	$b_{310} + b_{323}$
b_4	b_{218}	b_{310}
b_4	b_{221}	b_{346}
b_4	b_{222}	b_{329}
b_4	b_{224}	b_{316}
b_4	b_{225}	b_{345}
b_4	b_{226}	b_{333}
b_4	b_{230}	b_{336}
b_4	b_{233}	$b_{312} + b_{334} + b_{335}$
b_4	b_{234}	b_{336}
b_4	b_{235}	$b_{314} + b_{332} + b_{334}$
b_4	b_{238}	b_{333}
b_4	b_{240}	$b_{318} + b_{319} + b_{331} + b_{344} + b_{347}$
b_4	b_{245}	b_{336}
b_4	b_{252}	b_{345}
b_4	b_{253}	b_{315}
b_4	b_{256}	$b_{317} + b_{327} + b_{342} + b_{358}$
b_4	b_{258}	b_{362}
b_4	b_{263}	b_{363}
b_4	b_{265}	$b_{370} + b_{381} + b_{410}$
b_4	b_{267}	b_{389}
b_4	b_{268}	b_{362}
b_4	b_{269}	b_{410}
b_4	b_{274}	b_{369}
b_4	b_{276}	$b_{364} + b_{378} + b_{394}$
b_4	b_{278}	$b_{366} + b_{370}$
b_4	b_{281}	b_{395}
b_4	b_{282}	b_{360}
b_4	b_{286}	b_{363}
b_4	b_{292}	$b_{389} + b_{410}$
b_4	b_{293}	$b_{366} + b_{381} + b_{389}$
b_4	b_{295}	b_{398}
b_4	b_{298}	b_{373}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{302}	$b_{388} + b_{400} + b_{411}$
b_4	b_{303}	$b_{371} + b_{391}$
b_4	b_{304}	$b_{378} + b_{379}$
b_4	b_{305}	b_{379}
b_4	b_{306}	b_{409}
b_4	b_{307}	$b_{364} + b_{378}$
b_4	b_{308}	b_{417}
b_4	b_{309}	$b_{427} + b_{450} + b_{454}$
b_4	b_{310}	b_{413}
b_4	b_{319}	b_{417}
b_4	b_{321}	b_{424}
b_4	b_{324}	b_{438}
b_4	b_{325}	b_{443}
b_4	b_{328}	b_{416}
b_4	b_{330}	$b_{426} + b_{427} + b_{452}$
b_4	b_{331}	b_{417}
b_4	b_{338}	$b_{426} + b_{454}$
b_4	b_{340}	$b_{414} + b_{415}$
b_4	b_{341}	$b_{412} + b_{415} + b_{443}$
b_4	b_{346}	b_{421}
b_4	b_{348}	b_{416}
b_4	b_{349}	$b_{441} + b_{454}$
b_4	b_{350}	b_{445}
b_4	b_{353}	$b_{426} + b_{441}$
b_4	b_{355}	$b_{412} + b_{443}$
b_4	b_{356}	$b_{433} + b_{456}$
b_4	b_{357}	$b_{451} + b_{461}$
b_4	b_{359}	b_{437}
b_4	b_{361}	b_{463}
b_4	b_{372}	b_{479}
b_4	b_{373}	b_{498}
b_4	b_{374}	$b_{467} + b_{494}$
b_4	b_{375}	b_{479}
b_4	b_{377}	b_{463}
b_4	b_{383}	$b_{474} + b_{485} + b_{489}$
b_4	b_{384}	b_{486}
b_4	b_{385}	$b_{484} + b_{486}$
b_4	b_{386}	$b_{481} + b_{493}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{387}	$b_{484} + b_{506}$
b_4	b_{388}	b_{479}
b_4	b_{390}	b_{497}
b_4	b_{392}	b_{463}
b_4	b_{396}	b_{502}
b_4	b_{400}	b_{479}
b_4	b_{401}	b_{479}
b_4	b_{402}	b_{463}
b_4	b_{403}	$b_{495} + b_{507}$
b_4	b_{404}	b_{466}
b_4	b_{405}	b_{484}
b_4	b_{407}	$b_{486} + b_{506}$
b_4	b_{409}	$b_{501} + b_{502}$
b_4	b_{419}	$b_{516} + b_{523}$
b_4	b_{420}	b_{517}
b_4	b_{422}	b_{517}
b_4	b_{424}	$b_{527} + b_{543}$
b_4	b_{425}	$b_{515} + b_{538}$
b_4	b_{431}	$b_{516} + b_{531}$
b_4	b_{435}	b_{530}
b_4	b_{437}	$b_{522} + b_{523} + b_{529} + b_{531}$
b_4	b_{438}	b_{530}
b_4	b_{440}	b_{530}
b_4	b_{442}	b_{542}
b_4	b_{444}	b_{540}
b_4	b_{445}	b_{519}
b_4	b_{446}	$b_{515} + b_{520}$
b_4	b_{448}	b_{517}
b_4	b_{449}	$b_{511} + b_{519}$
b_4	b_{451}	b_{545}
b_4	b_{455}	$b_{514} + b_{542}$
b_4	b_{456}	b_{530}
b_4	b_{457}	$b_{540} + b_{549}$
b_4	b_{459}	b_{518}
b_4	b_{461}	b_{545}
b_4	b_{462}	b_{548}
b_4	b_{465}	b_{560}
b_4	b_{467}	b_{555}

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Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{472}	b_{554}
b_4	b_{474}	$b_{560} + b_{566}$
b_4	b_{477}	b_{558}
b_4	b_{483}	b_{563}
b_4	b_{485}	$b_{560} + b_{571}$
b_4	b_{489}	$b_{566} + b_{571}$
b_4	b_{490}	b_{570}
b_4	b_{493}	b_{564}
b_4	b_{494}	b_{558}
b_4	b_{498}	b_{554}
b_4	b_{500}	b_{556}
b_4	b_{502}	b_{583}
b_4	b_{503}	b_{583}
b_4	b_{507}	b_{588}
b_4	b_{508}	b_{563}
b_4	b_{510}	$b_{576} + b_{577} + b_{581} + b_{585} + b_{586} + b_{590}$
b_4	b_{523}	b_{602}
b_4	b_{531}	b_{607}
b_4	b_{535}	$b_{604} + b_{605}$
b_4	b_{537}	b_{617}
b_4	b_{539}	$b_{606} + b_{614} + b_{621}$
b_4	b_{543}	b_{593}
b_4	b_{544}	b_{605}
b_4	b_{546}	$b_{599} + b_{603} + b_{624} + b_{625}$
b_4	b_{547}	$b_{604} + b_{605} + b_{618}$
b_4	b_{550}	$b_{617} + b_{618}$
b_4	b_{552}	b_{617}
b_4	b_{553}	b_{618}
b_4	b_{557}	$b_{626} + b_{631}$
b_4	b_{559}	$b_{626} + b_{637}$
b_4	b_{567}	$b_{630} + b_{642}$
b_4	b_{574}	$b_{631} + b_{632} + b_{637} + b_{638}$
b_4	b_{579}	$b_{637} + b_{643}$
b_4	b_{580}	b_{652}
b_4	b_{582}	b_{635}
b_4	b_{584}	$b_{630} + b_{652}$
b_4	b_{587}	$b_{626} + b_{638} + b_{643} + b_{644}$
b_4	b_{591}	$b_{642} + b_{646} + b_{648}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{592}	$b_{642} + b_{647} + b_{648} + b_{652}$
b_4	b_{594}	b_{653}
b_4	b_{596}	b_{667}
b_4	b_{597}	b_{653}
b_4	b_{598}	b_{664}
b_4	b_{600}	$b_{653} + b_{654}$
b_4	b_{606}	$b_{653} + b_{654}$
b_4	b_{611}	$b_{661} + b_{672}$
b_4	b_{612}	b_{660}
b_4	b_{613}	b_{660}
b_4	b_{614}	$b_{654} + b_{666}$
b_4	b_{619}	b_{660}
b_4	b_{620}	$b_{660} + b_{671}$
b_4	b_{621}	b_{653}
b_4	b_{622}	b_{654}
b_4	b_{623}	b_{671}
b_4	b_{624}	$b_{670} + b_{671}$
b_4	b_{625}	b_{671}
b_4	b_{626}	b_{674}
b_4	b_{634}	$b_{675} + b_{686}$
b_4	b_{639}	$b_{680} + b_{684}$
b_4	b_{640}	$b_{679} + b_{680} + b_{683} + b_{684}$
b_4	b_{641}	$b_{683} + b_{689}$
b_4	b_{644}	b_{674}
b_4	b_{647}	b_{688}
b_4	b_{649}	b_{683}
b_4	b_{650}	$b_{677} + b_{687}$
b_4	b_{651}	$b_{678} + b_{684} + b_{687} + b_{689}$
b_4	b_{652}	b_{688}
b_4	b_{656}	b_{694}
b_4	b_{657}	$b_{694} + b_{695}$
b_4	b_{659}	$b_{692} + b_{698}$
b_4	b_{662}	b_{694}
b_4	b_{663}	$b_{694} + b_{696}$
b_4	b_{664}	$b_{695} + b_{696}$
b_4	b_{665}	b_{696}
b_4	b_{667}	$b_{692} + b_{700}$
b_4	b_{668}	b_{691}

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{669}	b_{694}
b_4	b_{672}	b_{696}
b_4	b_{673}	b_{694}
b_4	b_{675}	b_{705}
b_4	b_{676}	b_{706}
b_4	b_{681}	b_{702}
b_4	b_{686}	$b_{702} + b_{705} + b_{708}$
b_4	b_{690}	$b_{707} + b_{708} + b_{709}$
b_4	b_{692}	$b_{710} + b_{711}$
b_4	b_{693}	$b_{710} + b_{712}$
b_4	b_{697}	$b_{711} + b_{712} + b_{713}$
b_4	b_{698}	b_{711}
b_4	b_{700}	$b_{711} + b_{714}$
b_4	b_{701}	$b_{713} + b_{714}$
b_4	b_{702}	b_{715}
b_4	b_{703}	b_{715}
b_4	b_{705}	$b_{715} + b_{716}$
b_4	b_{706}	$b_{715} + b_{717}$
b_4	b_{707}	$b_{716} + b_{717}$
b_4	b_{708}	b_{716}
b_4	b_{710}	b_{718}
b_4	b_{711}	b_{718}
b_4	b_{712}	b_{718}
b_5	b_5	$b_{37} + b_{38}$
b_5	b_7	b_{29}
b_5	b_8	b_{33}
b_5	b_9	b_{29}
b_5	b_{11}	b_{60}
b_5	b_{17}	b_{52}
b_5	b_{21}	b_{85}
b_5	b_{23}	$b_{69} + b_{70}$
b_5	b_{25}	b_{68}
b_5	b_{28}	b_{69}
b_5	b_{30}	b_{108}
b_5	b_{31}	b_{99}
b_5	b_{38}	b_{123}
b_5	b_{45}	b_{97}
b_5	b_{48}	b_{127}

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_5	b_{59}	$b_{135} + b_{137} + b_{152}$
b_5	b_{65}	b_{132}
b_5	b_{71}	b_{173}
b_5	b_{81}	b_{180}
b_5	b_{83}	b_{173}
b_5	b_{90}	b_{180}
b_5	b_{101}	b_{209}
b_5	b_{111}	b_{236}
b_5	b_{126}	b_{236}
b_5	b_{136}	b_{266}
b_5	b_{144}	b_{264}
b_5	b_{155}	b_{264}
b_5	b_{156}	$b_{277} + b_{295}$
b_5	b_{161}	b_{273}
b_5	b_{165}	$b_{287} + b_{289}$
b_5	b_{181}	b_{345}
b_5	b_{186}	b_{333}
b_5	b_{189}	$b_{313} + b_{314}$
b_5	b_{200}	b_{315}
b_5	b_{201}	b_{329}
b_5	b_{205}	b_{333}
b_5	b_{213}	b_{363}
b_5	b_{236}	b_{398}
b_5	b_{253}	b_{369}
b_5	b_{256}	$b_{379} + b_{380} + b_{394}$
b_5	b_{287}	b_{421}
b_5	b_{290}	b_{416}
b_5	b_{298}	b_{432}
b_5	b_{303}	$b_{412} + b_{429}$
b_5	b_{307}	b_{416}
b_5	b_{321}	b_{483}
b_5	b_{325}	b_{463}
b_5	b_{339}	b_{463}
b_5	b_{340}	b_{463}
b_5	b_{350}	b_{466}
b_5	b_{356}	b_{506}
b_5	b_{374}	b_{538}
b_5	b_{386}	$b_{514} + b_{533}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_5	b_{390}	b_{518}
b_5	b_{404}	b_{519}
b_5	b_{405}	b_{530}
b_5	b_{406}	b_{530}
b_5	b_{424}	b_{563}
b_5	b_{430}	b_{554}
b_5	b_{432}	b_{554}
b_5	b_{442}	b_{563}
b_5	b_{446}	b_{558}
b_5	b_{453}	b_{583}
b_5	b_{455}	$b_{564} + b_{575}$
b_5	b_{483}	$b_{593} + b_{608}$
b_5	b_{510}	b_{618}
b_5	b_{539}	$b_{629} + b_{638}$
b_5	b_{546}	$b_{636} + b_{648}$
b_5	b_{567}	b_{660}
b_5	b_{582}	b_{660}
b_5	b_{584}	b_{660}
b_5	b_{587}	b_{654}
b_5	b_{592}	b_{671}
b_5	b_{596}	b_{681}
b_5	b_{611}	b_{689}
b_5	b_{620}	b_{688}
b_5	b_{622}	b_{674}
b_5	b_{634}	b_{698}
b_5	b_{649}	b_{696}
b_5	b_{650}	$b_{691} + b_{696}$
b_5	b_{651}	b_{694}
b_5	b_{659}	b_{708}
b_5	b_{667}	b_{702}
b_5	b_{681}	b_{714}
b_5	b_{682}	b_{714}
b_5	b_{686}	b_{711}
b_5	b_{690}	$b_{710} + b_{712}$
b_5	b_{698}	b_{716}
b_5	b_{699}	b_{716}
b_5	b_{700}	b_{715}
b_5	b_{701}	$b_{715} + b_{717}$

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_5	b_{708}	b_{718}
b_5	b_{709}	b_{718}
b_6	b_6	b_{37}
b_6	b_8	b_{29}
b_6	b_9	b_{29}
b_6	b_{23}	$b_{68} + b_{69}$
b_6	b_{25}	$b_{69} + b_{79} + b_{80}$
b_6	b_{28}	b_{80}
b_6	b_{31}	b_{100}
b_6	b_{42}	b_{121}
b_6	b_{45}	b_{109}
b_6	b_{48}	$b_{128} + b_{137}$
b_6	b_{59}	$b_{127} + b_{128} + b_{135}$
b_6	b_{65}	$b_{145} + b_{158}$
b_6	b_{66}	$b_{132} + b_{145}$
b_6	b_{77}	b_{173}
b_6	b_{82}	b_{180}
b_6	b_{83}	b_{173}
b_6	b_{90}	b_{180}
b_6	b_{102}	b_{209}
b_6	b_{111}	b_{211}
b_6	b_{114}	b_{209}
b_6	b_{115}	b_{209}
b_6	b_{136}	b_{266}
b_6	b_{144}	$b_{264} + b_{277}$
b_6	b_{147}	b_{260}
b_6	b_{150}	b_{294}
b_6	b_{156}	$b_{264} + b_{295}$
b_6	b_{159}	b_{282}
b_6	b_{168}	b_{333}
b_6	b_{177}	b_{333}
b_6	b_{185}	b_{329}
b_6	b_{186}	b_{333}
b_6	b_{189}	$b_{312} + b_{313}$
b_6	b_{194}	b_{345}
b_6	b_{203}	b_{336}
b_6	b_{207}	b_{336}
b_6	b_{211}	b_{398}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_6	b_{240}	$b_{370} + b_{389}$
b_6	b_{254}	b_{360}
b_6	b_{256}	$b_{364} + b_{378} + b_{380}$
b_6	b_{276}	b_{416}
b_6	b_{290}	b_{416}
b_6	b_{293}	b_{417}
b_6	b_{302}	b_{426}
b_6	b_{303}	$b_{429} + b_{443}$
b_6	b_{321}	b_{508}
b_6	b_{330}	b_{479}
b_6	b_{339}	b_{463}
b_6	b_{341}	b_{463}
b_6	b_{349}	b_{479}
b_6	b_{355}	b_{463}
b_6	b_{359}	b_{465}
b_6	b_{374}	b_{525}
b_6	b_{383}	$b_{512} + b_{516}$
b_6	b_{386}	$b_{533} + b_{542} + b_{551}$
b_6	b_{390}	b_{534}
b_6	b_{406}	b_{530}
b_6	b_{407}	b_{530}
b_6	b_{424}	b_{563}
b_6	b_{425}	b_{569}
b_6	b_{437}	b_{560}
b_6	b_{442}	b_{575}
b_6	b_{453}	b_{583}
b_6	b_{455}	$b_{563} + b_{575}$
b_6	b_{459}	b_{572}
b_6	b_{508}	b_{608}
b_6	b_{510}	$b_{604} + b_{605} + b_{617}$
b_6	b_{539}	$b_{629} + b_{637}$
b_6	b_{546}	$b_{636} + b_{642}$
b_6	b_{561}	b_{654}
b_6	b_{574}	$b_{653} + b_{654}$
b_6	b_{582}	b_{671}
b_6	b_{584}	b_{660}
b_6	b_{587}	b_{653}
b_6	b_{591}	$b_{660} + b_{671}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_6	b_{592}	b_{660}
b_6	b_{598}	b_{677}
b_6	b_{610}	b_{674}
b_6	b_{619}	b_{688}
b_6	b_{639}	$b_{691} + b_{694}$
b_6	b_{640}	b_{694}
b_6	b_{650}	$b_{694} + b_{696}$
b_6	b_{651}	b_{696}
b_6	b_{682}	b_{713}
b_6	b_{690}	$b_{710} + b_{711}$
b_6	b_{697}	b_{715}
b_6	b_{699}	$b_{716} + b_{717}$
b_6	b_{701}	$b_{715} + b_{716}$
b_6	b_{704}	b_{718}
b_6	b_{707}	b_{718}
b_6	b_{709}	b_{718}
b_7	b_7	b_{43}
b_7	b_8	b_{29}
b_7	b_{23}	$b_{68} + b_{79}$
b_7	b_{24}	b_{80}
b_7	b_{25}	$b_{69} + b_{79} + b_{80}$
b_7	b_{31}	b_{96}
b_7	b_{39}	b_{121}
b_7	b_{45}	b_{119}
b_7	b_{48}	$b_{128} + b_{139}$
b_7	b_{59}	$b_{127} + b_{128}$
b_7	b_{65}	$b_{145} + b_{162}$
b_7	b_{66}	$b_{132} + b_{145} + b_{160}$
b_7	b_{76}	b_{180}
b_7	b_{77}	b_{173}
b_7	b_{82}	b_{180}
b_7	b_{89}	b_{173}
b_7	b_{102}	b_{209}
b_7	b_{112}	b_{234}
b_7	b_{114}	b_{209}
b_7	b_{115}	b_{209}
b_7	b_{131}	b_{262}
b_7	b_{148}	$b_{282} + b_{288}$

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_7	b_{156}	b_{264}
b_7	b_{159}	$b_{282} + b_{300}$
b_7	b_{164}	b_{273}
b_7	b_{165}	b_{270}
b_7	b_{170}	b_{316}
b_7	b_{177}	b_{333}
b_7	b_{188}	b_{336}
b_7	b_{189}	$b_{312} + b_{334}$
b_7	b_{190}	b_{336}
b_7	b_{192}	b_{333}
b_7	b_{199}	b_{345}
b_7	b_{203}	b_{336}
b_7	b_{234}	b_{360}
b_7	b_{238}	b_{398}
b_7	b_{240}	$b_{370} + b_{381} + b_{389}$
b_7	b_{256}	$b_{364} + b_{378}$
b_7	b_{276}	b_{416}
b_7	b_{278}	b_{417}
b_7	b_{293}	b_{417}
b_7	b_{302}	$b_{426} + b_{441}$
b_7	b_{303}	b_{443}
b_7	b_{321}	b_{481}
b_7	b_{330}	b_{479}
b_7	b_{338}	b_{479}
b_7	b_{341}	b_{463}
b_7	b_{349}	b_{479}
b_7	b_{355}	b_{463}
b_7	b_{359}	b_{485}
b_7	b_{374}	b_{520}
b_7	b_{383}	$b_{516} + b_{529} + b_{531}$
b_7	b_{385}	b_{530}
b_7	b_{386}	$b_{527} + b_{542}$
b_7	b_{403}	b_{549}
b_7	b_{407}	b_{530}
b_7	b_{419}	b_{560}
b_7	b_{431}	b_{571}
b_7	b_{437}	$b_{560} + b_{571}$
b_7	b_{446}	b_{555}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_7	b_{449}	b_{554}
b_7	b_{455}	b_{563}
b_7	b_{457}	b_{588}
b_7	b_{485}	b_{607}
b_7	b_{510}	$b_{604} + b_{605} + b_{617}$
b_7	b_{539}	$b_{637} + b_{643}$
b_7	b_{546}	$b_{630} + b_{642}$
b_7	b_{557}	b_{654}
b_7	b_{559}	b_{653}
b_7	b_{574}	$b_{653} + b_{654}$
b_7	b_{580}	b_{671}
b_7	b_{587}	b_{653}
b_7	b_{591}	$b_{660} + b_{671}$
b_7	b_{592}	b_{660}
b_7	b_{598}	b_{680}
b_7	b_{600}	b_{674}
b_7	b_{623}	b_{688}
b_7	b_{639}	$b_{694} + b_{695}$
b_7	b_{640}	$b_{694} + b_{696}$
b_7	b_{650}	b_{694}
b_7	b_{651}	b_{696}
b_7	b_{676}	b_{712}
b_7	b_{690}	$b_{711} + b_{714}$
b_7	b_{693}	$b_{715} + b_{717}$
b_7	b_{697}	$b_{715} + b_{716}$
b_7	b_{701}	b_{716}
b_7	b_{703}	b_{718}
b_7	b_{706}	b_{718}
b_7	b_{707}	b_{718}
b_8	b_8	$b_{29} + 2b_{33} + b_{38} + b_{44}$
b_8	b_9	b_{33}
b_8	b_{11}	$b_{52} + b_{60}$
b_8	b_{14}	$b_{52} + b_{60}$
b_8	b_{17}	$b_{52} + b_{60}$
b_8	b_{19}	b_{85}
b_8	b_{21}	b_{85}
b_8	b_{23}	$b_{68} + b_{70} + b_{78} + b_{80}$
b_8	b_{24}	b_{79}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_8	b_{25}	$2b_{68} + b_{69} + b_{79} + b_{80}$
b_8	b_{27}	b_{85}
b_8	b_{28}	b_{69}
b_8	b_{30}	b_{108}
b_8	b_{31}	$b_{94} + b_{95} + b_{99}$
b_8	b_{33}	b_{123}
b_8	b_{35}	b_{121}
b_8	b_{36}	b_{108}
b_8	b_{45}	$b_{97} + b_{105} + b_{113}$
b_8	b_{48}	$2b_{127} + b_{128} + b_{135}$
b_8	b_{49}	b_{127}
b_8	b_{53}	b_{132}
b_8	b_{59}	$b_{127} + b_{128} + b_{137} + b_{152}$
b_8	b_{65}	$2b_{132} + b_{145} + b_{160}$
b_8	b_{66}	$b_{132} + b_{140} + b_{145} + b_{162}$
b_8	b_{67}	b_{173}
b_8	b_{71}	b_{173}
b_8	b_{72}	b_{173}
b_8	b_{75}	b_{180}
b_8	b_{77}	b_{173}
b_8	b_{81}	b_{180}
b_8	b_{82}	b_{180}
b_8	b_{93}	b_{180}
b_8	b_{101}	$2b_{209}$
b_8	b_{102}	b_{209}
b_8	b_{114}	b_{209}
b_8	b_{115}	b_{209}
b_8	b_{117}	b_{245}
b_8	b_{126}	b_{226}
b_8	b_{136}	b_{268}
b_8	b_{153}	$b_{282} + b_{300}$
b_8	b_{155}	$b_{264} + b_{295}$
b_8	b_{156}	$b_{264} + b_{277}$
b_8	b_{159}	$b_{282} + b_{288}$
b_8	b_{161}	$b_{273} + b_{294}$
b_8	b_{165}	b_{274}
b_8	b_{174}	$b_{310} + b_{323}$
b_8	b_{176}	b_{333}

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_8	b_{177}	b_{333}
b_8	b_{179}	b_{316}
b_8	b_{181}	b_{345}
b_8	b_{189}	$b_{312} + b_{314} + b_{332} + b_{335}$
b_8	b_{196}	b_{336}
b_8	b_{197}	b_{336}
b_8	b_{200}	$b_{315} + b_{346}$
b_8	b_{201}	b_{329}
b_8	b_{203}	b_{336}
b_8	b_{204}	b_{345}
b_8	b_{205}	b_{333}
b_8	b_{213}	b_{363}
b_8	b_{217}	b_{362}
b_8	b_{218}	b_{362}
b_8	b_{221}	b_{369}
b_8	b_{226}	b_{398}
b_8	b_{233}	b_{395}
b_8	b_{235}	b_{363}
b_8	b_{240}	$b_{366} + b_{370} + b_{389} + b_{410}$
b_8	b_{245}	b_{360}
b_8	b_{253}	b_{369}
b_8	b_{256}	$b_{364} + b_{378} + b_{379} + b_{394}$
b_8	b_{265}	b_{417}
b_8	b_{268}	b_{413}
b_8	b_{274}	b_{421}
b_8	b_{276}	b_{416}
b_8	b_{293}	b_{417}
b_8	b_{298}	b_{445}
b_8	b_{302}	$b_{426} + b_{454}$
b_8	b_{303}	$b_{412} + b_{443}$
b_8	b_{306}	b_{451}
b_8	b_{307}	b_{416}
b_8	b_{309}	b_{479}
b_8	b_{321}	b_{493}
b_8	b_{324}	b_{486}
b_8	b_{325}	b_{463}
b_8	b_{330}	b_{479}
b_8	b_{340}	b_{463}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_8	b_{341}	b_{463}
b_8	b_{349}	b_{479}
b_8	b_{350}	$b_{466} + b_{498}$
b_8	b_{353}	b_{479}
b_8	b_{355}	b_{463}
b_8	b_{356}	$b_{484} + b_{506}$
b_8	b_{357}	$b_{501} + b_{502}$
b_8	b_{359}	b_{474}
b_8	b_{373}	b_{519}
b_8	b_{374}	$b_{515} + b_{538}$
b_8	b_{383}	$b_{516} + b_{522} + b_{523}$
b_8	b_{384}	b_{530}
b_8	b_{386}	$b_{514} + b_{542} + b_{543}$
b_8	b_{387}	b_{530}
b_8	b_{390}	b_{518}
b_8	b_{396}	b_{545}
b_8	b_{403}	b_{540}
b_8	b_{404}	b_{519}
b_8	b_{405}	b_{530}
b_8	b_{407}	b_{530}
b_8	b_{409}	b_{545}
b_8	b_{419}	b_{566}
b_8	b_{424}	b_{564}
b_8	b_{425}	b_{558}
b_8	b_{431}	b_{560}
b_8	b_{437}	$b_{560} + b_{566}$
b_8	b_{442}	b_{563}
b_8	b_{445}	b_{554}
b_8	b_{446}	b_{558}
b_8	b_{451}	b_{583}
b_8	b_{455}	$b_{563} + b_{564}$
b_8	b_{474}	b_{602}
b_8	b_{493}	b_{593}
b_8	b_{510}	$b_{604} + b_{605} + b_{617} + 2b_{618}$
b_8	b_{539}	$b_{626} + b_{637} + b_{638} + b_{644}$
b_8	b_{546}	$b_{642} + b_{647} + b_{648} + b_{652}$
b_8	b_{557}	b_{653}
b_8	b_{559}	b_{654}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_8	b_{567}	b_{660}
b_8	b_{574}	$b_{653} + b_{654}$
b_8	b_{579}	b_{653}
b_8	b_{582}	b_{660}
b_8	b_{584}	b_{671}
b_8	b_{587}	$b_{653} + 2b_{654} + b_{666}$
b_8	b_{591}	$b_{660} + b_{671}$
b_8	b_{592}	$b_{660} + b_{670} + 2b_{671}$
b_8	b_{596}	b_{686}
b_8	b_{598}	b_{684}
b_8	b_{606}	b_{674}
b_8	b_{611}	$b_{683} + b_{689}$
b_8	b_{614}	b_{674}
b_8	b_{620}	b_{688}
b_8	b_{622}	b_{674}
b_8	b_{624}	b_{688}
b_8	b_{625}	b_{688}
b_8	b_{634}	$b_{692} + b_{698} + b_{700}$
b_8	b_{639}	$b_{694} + b_{696}$
b_8	b_{640}	$b_{694} + b_{695}$
b_8	b_{641}	b_{696}
b_8	b_{649}	b_{696}
b_8	b_{650}	$b_{691} + b_{694}$
b_8	b_{651}	$2b_{694} + b_{696}$
b_8	b_{659}	$b_{702} + b_{705} + b_{708}$
b_8	b_{667}	$b_{702} + b_{705} + b_{708}$
b_8	b_{675}	b_{711}
b_8	b_{681}	b_{711}
b_8	b_{686}	$b_{710} + 2b_{711} + b_{714}$
b_8	b_{690}	$b_{711} + b_{712} + b_{713}$
b_8	b_{692}	$b_{715} + b_{716}$
b_8	b_{697}	$b_{715} + b_{717}$
b_8	b_{698}	$b_{715} + b_{716}$
b_8	b_{700}	$b_{715} + b_{716}$
b_8	b_{701}	$b_{716} + b_{717}$
b_8	b_{702}	b_{718}
b_8	b_{705}	b_{718}
b_8	b_{707}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_8	b_{708}	b_{718}
b_9	b_9	$b_{43} + b_{44}$
b_9	b_{14}	b_{52}
b_9	b_{17}	b_{60}
b_9	b_{23}	$b_{78} + b_{79}$
b_9	b_{24}	b_{79}
b_9	b_{25}	b_{68}
b_9	b_{27}	b_{85}
b_9	b_{31}	b_{95}
b_9	b_{36}	b_{108}
b_9	b_{44}	b_{123}
b_9	b_{45}	b_{105}
b_9	b_{48}	b_{127}
b_9	b_{65}	b_{132}
b_9	b_{66}	$b_{140} + b_{160} + b_{162}$
b_9	b_{67}	b_{173}
b_9	b_{76}	b_{180}
b_9	b_{89}	b_{173}
b_9	b_{93}	b_{180}
b_9	b_{101}	b_{209}
b_9	b_{112}	b_{230}
b_9	b_{117}	b_{230}
b_9	b_{136}	$b_{257} + b_{258}$
b_9	b_{148}	b_{282}
b_9	b_{153}	b_{282}
b_9	b_{159}	$b_{288} + b_{300}$
b_9	b_{161}	b_{294}
b_9	b_{165}	b_{270}
b_9	b_{174}	b_{310}
b_9	b_{179}	b_{316}
b_9	b_{188}	b_{336}
b_9	b_{189}	$b_{332} + b_{334}$
b_9	b_{196}	b_{336}
b_9	b_{204}	b_{345}
b_9	b_{217}	b_{362}
b_9	b_{230}	b_{360}
b_9	b_{235}	b_{363}
b_9	b_{240}	$b_{366} + b_{381} + b_{410}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_9	b_{258}	b_{413}
b_9	b_{265}	b_{417}
b_9	b_{278}	b_{417}
b_9	b_{302}	$b_{441} + b_{454}$
b_9	b_{306}	b_{461}
b_9	b_{309}	b_{479}
b_9	b_{338}	b_{479}
b_9	b_{353}	b_{479}
b_9	b_{356}	b_{484}
b_9	b_{357}	b_{502}
b_9	b_{359}	b_{489}
b_9	b_{374}	b_{515}
b_9	b_{383}	$b_{523} + b_{531}$
b_9	b_{385}	b_{530}
b_9	b_{387}	b_{530}
b_9	b_{403}	b_{540}
b_9	b_{409}	b_{545}
b_9	b_{419}	b_{560}
b_9	b_{425}	b_{558}
b_9	b_{431}	b_{560}
b_9	b_{437}	$b_{566} + b_{571}$
b_9	b_{449}	b_{554}
b_9	b_{461}	b_{583}
b_9	b_{462}	b_{583}
b_9	b_{489}	$b_{602} + b_{607}$
b_9	b_{510}	b_{618}
b_9	b_{539}	$b_{626} + b_{643}$
b_9	b_{546}	$b_{630} + b_{652}$
b_9	b_{557}	b_{653}
b_9	b_{559}	b_{653}
b_9	b_{579}	b_{653}
b_9	b_{587}	b_{654}
b_9	b_{592}	b_{671}
b_9	b_{596}	b_{675}
b_9	b_{611}	b_{683}
b_9	b_{614}	b_{674}
b_9	b_{624}	b_{688}
b_9	b_{634}	b_{692}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_9	b_{640}	$b_{695} + b_{696}$
b_9	b_{641}	b_{696}
b_9	b_{651}	b_{694}
b_9	b_{659}	b_{702}
b_9	b_{667}	b_{705}
b_9	b_{675}	b_{710}
b_9	b_{676}	b_{710}
b_9	b_{686}	b_{711}
b_9	b_{690}	$b_{713} + b_{714}$
b_9	b_{692}	b_{715}
b_9	b_{693}	b_{715}
b_9	b_{697}	$b_{716} + b_{717}$
b_9	b_{700}	b_{716}
b_9	b_{705}	b_{718}
b_9	b_{706}	b_{718}
b_{10}	b_{59}	b_{173}
b_{10}	b_{111}	b_{264}
b_{10}	b_{144}	b_{333}
b_{10}	b_{156}	b_{333}
b_{10}	b_{186}	b_{398}
b_{10}	b_{256}	b_{416}
b_{10}	b_{303}	b_{463}
b_{10}	b_{321}	b_{533}
b_{10}	b_{386}	$b_{563} + b_{575}$
b_{10}	b_{455}	b_{608}
b_{10}	b_{546}	b_{660}
b_{10}	b_{682}	b_{716}
b_{10}	b_{690}	b_{715}
b_{10}	b_{699}	b_{718}
b_{10}	b_{701}	b_{718}
b_{11}	b_{11}	b_{85}
b_{11}	b_{17}	b_{85}
b_{11}	b_{21}	b_{123}
b_{11}	b_{23}	b_{108}
b_{11}	b_{31}	b_{127}
b_{11}	b_{45}	b_{132}
b_{11}	b_{48}	b_{173}
b_{11}	b_{59}	b_{173}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{11}	b_{65}	b_{180}
b_{11}	b_{126}	b_{264}
b_{11}	b_{155}	b_{333}
b_{11}	b_{156}	b_{333}
b_{11}	b_{161}	b_{345}
b_{11}	b_{165}	b_{315}
b_{11}	b_{189}	b_{363}
b_{11}	b_{200}	b_{369}
b_{11}	b_{205}	b_{398}
b_{11}	b_{253}	b_{421}
b_{11}	b_{256}	b_{416}
b_{11}	b_{298}	b_{466}
b_{11}	b_{303}	b_{463}
b_{11}	b_{321}	b_{514}
b_{11}	b_{350}	b_{519}
b_{11}	b_{356}	b_{530}
b_{11}	b_{374}	b_{558}
b_{11}	b_{386}	$b_{563} + b_{564}$
b_{11}	b_{404}	b_{554}
b_{11}	b_{455}	b_{593}
b_{11}	b_{539}	b_{654}
b_{11}	b_{546}	$b_{660} + b_{671}$
b_{11}	b_{587}	b_{674}
b_{11}	b_{592}	b_{688}
b_{11}	b_{596}	b_{698}
b_{11}	b_{611}	b_{696}
b_{11}	b_{634}	$b_{702} + b_{708}$
b_{11}	b_{659}	$b_{711} + b_{714}$
b_{11}	b_{667}	b_{711}
b_{11}	b_{681}	b_{716}
b_{11}	b_{686}	$b_{715} + b_{716}$
b_{11}	b_{690}	$b_{715} + b_{717}$
b_{11}	b_{698}	b_{718}
b_{11}	b_{700}	b_{718}
b_{11}	b_{701}	b_{718}
b_{12}	b_{25}	b_{121}
b_{12}	b_{31}	b_{128}
b_{12}	b_{45}	b_{145}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{12}	b_{59}	b_{173}
b_{12}	b_{66}	b_{180}
b_{12}	b_{156}	b_{333}
b_{12}	b_{159}	b_{336}
b_{12}	b_{177}	b_{398}
b_{12}	b_{203}	b_{360}
b_{12}	b_{240}	b_{417}
b_{12}	b_{256}	b_{416}
b_{12}	b_{302}	b_{479}
b_{12}	b_{303}	b_{463}
b_{12}	b_{321}	b_{542}
b_{12}	b_{359}	b_{516}
b_{12}	b_{383}	b_{560}
b_{12}	b_{386}	b_{563}
b_{12}	b_{539}	b_{653}
b_{12}	b_{546}	b_{660}
b_{12}	b_{574}	b_{674}
b_{12}	b_{591}	b_{688}
b_{12}	b_{598}	b_{694}
b_{12}	b_{690}	$b_{715} + b_{716}$
b_{12}	b_{697}	b_{718}
b_{12}	b_{701}	b_{718}
b_{13}	b_{66}	b_{180}
b_{13}	b_{112}	b_{282}
b_{13}	b_{148}	b_{336}
b_{13}	b_{159}	b_{336}
b_{13}	b_{188}	b_{360}
b_{13}	b_{240}	b_{417}
b_{13}	b_{302}	b_{479}
b_{13}	b_{359}	b_{531}
b_{13}	b_{383}	$b_{560} + b_{571}$
b_{13}	b_{437}	b_{607}
b_{13}	b_{539}	b_{653}
b_{13}	b_{676}	b_{715}
b_{13}	b_{690}	b_{716}
b_{13}	b_{693}	b_{718}
b_{13}	b_{697}	b_{718}
b_{14}	b_{14}	b_{85}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{14}	b_{17}	b_{85}
b_{14}	b_{23}	b_{108}
b_{14}	b_{27}	b_{123}
b_{14}	b_{31}	b_{127}
b_{14}	b_{45}	b_{132}
b_{14}	b_{48}	b_{173}
b_{14}	b_{65}	b_{180}
b_{14}	b_{66}	b_{180}
b_{14}	b_{117}	b_{282}
b_{14}	b_{136}	b_{310}
b_{14}	b_{153}	b_{336}
b_{14}	b_{159}	b_{336}
b_{14}	b_{161}	b_{345}
b_{14}	b_{174}	b_{362}
b_{14}	b_{189}	b_{363}
b_{14}	b_{196}	b_{360}
b_{14}	b_{217}	b_{413}
b_{14}	b_{240}	b_{417}
b_{14}	b_{302}	b_{479}
b_{14}	b_{306}	b_{502}
b_{14}	b_{356}	b_{530}
b_{14}	b_{357}	b_{545}
b_{14}	b_{359}	b_{523}
b_{14}	b_{374}	b_{558}
b_{14}	b_{383}	$b_{560} + b_{566}$
b_{14}	b_{409}	b_{583}
b_{14}	b_{437}	b_{602}
b_{14}	b_{539}	$b_{653} + b_{654}$
b_{14}	b_{546}	b_{671}
b_{14}	b_{587}	b_{674}
b_{14}	b_{592}	b_{688}
b_{14}	b_{596}	b_{692}
b_{14}	b_{611}	b_{696}
b_{14}	b_{634}	$b_{702} + b_{705}$
b_{14}	b_{659}	b_{711}
b_{14}	b_{667}	$b_{710} + b_{711}$
b_{14}	b_{675}	b_{715}
b_{14}	b_{686}	$b_{715} + b_{716}$

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{14}	b_{690}	$b_{716} + b_{717}$
b_{14}	b_{692}	b_{718}
b_{14}	b_{697}	b_{718}
b_{14}	b_{700}	b_{718}
b_{15}	b_{28}	b_{121}
b_{15}	b_{31}	b_{137}
b_{15}	b_{45}	b_{158}
b_{15}	b_{111}	b_{277}
b_{15}	b_{144}	b_{333}
b_{15}	b_{147}	b_{329}
b_{15}	b_{150}	b_{345}
b_{15}	b_{168}	b_{398}
b_{15}	b_{207}	b_{360}
b_{15}	b_{321}	b_{551}
b_{15}	b_{359}	b_{512}
b_{15}	b_{374}	b_{569}
b_{15}	b_{386}	b_{575}
b_{15}	b_{390}	b_{572}
b_{15}	b_{442}	b_{608}
b_{15}	b_{561}	b_{674}
b_{15}	b_{582}	b_{688}
b_{15}	b_{598}	b_{691}
b_{15}	b_{682}	b_{717}
b_{15}	b_{699}	b_{718}
b_{16}	b_{24}	b_{121}
b_{16}	b_{31}	b_{139}
b_{16}	b_{45}	b_{162}
b_{16}	b_{112}	b_{288}
b_{16}	b_{131}	b_{316}
b_{16}	b_{148}	b_{336}
b_{16}	b_{164}	b_{345}
b_{16}	b_{190}	b_{360}
b_{16}	b_{192}	b_{398}
b_{16}	b_{321}	b_{527}
b_{16}	b_{359}	b_{529}
b_{16}	b_{374}	b_{555}
b_{16}	b_{383}	b_{571}
b_{16}	b_{403}	b_{588}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{16}	b_{431}	b_{607}
b_{16}	b_{557}	b_{674}
b_{16}	b_{580}	b_{688}
b_{16}	b_{598}	b_{695}
b_{16}	b_{676}	b_{717}
b_{16}	b_{693}	b_{718}
b_{17}	b_{19}	b_{123}
b_{17}	b_{23}	b_{121}
b_{17}	b_{31}	$b_{127} + b_{135}$
b_{17}	b_{45}	$b_{132} + b_{160}$
b_{17}	b_{48}	b_{173}
b_{17}	b_{49}	b_{173}
b_{17}	b_{53}	b_{180}
b_{17}	b_{65}	b_{180}
b_{17}	b_{117}	b_{300}
b_{17}	b_{126}	b_{295}
b_{17}	b_{136}	b_{323}
b_{17}	b_{153}	b_{336}
b_{17}	b_{155}	b_{333}
b_{17}	b_{165}	b_{346}
b_{17}	b_{174}	b_{362}
b_{17}	b_{176}	b_{398}
b_{17}	b_{189}	b_{395}
b_{17}	b_{197}	b_{360}
b_{17}	b_{200}	b_{369}
b_{17}	b_{218}	b_{413}
b_{17}	b_{221}	b_{421}
b_{17}	b_{298}	b_{498}
b_{17}	b_{306}	b_{501}
b_{17}	b_{321}	b_{543}
b_{17}	b_{324}	b_{530}
b_{17}	b_{350}	b_{519}
b_{17}	b_{357}	b_{545}
b_{17}	b_{359}	b_{522}
b_{17}	b_{373}	b_{554}
b_{17}	b_{383}	b_{566}
b_{17}	b_{386}	b_{564}
b_{17}	b_{396}	b_{583}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{17}	b_{419}	b_{602}
b_{17}	b_{424}	b_{593}
b_{17}	b_{539}	$b_{654} + b_{666}$
b_{17}	b_{546}	$b_{670} + b_{671}$
b_{17}	b_{559}	b_{674}
b_{17}	b_{584}	b_{688}
b_{17}	b_{587}	b_{674}
b_{17}	b_{592}	b_{688}
b_{17}	b_{596}	b_{700}
b_{17}	b_{598}	b_{696}
b_{17}	b_{634}	$b_{705} + b_{708}$
b_{17}	b_{659}	$b_{710} + b_{711}$
b_{17}	b_{667}	$b_{711} + b_{714}$
b_{17}	b_{675}	b_{716}
b_{17}	b_{681}	b_{715}
b_{17}	b_{686}	$b_{715} + b_{716}$
b_{17}	b_{692}	b_{718}
b_{17}	b_{698}	b_{718}
b_{18}	b_{156}	b_{398}
b_{18}	b_{321}	b_{563}
b_{18}	b_{690}	b_{718}
b_{19}	b_{596}	b_{702}
b_{19}	b_{634}	b_{711}
b_{19}	b_{659}	b_{716}
b_{19}	b_{667}	b_{715}
b_{19}	b_{686}	b_{718}
b_{19}	b_{690}	b_{718}
b_{20}	b_{111}	b_{333}
b_{20}	b_{144}	b_{398}
b_{20}	b_{321}	b_{575}
b_{20}	b_{386}	b_{608}
b_{20}	b_{682}	b_{718}
b_{21}	b_{31}	b_{173}
b_{21}	b_{45}	b_{180}
b_{21}	b_{126}	b_{333}
b_{21}	b_{155}	b_{398}
b_{21}	b_{165}	b_{369}
b_{21}	b_{200}	b_{421}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{21}	b_{298}	b_{519}
b_{21}	b_{321}	b_{564}
b_{21}	b_{350}	b_{554}
b_{21}	b_{386}	b_{593}
b_{21}	b_{539}	b_{674}
b_{21}	b_{546}	b_{688}
b_{21}	b_{596}	b_{708}
b_{21}	b_{634}	$b_{711} + b_{714}$
b_{21}	b_{659}	$b_{715} + b_{716}$
b_{21}	b_{667}	b_{716}
b_{21}	b_{681}	b_{718}
b_{21}	b_{686}	b_{718}
b_{22}	b_{159}	b_{360}
b_{22}	b_{359}	b_{560}
b_{22}	b_{690}	b_{718}
b_{23}	b_{23}	$b_{135} + b_{139} + b_{140} + b_{152} + b_{158} + b_{160}$
b_{23}	b_{24}	$b_{127} + b_{135}$
b_{23}	b_{25}	$b_{127} + b_{128} + b_{132} + b_{140} + b_{145} + b_{152}$
b_{23}	b_{28}	$b_{132} + b_{160}$
b_{23}	b_{30}	b_{180}
b_{23}	b_{31}	$b_{167} + b_{176}$
b_{23}	b_{34}	b_{180}
b_{23}	b_{35}	$b_{173} + b_{180}$
b_{23}	b_{36}	b_{173}
b_{23}	b_{39}	b_{173}
b_{23}	b_{40}	b_{173}
b_{23}	b_{42}	b_{180}
b_{23}	b_{45}	$b_{184} + b_{197}$
b_{23}	b_{48}	$b_{209} + b_{226}$
b_{23}	b_{59}	$b_{209} + b_{211} + b_{236}$
b_{23}	b_{65}	$b_{209} + b_{245}$
b_{23}	b_{66}	$b_{209} + b_{230} + b_{234}$
b_{23}	b_{67}	b_{295}
b_{23}	b_{71}	b_{264}
b_{23}	b_{77}	$b_{264} + b_{277}$
b_{23}	b_{81}	b_{300}
b_{23}	b_{82}	$b_{282} + b_{288}$
b_{23}	b_{89}	b_{295}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{23}	b_{90}	b_{300}
b_{23}	b_{93}	b_{282}
b_{23}	b_{94}	b_{333}
b_{23}	b_{113}	b_{336}
b_{23}	b_{116}	b_{333}
b_{23}	b_{122}	b_{336}
b_{23}	b_{135}	b_{398}
b_{23}	b_{136}	$b_{381} + b_{410}$
b_{23}	b_{160}	b_{360}
b_{23}	b_{165}	$b_{379} + b_{380}$
b_{23}	b_{174}	b_{417}
b_{23}	b_{189}	$b_{412} + b_{418} + b_{426} + b_{443} + b_{450} + b_{454}$
b_{23}	b_{200}	b_{416}
b_{23}	b_{213}	b_{463}
b_{23}	b_{233}	$b_{463} + b_{479}$
b_{23}	b_{235}	b_{479}
b_{23}	b_{240}	$b_{479} + b_{484} + b_{486}$
b_{23}	b_{256}	$b_{463} + b_{486} + b_{506}$
b_{23}	b_{265}	b_{530}
b_{23}	b_{269}	b_{530}
b_{23}	b_{276}	b_{530}
b_{23}	b_{293}	b_{530}
b_{23}	b_{301}	b_{530}
b_{23}	b_{302}	b_{545}
b_{23}	b_{303}	b_{519}
b_{23}	b_{307}	b_{530}
b_{23}	b_{309}	b_{583}
b_{23}	b_{321}	b_{584}
b_{23}	b_{338}	b_{583}
b_{23}	b_{339}	b_{554}
b_{23}	b_{340}	b_{554}
b_{23}	b_{359}	b_{559}
b_{23}	b_{383}	$b_{597} + b_{606}$
b_{23}	b_{386}	$b_{603} + b_{625}$
b_{23}	b_{419}	$b_{629} + b_{638}$
b_{23}	b_{424}	$b_{630} + b_{652}$
b_{23}	b_{431}	b_{637}
b_{23}	b_{437}	$b_{626} + b_{637}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{23}	b_{442}	b_{642}
b_{23}	b_{455}	$b_{642} + b_{648}$
b_{23}	b_{474}	b_{654}
b_{23}	b_{483}	b_{660}
b_{23}	b_{485}	b_{653}
b_{23}	b_{489}	b_{653}
b_{23}	b_{493}	b_{671}
b_{23}	b_{508}	b_{660}
b_{23}	b_{510}	$b_{653} + b_{654} + b_{660} + b_{671}$
b_{23}	b_{522}	b_{674}
b_{23}	b_{535}	b_{674}
b_{23}	b_{539}	$b_{677} + b_{684} + b_{685} + b_{689}$
b_{23}	b_{543}	b_{688}
b_{23}	b_{546}	$b_{679} + b_{680} + b_{683} + b_{684}$
b_{23}	b_{552}	b_{688}
b_{23}	b_{559}	$b_{691} + b_{696}$
b_{23}	b_{561}	b_{696}
b_{23}	b_{567}	$b_{694} + b_{696}$
b_{23}	b_{574}	b_{694}
b_{23}	b_{579}	$b_{694} + b_{696}$
b_{23}	b_{580}	b_{696}
b_{23}	b_{584}	$b_{695} + b_{696}$
b_{23}	b_{587}	$b_{691} + b_{694}$
b_{23}	b_{591}	b_{694}
b_{23}	b_{592}	$b_{694} + b_{695}$
b_{23}	b_{598}	b_{702}
b_{23}	b_{611}	$b_{705} + b_{708}$
b_{23}	b_{639}	b_{711}
b_{23}	b_{640}	$b_{710} + b_{712}$
b_{23}	b_{641}	$b_{710} + b_{711}$
b_{23}	b_{649}	$b_{711} + b_{714}$
b_{23}	b_{650}	$b_{713} + b_{714}$
b_{23}	b_{651}	$b_{711} + b_{712} + b_{713}$
b_{23}	b_{661}	b_{716}
b_{23}	b_{662}	b_{716}
b_{23}	b_{663}	$b_{715} + b_{717}$
b_{23}	b_{664}	b_{715}
b_{23}	b_{665}	b_{715}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{23}	b_{672}	$b_{715} + b_{716}$
b_{23}	b_{673}	$b_{716} + b_{717}$
b_{23}	b_{683}	b_{718}
b_{23}	b_{684}	b_{718}
b_{23}	b_{689}	b_{718}
b_{24}	b_{24}	$2b_{139} + b_{158} + b_{162}$
b_{24}	b_{25}	$2b_{128} + b_{145}$
b_{24}	b_{28}	$b_{137} + b_{162}$
b_{24}	b_{30}	b_{173}
b_{24}	b_{31}	$b_{178} + b_{182} + b_{192}$
b_{24}	b_{36}	b_{173}
b_{24}	b_{45}	$b_{175} + b_{182} + b_{190}$
b_{24}	b_{48}	b_{238}
b_{24}	b_{59}	b_{209}
b_{24}	b_{65}	b_{234}
b_{24}	b_{66}	$2b_{209} + b_{230} + b_{245}$
b_{24}	b_{67}	b_{295}
b_{24}	b_{73}	b_{277}
b_{24}	b_{87}	b_{288}
b_{24}	b_{88}	$b_{282} + b_{300}$
b_{24}	b_{92}	b_{288}
b_{24}	b_{93}	b_{282}
b_{24}	b_{96}	b_{333}
b_{24}	b_{101}	$b_{316} + b_{329} + b_{345}$
b_{24}	b_{104}	b_{316}
b_{24}	b_{112}	$2b_{316}$
b_{24}	b_{119}	b_{336}
b_{24}	b_{124}	b_{345}
b_{24}	b_{125}	b_{336}
b_{24}	b_{136}	b_{410}
b_{24}	b_{139}	b_{398}
b_{24}	b_{162}	b_{360}
b_{24}	b_{189}	$b_{427} + b_{454}$
b_{24}	b_{213}	b_{479}
b_{24}	b_{235}	b_{479}
b_{24}	b_{240}	$2b_{479} + b_{484} + b_{506}$
b_{24}	b_{256}	b_{463}
b_{24}	b_{265}	b_{530}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{24}	b_{292}	b_{530}
b_{24}	b_{309}	b_{583}
b_{24}	b_{321}	b_{580}
b_{24}	b_{359}	b_{557}
b_{24}	b_{374}	$b_{595} + b_{618}$
b_{24}	b_{383}	$b_{594} + b_{600}$
b_{24}	b_{386}	b_{623}
b_{24}	b_{390}	b_{618}
b_{24}	b_{403}	$2b_{607} + b_{615} + b_{618}$
b_{24}	b_{419}	b_{631}
b_{24}	b_{424}	b_{652}
b_{24}	b_{431}	$b_{627} + b_{632}$
b_{24}	b_{437}	$b_{626} + b_{631}$
b_{24}	b_{442}	b_{646}
b_{24}	b_{474}	b_{653}
b_{24}	b_{481}	b_{671}
b_{24}	b_{485}	b_{654}
b_{24}	b_{489}	b_{653}
b_{24}	b_{510}	$2b_{653} + b_{660}$
b_{24}	b_{527}	b_{688}
b_{24}	b_{529}	b_{674}
b_{24}	b_{537}	$b_{674} + b_{688}$
b_{24}	b_{541}	b_{688}
b_{24}	b_{544}	b_{674}
b_{24}	b_{546}	$b_{683} + b_{689}$
b_{24}	b_{557}	$b_{691} + b_{695}$
b_{24}	b_{561}	b_{695}
b_{24}	b_{574}	b_{694}
b_{24}	b_{580}	$2b_{695}$
b_{24}	b_{582}	b_{691}
b_{24}	b_{584}	b_{696}
b_{24}	b_{591}	$2b_{694}$
b_{24}	b_{592}	b_{696}
b_{24}	b_{598}	b_{703}
b_{24}	b_{639}	b_{712}
b_{24}	b_{640}	$b_{710} + b_{711}$
b_{24}	b_{655}	b_{717}
b_{24}	b_{656}	b_{717}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{24}	b_{657}	$b_{715} + b_{716}$
b_{24}	b_{664}	b_{715}
b_{24}	b_{679}	b_{718}
b_{24}	b_{680}	b_{718}
b_{25}	b_{25}	$2b_{127} + 2b_{128} + 2b_{132} + b_{135} + b_{137} + 2b_{139} + 2b_{145} + 2b_{158} + b_{160} + b_{162}$
b_{25}	b_{28}	$b_{128} + 2b_{145}$
b_{25}	b_{30}	b_{173}
b_{25}	b_{31}	$b_{166} + b_{169} + b_{172} + b_{177}$
b_{25}	b_{32}	$b_{173} + b_{180}$
b_{25}	b_{35}	$b_{173} + b_{180}$
b_{25}	b_{36}	b_{180}
b_{25}	b_{41}	$b_{173} + b_{180}$
b_{25}	b_{45}	$b_{166} + b_{169} + b_{172} + b_{203}$
b_{25}	b_{48}	$2b_{209} + b_{211} + b_{226} + b_{238}$
b_{25}	b_{49}	b_{209}
b_{25}	b_{53}	b_{209}
b_{25}	b_{59}	$2b_{209} + b_{211} + b_{226} + b_{238}$
b_{25}	b_{65}	$2b_{209} + b_{234} + b_{245} + b_{254}$
b_{25}	b_{66}	$2b_{209} + b_{234} + b_{245} + b_{254}$
b_{25}	b_{67}	$b_{264} + b_{277}$
b_{25}	b_{71}	$b_{277} + b_{295}$
b_{25}	b_{73}	$b_{264} + b_{295}$
b_{25}	b_{77}	$b_{264} + b_{295}$
b_{25}	b_{81}	$b_{282} + b_{288}$
b_{25}	b_{82}	$b_{282} + b_{300}$
b_{25}	b_{84}	$b_{264} + b_{277}$
b_{25}	b_{87}	$b_{282} + b_{300}$
b_{25}	b_{88}	$b_{282} + b_{288}$
b_{25}	b_{93}	$b_{288} + b_{300}$
b_{25}	b_{94}	b_{333}
b_{25}	b_{96}	b_{333}
b_{25}	b_{100}	b_{333}
b_{25}	b_{102}	$b_{316} + b_{345}$
b_{25}	b_{107}	b_{333}
b_{25}	b_{109}	b_{336}
b_{25}	b_{110}	b_{336}
b_{25}	b_{113}	b_{336}
b_{25}	b_{114}	$b_{329} + b_{345}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{25}	b_{119}	b_{336}
b_{25}	b_{128}	b_{398}
b_{25}	b_{136}	b_{389}
b_{25}	b_{145}	b_{360}
b_{25}	b_{165}	b_{378}
b_{25}	b_{189}	$b_{414} + b_{415} + b_{426} + b_{427} + b_{443} + b_{452}$
b_{25}	b_{213}	b_{479}
b_{25}	b_{233}	$b_{463} + b_{479}$
b_{25}	b_{235}	b_{463}
b_{25}	b_{240}	$2b_{479} + b_{486} + b_{506}$
b_{25}	b_{256}	$2b_{463} + b_{484} + b_{486}$
b_{25}	b_{267}	b_{530}
b_{25}	b_{276}	b_{530}
b_{25}	b_{292}	b_{530}
b_{25}	b_{293}	b_{530}
b_{25}	b_{304}	b_{530}
b_{25}	b_{305}	b_{530}
b_{25}	b_{321}	b_{591}
b_{25}	b_{330}	b_{583}
b_{25}	b_{341}	b_{554}
b_{25}	b_{359}	b_{574}
b_{25}	b_{374}	$b_{605} + b_{617}$
b_{25}	b_{383}	$b_{600} + b_{606} + b_{609} + b_{610}$
b_{25}	b_{386}	$b_{612} + b_{619} + b_{623} + b_{625}$
b_{25}	b_{390}	b_{605}
b_{25}	b_{403}	b_{617}
b_{25}	b_{419}	$b_{626} + b_{632} + b_{637}$
b_{25}	b_{424}	$b_{642} + b_{646} + b_{648}$
b_{25}	b_{431}	$b_{626} + b_{631} + b_{638}$
b_{25}	b_{437}	$b_{631} + b_{632} + b_{637} + b_{638}$
b_{25}	b_{442}	$b_{635} + b_{648} + b_{652}$
b_{25}	b_{455}	$b_{635} + b_{642} + b_{646} + b_{652}$
b_{25}	b_{465}	$b_{653} + b_{654}$
b_{25}	b_{474}	$b_{653} + b_{654}$
b_{25}	b_{481}	$b_{660} + b_{671}$
b_{25}	b_{485}	$b_{653} + b_{654}$
b_{25}	b_{493}	$b_{660} + b_{671}$
b_{25}	b_{508}	$b_{660} + b_{671}$

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Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{25}	b_{510}	$2b_{653} + 2b_{654} + 2b_{660} + b_{666} + b_{670} + 2b_{671}$
b_{25}	b_{516}	b_{674}
b_{25}	b_{539}	$b_{678} + b_{683} + b_{684} + b_{687}$
b_{25}	b_{542}	b_{688}
b_{25}	b_{546}	$b_{678} + b_{684} + b_{687} + b_{689}$
b_{25}	b_{547}	$b_{674} + b_{688}$
b_{25}	b_{550}	$b_{674} + b_{688}$
b_{25}	b_{553}	$b_{674} + b_{688}$
b_{25}	b_{557}	b_{694}
b_{25}	b_{559}	b_{694}
b_{25}	b_{561}	$2b_{694}$
b_{25}	b_{567}	b_{696}
b_{25}	b_{574}	$2b_{691} + 2b_{694} + b_{695} + b_{696}$
b_{25}	b_{579}	b_{696}
b_{25}	b_{580}	$2b_{694}$
b_{25}	b_{582}	b_{694}
b_{25}	b_{584}	b_{694}
b_{25}	b_{587}	$2b_{694} + b_{696}$
b_{25}	b_{591}	$b_{691} + 2b_{694} + 2b_{695} + b_{696}$
b_{25}	b_{592}	$2b_{694} + b_{696}$
b_{25}	b_{598}	b_{707}
b_{25}	b_{639}	$b_{711} + b_{712} + b_{713}$
b_{25}	b_{640}	$b_{711} + b_{712} + b_{713}$
b_{25}	b_{650}	$b_{711} + b_{712} + b_{713}$
b_{25}	b_{651}	$b_{710} + 2b_{711} + b_{714}$
b_{25}	b_{656}	$b_{715} + b_{716}$
b_{25}	b_{657}	$b_{715} + b_{717}$
b_{25}	b_{662}	$b_{715} + b_{717}$
b_{25}	b_{663}	$b_{715} + b_{716}$
b_{25}	b_{664}	$b_{716} + b_{717}$
b_{25}	b_{668}	$b_{716} + b_{717}$
b_{25}	b_{669}	$b_{715} + b_{716}$
b_{25}	b_{673}	$b_{715} + b_{716}$
b_{25}	b_{677}	b_{718}
b_{25}	b_{678}	b_{718}
b_{25}	b_{680}	b_{718}
b_{25}	b_{684}	b_{718}
b_{25}	b_{687}	b_{718}

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TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{26}	b_{112}	b_{336}
b_{26}	b_{148}	b_{360}
b_{26}	b_{359}	b_{571}
b_{26}	b_{383}	b_{607}
b_{26}	b_{676}	b_{718}
b_{27}	b_{31}	b_{173}
b_{27}	b_{45}	b_{180}
b_{27}	b_{117}	b_{336}
b_{27}	b_{136}	b_{362}
b_{27}	b_{153}	b_{360}
b_{27}	b_{174}	b_{413}
b_{27}	b_{306}	b_{545}
b_{27}	b_{357}	b_{583}
b_{27}	b_{359}	b_{566}
b_{27}	b_{383}	b_{602}
b_{27}	b_{539}	b_{674}
b_{27}	b_{546}	b_{688}
b_{27}	b_{596}	b_{705}
b_{27}	b_{634}	$b_{710} + b_{711}$
b_{27}	b_{659}	b_{715}
b_{27}	b_{667}	$b_{715} + b_{716}$
b_{27}	b_{675}	b_{718}
b_{27}	b_{686}	b_{718}
b_{28}	b_{28}	$b_{137} + b_{139} + 2b_{158}$
b_{28}	b_{30}	b_{180}
b_{28}	b_{31}	$b_{168} + b_{175} + b_{182}$
b_{28}	b_{36}	b_{180}
b_{28}	b_{45}	$b_{175} + b_{178} + b_{207}$
b_{28}	b_{48}	b_{211}
b_{28}	b_{59}	$2b_{209} + b_{226} + b_{236}$
b_{28}	b_{65}	b_{254}
b_{28}	b_{66}	b_{209}
b_{28}	b_{71}	b_{264}
b_{28}	b_{73}	b_{277}
b_{28}	b_{81}	b_{300}
b_{28}	b_{84}	$b_{264} + b_{295}$
b_{28}	b_{87}	b_{288}
b_{28}	b_{91}	b_{277}

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Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{28}	b_{100}	b_{333}
b_{28}	b_{101}	$b_{316} + b_{329} + b_{345}$
b_{28}	b_{104}	b_{345}
b_{28}	b_{109}	b_{336}
b_{28}	b_{111}	$2b_{329}$
b_{28}	b_{118}	b_{333}
b_{28}	b_{124}	b_{329}
b_{28}	b_{137}	b_{398}
b_{28}	b_{158}	b_{360}
b_{28}	b_{165}	b_{379}
b_{28}	b_{189}	$b_{412} + b_{414}$
b_{28}	b_{213}	b_{463}
b_{28}	b_{235}	b_{463}
b_{28}	b_{240}	b_{479}
b_{28}	b_{256}	$2b_{463} + b_{484} + b_{506}$
b_{28}	b_{305}	b_{530}
b_{28}	b_{307}	b_{530}
b_{28}	b_{321}	b_{582}
b_{28}	b_{340}	b_{554}
b_{28}	b_{359}	b_{561}
b_{28}	b_{374}	$b_{615} + b_{618}$
b_{28}	b_{383}	b_{610}
b_{28}	b_{386}	$b_{601} + b_{619}$
b_{28}	b_{390}	$b_{595} + 2b_{608} + b_{618}$
b_{28}	b_{403}	b_{618}
b_{28}	b_{419}	b_{638}
b_{28}	b_{424}	b_{635}
b_{28}	b_{431}	b_{632}
b_{28}	b_{442}	$b_{628} + b_{646}$
b_{28}	b_{455}	$b_{635} + b_{648}$
b_{28}	b_{465}	b_{654}
b_{28}	b_{483}	b_{660}
b_{28}	b_{493}	b_{660}
b_{28}	b_{508}	b_{671}
b_{28}	b_{510}	$b_{653} + 2b_{660}$
b_{28}	b_{512}	b_{674}
b_{28}	b_{537}	b_{688}
b_{28}	b_{539}	$b_{683} + b_{689}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{28}	b_{541}	b_{674}
b_{28}	b_{544}	$b_{674} + b_{688}$
b_{28}	b_{551}	b_{688}
b_{28}	b_{557}	b_{695}
b_{28}	b_{559}	b_{696}
b_{28}	b_{561}	$2b_{691}$
b_{28}	b_{574}	$2b_{694}$
b_{28}	b_{580}	b_{691}
b_{28}	b_{582}	$b_{691} + b_{695}$
b_{28}	b_{587}	b_{696}
b_{28}	b_{591}	b_{694}
b_{28}	b_{598}	b_{704}
b_{28}	b_{639}	b_{713}
b_{28}	b_{650}	$b_{711} + b_{714}$
b_{28}	b_{656}	b_{717}
b_{28}	b_{658}	b_{717}
b_{28}	b_{662}	b_{716}
b_{28}	b_{668}	$b_{715} + b_{716}$
b_{28}	b_{677}	b_{718}
b_{28}	b_{685}	b_{718}
b_{30}	b_{59}	b_{264}
b_{30}	b_{77}	b_{333}
b_{30}	b_{89}	b_{333}
b_{30}	b_{116}	b_{398}
b_{30}	b_{165}	b_{416}
b_{30}	b_{189}	b_{463}
b_{30}	b_{256}	b_{530}
b_{30}	b_{303}	b_{554}
b_{30}	b_{321}	b_{603}
b_{30}	b_{386}	$b_{630} + b_{642}$
b_{30}	b_{455}	b_{660}
b_{30}	b_{539}	$b_{691} + b_{696}$
b_{30}	b_{546}	$b_{694} + b_{695}$
b_{30}	b_{611}	$b_{711} + b_{714}$
b_{30}	b_{641}	$b_{715} + b_{716}$
b_{30}	b_{649}	b_{716}
b_{30}	b_{650}	b_{716}
b_{30}	b_{651}	$b_{715} + b_{717}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{30}	b_{665}	b_{718}
b_{30}	b_{672}	b_{718}
b_{30}	b_{673}	b_{718}
b_{31}	b_{31}	$b_{239} + b_{243}$
b_{31}	b_{32}	b_{209}
b_{31}	b_{35}	$b_{209} + b_{226}$
b_{31}	b_{39}	b_{238}
b_{31}	b_{41}	b_{209}
b_{31}	b_{42}	b_{211}
b_{31}	b_{45}	$b_{210} + b_{214}$
b_{31}	b_{48}	$b_{291} + b_{294}$
b_{31}	b_{55}	b_{295}
b_{31}	b_{57}	b_{264}
b_{31}	b_{63}	b_{277}
b_{31}	b_{65}	$b_{260} + b_{262}$
b_{31}	b_{73}	$b_{329} + b_{345}$
b_{31}	b_{80}	b_{333}
b_{31}	b_{87}	$b_{316} + b_{329}$
b_{31}	b_{91}	b_{345}
b_{31}	b_{92}	b_{316}
b_{31}	b_{121}	b_{398}
b_{31}	b_{136}	b_{438}
b_{31}	b_{174}	b_{486}
b_{31}	b_{189}	$b_{496} + b_{502}$
b_{31}	b_{202}	b_{486}
b_{31}	b_{217}	b_{530}
b_{31}	b_{223}	b_{530}
b_{31}	b_{233}	$b_{517} + b_{545}$
b_{31}	b_{281}	b_{583}
b_{31}	b_{321}	b_{598}
b_{31}	b_{374}	$b_{628} + b_{646}$
b_{31}	b_{386}	b_{639}
b_{31}	b_{390}	$b_{632} + b_{646}$
b_{31}	b_{403}	$b_{627} + b_{632}$
b_{31}	b_{424}	b_{664}
b_{31}	b_{425}	b_{671}
b_{31}	b_{428}	b_{671}
b_{31}	b_{442}	b_{656}

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{31}	b_{455}	b_{662}
b_{31}	b_{457}	b_{654}
b_{31}	b_{459}	b_{654}
b_{31}	b_{476}	b_{688}
b_{31}	b_{480}	b_{688}
b_{31}	b_{481}	b_{680}
b_{31}	b_{493}	b_{684}
b_{31}	b_{505}	b_{674}
b_{31}	b_{508}	b_{677}
b_{31}	b_{509}	b_{674}
b_{31}	b_{510}	$b_{678} + b_{684} + b_{687}$
b_{31}	b_{527}	b_{695}
b_{31}	b_{537}	$b_{691} + b_{695}$
b_{31}	b_{541}	b_{695}
b_{31}	b_{542}	b_{694}
b_{31}	b_{543}	b_{696}
b_{31}	b_{544}	b_{691}
b_{31}	b_{546}	$b_{692} + b_{698}$
b_{31}	b_{547}	b_{694}
b_{31}	b_{550}	b_{694}
b_{31}	b_{551}	b_{691}
b_{31}	b_{552}	b_{696}
b_{31}	b_{553}	b_{694}
b_{31}	b_{580}	b_{703}
b_{31}	b_{582}	b_{704}
b_{31}	b_{584}	b_{702}
b_{31}	b_{591}	b_{707}
b_{31}	b_{592}	$b_{702} + b_{705} + b_{708}$
b_{31}	b_{619}	b_{713}
b_{31}	b_{620}	$b_{711} + b_{714}$
b_{31}	b_{623}	b_{712}
b_{31}	b_{624}	$b_{710} + b_{711}$
b_{31}	b_{625}	b_{711}
b_{31}	b_{645}	b_{717}
b_{31}	b_{646}	b_{717}
b_{31}	b_{647}	$b_{715} + b_{716}$
b_{31}	b_{648}	b_{716}
b_{31}	b_{652}	b_{715}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{31}	b_{670}	b_{718}
b_{31}	b_{671}	b_{718}
b_{32}	b_{45}	b_{209}
b_{32}	b_{59}	$b_{277} + b_{295}$
b_{32}	b_{77}	b_{333}
b_{32}	b_{84}	b_{333}
b_{32}	b_{107}	b_{398}
b_{32}	b_{321}	b_{612}
b_{32}	b_{386}	$b_{635} + b_{642}$
b_{32}	b_{424}	b_{660}
b_{32}	b_{442}	b_{660}
b_{32}	b_{510}	$b_{674} + b_{688}$
b_{32}	b_{539}	b_{694}
b_{32}	b_{546}	b_{694}
b_{32}	b_{650}	$b_{715} + b_{717}$
b_{32}	b_{651}	$b_{715} + b_{716}$
b_{32}	b_{668}	b_{718}
b_{32}	b_{669}	b_{718}
b_{32}	b_{673}	b_{718}
b_{33}	b_{596}	b_{711}
b_{33}	b_{634}	$b_{715} + b_{716}$
b_{33}	b_{659}	b_{718}
b_{33}	b_{667}	b_{718}
b_{34}	b_{59}	b_{264}
b_{34}	b_{84}	b_{333}
b_{34}	b_{91}	b_{333}
b_{34}	b_{118}	b_{398}
b_{34}	b_{189}	b_{463}
b_{34}	b_{256}	b_{530}
b_{34}	b_{321}	b_{601}
b_{34}	b_{386}	$b_{628} + b_{635}$
b_{34}	b_{455}	b_{660}
b_{34}	b_{539}	b_{696}
b_{34}	b_{650}	b_{716}
b_{34}	b_{658}	b_{718}
b_{34}	b_{668}	b_{718}
b_{35}	b_{45}	$b_{209} + b_{245}$
b_{35}	b_{48}	$b_{264} + b_{295}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{35}	b_{59}	$b_{264} + b_{277}$
b_{35}	b_{65}	$b_{282} + b_{300}$
b_{35}	b_{66}	$b_{282} + b_{288}$
b_{35}	b_{67}	b_{333}
b_{35}	b_{71}	b_{333}
b_{35}	b_{77}	b_{333}
b_{35}	b_{81}	b_{336}
b_{35}	b_{82}	b_{336}
b_{35}	b_{93}	b_{336}
b_{35}	b_{94}	b_{398}
b_{35}	b_{113}	b_{360}
b_{35}	b_{189}	$b_{463} + b_{479}$
b_{35}	b_{240}	b_{530}
b_{35}	b_{256}	b_{530}
b_{35}	b_{321}	b_{625}
b_{35}	b_{359}	b_{606}
b_{35}	b_{383}	$b_{626} + b_{637} + b_{638}$
b_{35}	b_{386}	$b_{642} + b_{648} + b_{652}$
b_{35}	b_{419}	b_{654}
b_{35}	b_{424}	b_{671}
b_{35}	b_{431}	b_{653}
b_{35}	b_{437}	$b_{653} + b_{654}$
b_{35}	b_{442}	b_{660}
b_{35}	b_{455}	$b_{660} + b_{671}$
b_{35}	b_{474}	b_{674}
b_{35}	b_{493}	b_{688}
b_{35}	b_{510}	$b_{674} + b_{688}$
b_{35}	b_{539}	$b_{694} + b_{696}$
b_{35}	b_{546}	$b_{694} + b_{696}$
b_{35}	b_{598}	b_{711}
b_{35}	b_{639}	$b_{715} + b_{716}$
b_{35}	b_{640}	$b_{715} + b_{717}$
b_{35}	b_{650}	$b_{716} + b_{717}$
b_{35}	b_{651}	$b_{715} + b_{716}$
b_{35}	b_{662}	b_{718}
b_{35}	b_{663}	b_{718}
b_{35}	b_{664}	b_{718}
b_{35}	b_{673}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{36}	b_{66}	b_{282}
b_{36}	b_{82}	b_{336}
b_{36}	b_{90}	b_{336}
b_{36}	b_{122}	b_{360}
b_{36}	b_{136}	b_{417}
b_{36}	b_{189}	b_{479}
b_{36}	b_{240}	b_{530}
b_{36}	b_{302}	b_{583}
b_{36}	b_{359}	b_{597}
b_{36}	b_{383}	$b_{629} + b_{637}$
b_{36}	b_{437}	b_{653}
b_{36}	b_{539}	$b_{691} + b_{694}$
b_{36}	b_{546}	$b_{695} + b_{696}$
b_{36}	b_{611}	$b_{710} + b_{711}$
b_{36}	b_{640}	b_{715}
b_{36}	b_{641}	b_{715}
b_{36}	b_{649}	$b_{715} + b_{716}$
b_{36}	b_{651}	$b_{716} + b_{717}$
b_{36}	b_{661}	b_{718}
b_{36}	b_{663}	b_{718}
b_{36}	b_{672}	b_{718}
b_{37}	b_{111}	b_{398}
b_{37}	b_{321}	b_{608}
b_{38}	b_{126}	b_{398}
b_{38}	b_{165}	b_{421}
b_{38}	b_{298}	b_{554}
b_{38}	b_{321}	b_{593}
b_{38}	b_{596}	b_{714}
b_{38}	b_{634}	b_{716}
b_{38}	b_{659}	b_{718}
b_{39}	b_{45}	b_{234}
b_{39}	b_{48}	$b_{277} + b_{295}$
b_{39}	b_{65}	$b_{282} + b_{288}$
b_{39}	b_{66}	$b_{282} + b_{300}$
b_{39}	b_{67}	b_{333}
b_{39}	b_{73}	b_{333}
b_{39}	b_{87}	b_{336}
b_{39}	b_{88}	b_{336}

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{39}	b_{93}	b_{336}
b_{39}	b_{96}	b_{398}
b_{39}	b_{119}	b_{360}
b_{39}	b_{189}	b_{479}
b_{39}	b_{240}	b_{530}
b_{39}	b_{321}	b_{623}
b_{39}	b_{359}	b_{600}
b_{39}	b_{383}	$b_{626} + b_{631} + b_{632}$
b_{39}	b_{386}	$b_{646} + b_{652}$
b_{39}	b_{419}	b_{653}
b_{39}	b_{424}	b_{671}
b_{39}	b_{431}	b_{654}
b_{39}	b_{437}	$b_{653} + b_{654}$
b_{39}	b_{442}	b_{671}
b_{39}	b_{481}	b_{688}
b_{39}	b_{485}	b_{674}
b_{39}	b_{546}	b_{696}
b_{39}	b_{598}	b_{712}
b_{39}	b_{639}	$b_{715} + b_{717}$
b_{39}	b_{640}	$b_{715} + b_{716}$
b_{39}	b_{656}	b_{718}
b_{39}	b_{657}	b_{718}
b_{39}	b_{664}	b_{718}
b_{40}	b_{66}	b_{282}
b_{40}	b_{88}	b_{336}
b_{40}	b_{92}	b_{336}
b_{40}	b_{125}	b_{360}
b_{40}	b_{189}	b_{479}
b_{40}	b_{240}	b_{530}
b_{40}	b_{359}	b_{594}
b_{40}	b_{383}	$b_{627} + b_{631}$
b_{40}	b_{437}	b_{653}
b_{40}	b_{546}	b_{696}
b_{40}	b_{640}	b_{715}
b_{40}	b_{655}	b_{718}
b_{40}	b_{657}	b_{718}
b_{41}	b_{45}	b_{209}
b_{41}	b_{66}	$b_{288} + b_{300}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{41}	b_{82}	b_{336}
b_{41}	b_{88}	b_{336}
b_{41}	b_{110}	b_{360}
b_{41}	b_{359}	b_{609}
b_{41}	b_{383}	$b_{631} + b_{637}$
b_{41}	b_{419}	b_{653}
b_{41}	b_{431}	b_{653}
b_{41}	b_{510}	$b_{674} + b_{688}$
b_{41}	b_{539}	b_{694}
b_{41}	b_{546}	b_{694}
b_{41}	b_{640}	$b_{716} + b_{717}$
b_{41}	b_{651}	$b_{715} + b_{716}$
b_{41}	b_{657}	b_{718}
b_{41}	b_{663}	b_{718}
b_{41}	b_{669}	b_{718}
b_{42}	b_{45}	b_{254}
b_{42}	b_{48}	$b_{264} + b_{277}$
b_{42}	b_{59}	$b_{264} + b_{295}$
b_{42}	b_{65}	$b_{288} + b_{300}$
b_{42}	b_{71}	b_{333}
b_{42}	b_{73}	b_{333}
b_{42}	b_{81}	b_{336}
b_{42}	b_{84}	b_{333}
b_{42}	b_{87}	b_{336}
b_{42}	b_{100}	b_{398}
b_{42}	b_{109}	b_{360}
b_{42}	b_{189}	b_{463}
b_{42}	b_{256}	b_{530}
b_{42}	b_{321}	b_{619}
b_{42}	b_{359}	b_{610}
b_{42}	b_{383}	$b_{632} + b_{638}$
b_{42}	b_{386}	$b_{635} + b_{646} + b_{648}$
b_{42}	b_{419}	b_{654}
b_{42}	b_{424}	b_{660}
b_{42}	b_{431}	b_{654}
b_{42}	b_{442}	b_{671}
b_{42}	b_{455}	$b_{660} + b_{671}$
b_{42}	b_{465}	b_{674}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{42}	b_{508}	b_{688}
b_{42}	b_{539}	b_{696}
b_{42}	b_{598}	b_{713}
b_{42}	b_{639}	$b_{716} + b_{717}$
b_{42}	b_{650}	$b_{715} + b_{716}$
b_{42}	b_{656}	b_{718}
b_{42}	b_{662}	b_{718}
b_{42}	b_{668}	b_{718}
b_{43}	b_{112}	b_{360}
b_{43}	b_{359}	b_{607}
b_{44}	b_{117}	b_{360}
b_{44}	b_{136}	b_{413}
b_{44}	b_{306}	b_{583}
b_{44}	b_{359}	b_{602}
b_{44}	b_{596}	b_{710}
b_{44}	b_{634}	b_{715}
b_{44}	b_{667}	b_{718}
b_{45}	b_{45}	$b_{220} + b_{227}$
b_{45}	b_{48}	$b_{260} + b_{262}$
b_{45}	b_{55}	b_{282}
b_{45}	b_{57}	b_{300}
b_{45}	b_{63}	b_{288}
b_{45}	b_{65}	$b_{273} + b_{275}$
b_{45}	b_{73}	$b_{316} + b_{329}$
b_{45}	b_{80}	b_{336}
b_{45}	b_{87}	$b_{316} + b_{345}$
b_{45}	b_{91}	b_{329}
b_{45}	b_{92}	b_{345}
b_{45}	b_{121}	b_{360}
b_{45}	b_{165}	b_{434}
b_{45}	b_{189}	$b_{466} + b_{470}$
b_{45}	b_{200}	b_{486}
b_{45}	b_{202}	b_{486}
b_{45}	b_{233}	$b_{517} + b_{519}$
b_{45}	b_{249}	b_{530}
b_{45}	b_{253}	b_{530}
b_{45}	b_{285}	b_{554}
b_{45}	b_{359}	b_{598}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{45}	b_{374}	$b_{627} + b_{632}$
b_{45}	b_{383}	b_{639}
b_{45}	b_{390}	$b_{628} + b_{646}$
b_{45}	b_{403}	$b_{632} + b_{646}$
b_{45}	b_{419}	b_{662}
b_{45}	b_{431}	b_{656}
b_{45}	b_{437}	b_{664}
b_{45}	b_{444}	b_{654}
b_{45}	b_{446}	b_{654}
b_{45}	b_{457}	b_{671}
b_{45}	b_{459}	b_{671}
b_{45}	b_{465}	b_{677}
b_{45}	b_{474}	b_{684}
b_{45}	b_{485}	b_{680}
b_{45}	b_{492}	b_{674}
b_{45}	b_{499}	b_{674}
b_{45}	b_{505}	b_{688}
b_{45}	b_{509}	b_{688}
b_{45}	b_{510}	$b_{678} + b_{684} + b_{687}$
b_{45}	b_{512}	b_{691}
b_{45}	b_{516}	b_{694}
b_{45}	b_{522}	b_{696}
b_{45}	b_{529}	b_{695}
b_{45}	b_{535}	b_{696}
b_{45}	b_{537}	b_{695}
b_{45}	b_{539}	$b_{692} + b_{698}$
b_{45}	b_{541}	b_{691}
b_{45}	b_{544}	$b_{691} + b_{695}$
b_{45}	b_{547}	b_{694}
b_{45}	b_{550}	b_{694}
b_{45}	b_{553}	b_{694}
b_{45}	b_{557}	b_{703}
b_{45}	b_{559}	b_{702}
b_{45}	b_{561}	b_{704}
b_{45}	b_{574}	b_{707}
b_{45}	b_{587}	$b_{702} + b_{705} + b_{708}$
b_{45}	b_{600}	b_{712}
b_{45}	b_{606}	b_{711}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{45}	b_{610}	b_{713}
b_{45}	b_{614}	$b_{710} + b_{711}$
b_{45}	b_{622}	$b_{711} + b_{714}$
b_{45}	b_{626}	b_{715}
b_{45}	b_{632}	b_{717}
b_{45}	b_{633}	b_{717}
b_{45}	b_{638}	b_{716}
b_{45}	b_{644}	$b_{715} + b_{716}$
b_{45}	b_{654}	b_{718}
b_{45}	b_{666}	b_{718}
b_{46}	b_{59}	b_{333}
b_{46}	b_{77}	b_{398}
b_{46}	b_{321}	b_{642}
b_{46}	b_{386}	b_{660}
b_{46}	b_{650}	b_{718}
b_{46}	b_{651}	b_{718}
b_{47}	b_{611}	$b_{715} + b_{716}$
b_{47}	b_{641}	b_{718}
b_{47}	b_{649}	b_{718}
b_{47}	b_{651}	b_{718}
b_{48}	b_{48}	$b_{329} + b_{345}$
b_{48}	b_{55}	b_{333}
b_{48}	b_{57}	b_{333}
b_{48}	b_{63}	b_{333}
b_{48}	b_{65}	$b_{316} + b_{329}$
b_{48}	b_{80}	b_{398}
b_{48}	b_{136}	b_{486}
b_{48}	b_{174}	b_{530}
b_{48}	b_{189}	$b_{517} + b_{545}$
b_{48}	b_{202}	b_{530}
b_{48}	b_{233}	b_{583}
b_{48}	b_{321}	b_{639}
b_{48}	b_{374}	b_{671}
b_{48}	b_{386}	$b_{656} + b_{662} + b_{664}$
b_{48}	b_{390}	$b_{654} + b_{671}$
b_{48}	b_{403}	b_{654}
b_{48}	b_{424}	$b_{680} + b_{684}$
b_{48}	b_{425}	b_{688}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{48}	b_{428}	b_{688}
b_{48}	b_{442}	$b_{677} + b_{680}$
b_{48}	b_{455}	$b_{677} + b_{684}$
b_{48}	b_{457}	b_{674}
b_{48}	b_{459}	b_{674}
b_{48}	b_{481}	$b_{694} + b_{695}$
b_{48}	b_{493}	$b_{694} + b_{696}$
b_{48}	b_{508}	$b_{691} + b_{694}$
b_{48}	b_{510}	$2b_{694} + b_{696}$
b_{48}	b_{546}	$b_{702} + b_{705} + b_{708}$
b_{48}	b_{580}	b_{712}
b_{48}	b_{582}	b_{713}
b_{48}	b_{584}	b_{711}
b_{48}	b_{591}	$b_{711} + b_{712} + b_{713}$
b_{48}	b_{592}	$b_{710} + 2b_{711} + b_{714}$
b_{48}	b_{619}	$b_{716} + b_{717}$
b_{48}	b_{620}	$b_{715} + b_{716}$
b_{48}	b_{623}	$b_{715} + b_{717}$
b_{48}	b_{624}	$b_{715} + b_{716}$
b_{48}	b_{625}	$b_{715} + b_{716}$
b_{48}	b_{646}	b_{718}
b_{48}	b_{647}	b_{718}
b_{48}	b_{648}	b_{718}
b_{48}	b_{652}	b_{718}
b_{49}	b_{510}	b_{694}
b_{49}	b_{546}	b_{702}
b_{49}	b_{592}	b_{711}
b_{49}	b_{620}	b_{716}
b_{49}	b_{624}	b_{715}
b_{49}	b_{645}	b_{718}
b_{49}	b_{647}	b_{718}
b_{50}	b_{651}	b_{718}
b_{51}	b_{59}	b_{333}
b_{51}	b_{84}	b_{398}
b_{51}	b_{321}	b_{635}
b_{51}	b_{386}	b_{660}
b_{51}	b_{650}	b_{718}
b_{52}	b_{596}	b_{715}

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{52}	b_{634}	b_{718}
b_{53}	b_{510}	b_{694}
b_{53}	b_{539}	b_{702}
b_{53}	b_{587}	b_{711}
b_{53}	b_{614}	b_{715}
b_{53}	b_{622}	b_{716}
b_{53}	b_{633}	b_{718}
b_{53}	b_{644}	b_{718}
b_{54}	b_{89}	b_{398}
b_{54}	b_{321}	b_{630}
b_{54}	b_{611}	b_{716}
b_{54}	b_{641}	b_{718}
b_{55}	b_{65}	b_{336}
b_{55}	b_{66}	b_{336}
b_{55}	b_{67}	b_{398}
b_{55}	b_{93}	b_{360}
b_{55}	b_{321}	b_{652}
b_{55}	b_{359}	b_{626}
b_{55}	b_{383}	$b_{653} + b_{654}$
b_{55}	b_{386}	b_{671}
b_{55}	b_{424}	b_{688}
b_{55}	b_{437}	b_{674}
b_{55}	b_{598}	b_{715}
b_{55}	b_{639}	b_{718}
b_{55}	b_{640}	b_{718}
b_{56}	b_{66}	b_{336}
b_{56}	b_{82}	b_{360}
b_{56}	b_{359}	b_{637}
b_{56}	b_{383}	b_{653}
b_{56}	b_{640}	b_{718}
b_{56}	b_{651}	b_{718}
b_{57}	b_{59}	b_{333}
b_{57}	b_{65}	b_{336}
b_{57}	b_{71}	b_{398}
b_{57}	b_{81}	b_{360}
b_{57}	b_{321}	b_{648}
b_{57}	b_{359}	b_{638}
b_{57}	b_{383}	b_{654}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{57}	b_{386}	$b_{660} + b_{671}$
b_{57}	b_{419}	b_{674}
b_{57}	b_{455}	b_{688}
b_{57}	b_{598}	b_{716}
b_{57}	b_{639}	b_{718}
b_{57}	b_{650}	b_{718}
b_{58}	b_{90}	b_{360}
b_{58}	b_{359}	b_{629}
b_{58}	b_{611}	b_{715}
b_{58}	b_{649}	b_{718}
b_{59}	b_{59}	$2b_{329} + b_{345}$
b_{59}	b_{69}	b_{398}
b_{59}	b_{165}	b_{463}
b_{59}	b_{189}	b_{517}
b_{59}	b_{202}	b_{530}
b_{59}	b_{256}	b_{554}
b_{59}	b_{321}	b_{650}
b_{59}	b_{374}	b_{660}
b_{59}	b_{386}	$b_{662} + b_{668} + b_{673}$
b_{59}	b_{390}	$2b_{660}$
b_{59}	b_{424}	$b_{677} + b_{687}$
b_{59}	b_{442}	$b_{684} + b_{687}$
b_{59}	b_{455}	$b_{677} + b_{684} + b_{685} + b_{689}$
b_{59}	b_{481}	b_{694}
b_{59}	b_{483}	$b_{691} + b_{696}$
b_{59}	b_{493}	$b_{691} + b_{694}$
b_{59}	b_{508}	$b_{694} + b_{696}$
b_{59}	b_{510}	$2b_{691} + 2b_{694} + b_{695} + b_{696}$
b_{59}	b_{546}	$b_{707} + b_{708} + b_{709}$
b_{59}	b_{567}	$b_{711} + b_{714}$
b_{59}	b_{582}	$b_{711} + b_{714}$
b_{59}	b_{584}	$b_{713} + b_{714}$
b_{59}	b_{591}	$b_{711} + b_{712} + b_{713}$
b_{59}	b_{592}	$b_{711} + b_{712} + b_{713}$
b_{59}	b_{601}	b_{716}
b_{59}	b_{603}	b_{716}
b_{59}	b_{612}	$b_{715} + b_{717}$
b_{59}	b_{613}	$b_{715} + b_{716}$

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Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{59}	b_{619}	$b_{715} + b_{716}$
b_{59}	b_{620}	$b_{715} + b_{717}$
b_{59}	b_{625}	$b_{716} + b_{717}$
b_{59}	b_{635}	b_{718}
b_{59}	b_{636}	b_{718}
b_{59}	b_{642}	b_{718}
b_{59}	b_{648}	b_{718}
b_{60}	b_{596}	b_{716}
b_{60}	b_{634}	b_{718}
b_{61}	b_{91}	b_{398}
b_{61}	b_{321}	b_{628}
b_{62}	b_{66}	b_{336}
b_{62}	b_{88}	b_{360}
b_{62}	b_{359}	b_{631}
b_{62}	b_{383}	b_{653}
b_{62}	b_{640}	b_{718}
b_{63}	b_{65}	b_{336}
b_{63}	b_{73}	b_{398}
b_{63}	b_{87}	b_{360}
b_{63}	b_{321}	b_{646}
b_{63}	b_{359}	b_{632}
b_{63}	b_{383}	b_{654}
b_{63}	b_{386}	b_{671}
b_{63}	b_{431}	b_{674}
b_{63}	b_{442}	b_{688}
b_{63}	b_{598}	b_{717}
b_{63}	b_{639}	b_{718}
b_{64}	b_{92}	b_{360}
b_{64}	b_{359}	b_{627}
b_{65}	b_{65}	$b_{316} + b_{345}$
b_{65}	b_{80}	b_{360}
b_{65}	b_{165}	b_{486}
b_{65}	b_{189}	$b_{517} + b_{519}$
b_{65}	b_{200}	b_{530}
b_{65}	b_{202}	b_{530}
b_{65}	b_{233}	b_{554}
b_{65}	b_{359}	b_{639}
b_{65}	b_{374}	b_{654}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{65}	b_{383}	$b_{656} + b_{662} + b_{664}$
b_{65}	b_{390}	b_{671}
b_{65}	b_{403}	$b_{654} + b_{671}$
b_{65}	b_{419}	$b_{677} + b_{684}$
b_{65}	b_{431}	$b_{677} + b_{680}$
b_{65}	b_{437}	$b_{680} + b_{684}$
b_{65}	b_{444}	b_{674}
b_{65}	b_{446}	b_{674}
b_{65}	b_{457}	b_{688}
b_{65}	b_{459}	b_{688}
b_{65}	b_{465}	$b_{691} + b_{694}$
b_{65}	b_{474}	$b_{694} + b_{696}$
b_{65}	b_{485}	$b_{694} + b_{695}$
b_{65}	b_{510}	$2b_{694} + b_{696}$
b_{65}	b_{539}	$b_{702} + b_{705} + b_{708}$
b_{65}	b_{557}	b_{712}
b_{65}	b_{559}	b_{711}
b_{65}	b_{561}	b_{713}
b_{65}	b_{574}	$b_{711} + b_{712} + b_{713}$
b_{65}	b_{587}	$b_{710} + 2b_{711} + b_{714}$
b_{65}	b_{600}	$b_{715} + b_{717}$
b_{65}	b_{606}	$b_{715} + b_{716}$
b_{65}	b_{610}	$b_{716} + b_{717}$
b_{65}	b_{614}	$b_{715} + b_{716}$
b_{65}	b_{622}	$b_{715} + b_{716}$
b_{65}	b_{626}	b_{718}
b_{65}	b_{632}	b_{718}
b_{65}	b_{638}	b_{718}
b_{65}	b_{644}	b_{718}
b_{66}	b_{66}	$2b_{316} + b_{345}$
b_{66}	b_{79}	b_{360}
b_{66}	b_{136}	b_{479}
b_{66}	b_{189}	b_{517}
b_{66}	b_{202}	b_{530}
b_{66}	b_{240}	b_{583}
b_{66}	b_{359}	b_{640}
b_{66}	b_{374}	b_{653}
b_{66}	b_{383}	$b_{657} + b_{663} + b_{664}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{66}	b_{403}	$2b_{653}$
b_{66}	b_{419}	$b_{678} + b_{680}$
b_{66}	b_{431}	$b_{678} + b_{684}$
b_{66}	b_{437}	$b_{679} + b_{680} + b_{683} + b_{684}$
b_{66}	b_{465}	b_{694}
b_{66}	b_{474}	$b_{694} + b_{695}$
b_{66}	b_{485}	$b_{694} + b_{696}$
b_{66}	b_{489}	$b_{695} + b_{696}$
b_{66}	b_{510}	$b_{691} + 2b_{694} + 2b_{695} + b_{696}$
b_{66}	b_{539}	$b_{705} + b_{706} + b_{707}$
b_{66}	b_{557}	$b_{710} + b_{711}$
b_{66}	b_{559}	$b_{710} + b_{712}$
b_{66}	b_{574}	$b_{711} + b_{712} + b_{713}$
b_{66}	b_{579}	$b_{710} + b_{711}$
b_{66}	b_{587}	$b_{711} + b_{712} + b_{713}$
b_{66}	b_{594}	b_{715}
b_{66}	b_{597}	b_{715}
b_{66}	b_{600}	$b_{715} + b_{716}$
b_{66}	b_{606}	$b_{715} + b_{717}$
b_{66}	b_{609}	$b_{716} + b_{717}$
b_{66}	b_{614}	$b_{716} + b_{717}$
b_{66}	b_{621}	$b_{715} + b_{716}$
b_{66}	b_{626}	b_{718}
b_{66}	b_{631}	b_{718}
b_{66}	b_{637}	b_{718}
b_{66}	b_{643}	b_{718}
b_{67}	b_{136}	b_{530}
b_{67}	b_{189}	b_{583}
b_{67}	b_{321}	b_{664}
b_{67}	b_{386}	$b_{680} + b_{684}$
b_{67}	b_{424}	$b_{695} + b_{696}$
b_{67}	b_{442}	b_{694}
b_{67}	b_{455}	b_{694}
b_{67}	b_{546}	$b_{710} + b_{711}$
b_{67}	b_{580}	b_{715}
b_{67}	b_{584}	b_{715}
b_{67}	b_{591}	$b_{716} + b_{717}$
b_{67}	b_{592}	$b_{715} + b_{716}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{67}	b_{623}	b_{718}
b_{67}	b_{624}	b_{718}
b_{67}	b_{625}	b_{718}
b_{69}	b_{321}	b_{660}
b_{70}	b_{611}	b_{718}
b_{71}	b_{321}	b_{662}
b_{71}	b_{386}	$b_{677} + b_{684}$
b_{71}	b_{424}	b_{694}
b_{71}	b_{442}	b_{694}
b_{71}	b_{455}	$b_{691} + b_{696}$
b_{71}	b_{546}	$b_{711} + b_{714}$
b_{71}	b_{582}	b_{716}
b_{71}	b_{584}	b_{716}
b_{71}	b_{591}	$b_{715} + b_{717}$
b_{71}	b_{592}	$b_{715} + b_{716}$
b_{71}	b_{619}	b_{718}
b_{71}	b_{620}	b_{718}
b_{71}	b_{625}	b_{718}
b_{72}	b_{546}	b_{711}
b_{72}	b_{592}	$b_{715} + b_{716}$
b_{72}	b_{620}	b_{718}
b_{72}	b_{624}	b_{718}
b_{73}	b_{321}	b_{656}
b_{73}	b_{374}	b_{688}
b_{73}	b_{386}	$b_{677} + b_{680}$
b_{73}	b_{390}	$b_{674} + b_{688}$
b_{73}	b_{403}	b_{674}
b_{73}	b_{424}	b_{694}
b_{73}	b_{442}	$b_{691} + b_{695}$
b_{73}	b_{455}	b_{694}
b_{73}	b_{580}	b_{717}
b_{73}	b_{582}	b_{717}
b_{73}	b_{591}	$b_{715} + b_{716}$
b_{73}	b_{619}	b_{718}
b_{73}	b_{623}	b_{718}
b_{75}	b_{539}	b_{711}
b_{75}	b_{587}	$b_{715} + b_{716}$
b_{75}	b_{614}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{75}	b_{622}	b_{718}
b_{76}	b_{539}	$b_{710} + b_{712}$
b_{76}	b_{579}	b_{715}
b_{76}	b_{587}	$b_{715} + b_{717}$
b_{76}	b_{614}	b_{718}
b_{76}	b_{621}	b_{718}
b_{77}	b_{321}	b_{673}
b_{77}	b_{386}	$b_{684} + b_{687} + b_{689}$
b_{77}	b_{424}	b_{694}
b_{77}	b_{442}	b_{696}
b_{77}	b_{455}	$b_{694} + b_{696}$
b_{77}	b_{546}	$b_{711} + b_{712} + b_{713}$
b_{77}	b_{567}	$b_{715} + b_{716}$
b_{77}	b_{584}	$b_{716} + b_{717}$
b_{77}	b_{591}	$b_{715} + b_{716}$
b_{77}	b_{592}	$b_{715} + b_{717}$
b_{77}	b_{603}	b_{718}
b_{77}	b_{612}	b_{718}
b_{77}	b_{613}	b_{718}
b_{77}	b_{625}	b_{718}
b_{78}	b_{611}	b_{718}
b_{79}	b_{359}	b_{653}
b_{80}	b_{321}	b_{671}
b_{80}	b_{359}	b_{654}
b_{80}	b_{383}	b_{674}
b_{80}	b_{386}	b_{688}
b_{80}	b_{598}	b_{718}
b_{81}	b_{165}	b_{530}
b_{81}	b_{189}	b_{554}
b_{81}	b_{359}	b_{662}
b_{81}	b_{383}	$b_{677} + b_{684}$
b_{81}	b_{419}	$b_{691} + b_{696}$
b_{81}	b_{431}	b_{694}
b_{81}	b_{437}	b_{694}
b_{81}	b_{539}	$b_{711} + b_{714}$
b_{81}	b_{559}	b_{716}
b_{81}	b_{561}	b_{716}
b_{81}	b_{574}	$b_{715} + b_{717}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{81}	b_{587}	$b_{715} + b_{716}$
b_{81}	b_{606}	b_{718}
b_{81}	b_{610}	b_{718}
b_{81}	b_{622}	b_{718}
b_{82}	b_{359}	b_{663}
b_{82}	b_{383}	$b_{678} + b_{683} + b_{684}$
b_{82}	b_{419}	b_{694}
b_{82}	b_{431}	b_{696}
b_{82}	b_{437}	$b_{694} + b_{696}$
b_{82}	b_{539}	$b_{711} + b_{712} + b_{713}$
b_{82}	b_{559}	$b_{715} + b_{717}$
b_{82}	b_{574}	$b_{715} + b_{716}$
b_{82}	b_{579}	$b_{715} + b_{716}$
b_{82}	b_{587}	$b_{716} + b_{717}$
b_{82}	b_{597}	b_{718}
b_{82}	b_{606}	b_{718}
b_{82}	b_{609}	b_{718}
b_{82}	b_{621}	b_{718}
b_{83}	b_{546}	$b_{713} + b_{714}$
b_{83}	b_{567}	b_{716}
b_{83}	b_{592}	$b_{716} + b_{717}$
b_{83}	b_{613}	b_{718}
b_{83}	b_{620}	b_{718}
b_{84}	b_{321}	b_{668}
b_{84}	b_{386}	$b_{677} + b_{685} + b_{687}$
b_{84}	b_{424}	b_{691}
b_{84}	b_{442}	b_{694}
b_{84}	b_{455}	$b_{691} + b_{694}$
b_{84}	b_{582}	$b_{715} + b_{716}$
b_{84}	b_{591}	$b_{716} + b_{717}$
b_{84}	b_{601}	b_{718}
b_{84}	b_{612}	b_{718}
b_{84}	b_{619}	b_{718}
b_{85}	b_{596}	b_{718}
b_{87}	b_{359}	b_{656}
b_{87}	b_{374}	b_{674}
b_{87}	b_{383}	$b_{677} + b_{680}$
b_{87}	b_{390}	b_{688}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{87}	b_{403}	$b_{674} + b_{688}$
b_{87}	b_{419}	b_{694}
b_{87}	b_{431}	$b_{691} + b_{695}$
b_{87}	b_{437}	b_{694}
b_{87}	b_{557}	b_{717}
b_{87}	b_{561}	b_{717}
b_{87}	b_{574}	$b_{715} + b_{716}$
b_{87}	b_{600}	b_{718}
b_{87}	b_{610}	b_{718}
b_{88}	b_{359}	b_{657}
b_{88}	b_{383}	$b_{678} + b_{679} + b_{680}$
b_{88}	b_{419}	b_{695}
b_{88}	b_{431}	b_{694}
b_{88}	b_{437}	$b_{694} + b_{695}$
b_{88}	b_{557}	$b_{715} + b_{716}$
b_{88}	b_{574}	$b_{715} + b_{717}$
b_{88}	b_{594}	b_{718}
b_{88}	b_{600}	b_{718}
b_{88}	b_{609}	b_{718}
b_{89}	b_{136}	b_{530}
b_{89}	b_{189}	b_{583}
b_{89}	b_{321}	b_{665}
b_{89}	b_{386}	b_{689}
b_{89}	b_{424}	b_{696}
b_{89}	b_{546}	$b_{710} + b_{712}$
b_{89}	b_{567}	$b_{715} + b_{717}$
b_{89}	b_{584}	b_{715}
b_{89}	b_{599}	b_{718}
b_{89}	b_{603}	b_{718}
b_{90}	b_{165}	b_{530}
b_{90}	b_{189}	b_{554}
b_{90}	b_{359}	b_{661}
b_{90}	b_{383}	b_{683}
b_{90}	b_{419}	b_{696}
b_{90}	b_{539}	$b_{713} + b_{714}$
b_{90}	b_{559}	b_{716}
b_{90}	b_{579}	$b_{716} + b_{717}$
b_{90}	b_{597}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{90}	b_{616}	b_{718}
b_{91}	b_{321}	b_{658}
b_{91}	b_{374}	b_{688}
b_{91}	b_{386}	b_{685}
b_{91}	b_{390}	b_{674}
b_{91}	b_{442}	b_{691}
b_{91}	b_{582}	b_{717}
b_{91}	b_{601}	b_{718}
b_{92}	b_{359}	b_{655}
b_{92}	b_{374}	b_{674}
b_{92}	b_{383}	b_{679}
b_{92}	b_{403}	b_{688}
b_{92}	b_{431}	b_{695}
b_{92}	b_{557}	b_{717}
b_{92}	b_{594}	b_{718}
b_{93}	b_{359}	b_{664}
b_{93}	b_{383}	$b_{680} + b_{684}$
b_{93}	b_{419}	b_{694}
b_{93}	b_{431}	b_{694}
b_{93}	b_{437}	$b_{695} + b_{696}$
b_{93}	b_{539}	$b_{710} + b_{711}$
b_{93}	b_{557}	b_{715}
b_{93}	b_{559}	b_{715}
b_{93}	b_{574}	$b_{716} + b_{717}$
b_{93}	b_{587}	$b_{715} + b_{716}$
b_{93}	b_{600}	b_{718}
b_{93}	b_{606}	b_{718}
b_{93}	b_{614}	b_{718}
b_{94}	b_{321}	b_{684}
b_{94}	b_{386}	$b_{694} + b_{696}$
b_{94}	b_{546}	$b_{715} + b_{716}$
b_{94}	b_{584}	b_{718}
b_{94}	b_{591}	b_{718}
b_{94}	b_{592}	b_{718}
b_{95}	b_{546}	b_{715}
b_{95}	b_{592}	b_{718}
b_{96}	b_{321}	b_{680}
b_{96}	b_{386}	$b_{694} + b_{695}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{96}	b_{580}	b_{718}
b_{96}	b_{591}	b_{718}
b_{97}	b_{539}	b_{716}
b_{97}	b_{587}	b_{718}
b_{98}	b_{539}	$b_{715} + b_{717}$
b_{98}	b_{579}	b_{718}
b_{98}	b_{587}	b_{718}
b_{99}	b_{546}	b_{716}
b_{99}	b_{592}	b_{718}
b_{100}	b_{321}	b_{677}
b_{100}	b_{386}	$b_{691} + b_{694}$
b_{100}	b_{582}	b_{718}
b_{100}	b_{591}	b_{718}
b_{101}	b_{374}	$b_{691} + b_{695}$
b_{101}	b_{390}	$b_{691} + b_{695}$
b_{101}	b_{403}	$b_{691} + b_{695}$
b_{101}	b_{510}	$b_{710} + 2b_{711} + b_{714}$
b_{101}	b_{537}	b_{717}
b_{101}	b_{541}	b_{717}
b_{101}	b_{544}	b_{717}
b_{101}	b_{547}	$b_{715} + b_{716}$
b_{101}	b_{550}	$b_{715} + b_{716}$
b_{101}	b_{553}	$b_{715} + b_{716}$
b_{101}	b_{581}	b_{718}
b_{101}	b_{586}	b_{718}
b_{101}	b_{590}	b_{718}
b_{102}	b_{374}	b_{694}
b_{102}	b_{403}	b_{694}
b_{102}	b_{510}	$b_{711} + b_{712} + b_{713}$
b_{102}	b_{537}	$b_{715} + b_{716}$
b_{102}	b_{547}	$b_{716} + b_{717}$
b_{102}	b_{550}	$b_{715} + b_{717}$
b_{102}	b_{552}	$b_{715} + b_{716}$
b_{102}	b_{578}	b_{718}
b_{102}	b_{581}	b_{718}
b_{102}	b_{585}	b_{718}
b_{102}	b_{589}	b_{718}
b_{103}	b_{539}	b_{716}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{103}	b_{579}	b_{718}
b_{104}	b_{374}	b_{691}
b_{104}	b_{403}	b_{695}
b_{104}	b_{537}	b_{717}
b_{104}	b_{578}	b_{718}
b_{105}	b_{539}	b_{715}
b_{105}	b_{587}	b_{718}
b_{106}	b_{546}	$b_{716} + b_{717}$
b_{106}	b_{567}	b_{718}
b_{106}	b_{592}	b_{718}
b_{107}	b_{321}	b_{687}
b_{107}	b_{386}	b_{694}
b_{107}	b_{591}	b_{718}
b_{109}	b_{359}	b_{677}
b_{109}	b_{383}	$b_{691} + b_{694}$
b_{109}	b_{561}	b_{718}
b_{109}	b_{574}	b_{718}
b_{110}	b_{359}	b_{678}
b_{110}	b_{383}	b_{694}
b_{110}	b_{574}	b_{718}
b_{111}	b_{165}	b_{554}
b_{111}	b_{321}	b_{682}
b_{111}	b_{386}	b_{699}
b_{111}	b_{390}	$2b_{691}$
b_{111}	b_{442}	b_{704}
b_{111}	b_{455}	b_{709}
b_{111}	b_{483}	b_{714}
b_{111}	b_{508}	b_{713}
b_{111}	b_{533}	b_{716}
b_{111}	b_{551}	b_{717}
b_{111}	b_{575}	b_{718}
b_{112}	b_{136}	b_{583}
b_{112}	b_{359}	b_{676}
b_{112}	b_{383}	b_{693}
b_{112}	b_{403}	$2b_{695}$
b_{112}	b_{431}	b_{703}
b_{112}	b_{437}	b_{706}
b_{112}	b_{485}	b_{712}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{112}	b_{489}	b_{710}
b_{112}	b_{529}	b_{717}
b_{112}	b_{531}	b_{715}
b_{112}	b_{571}	b_{718}
b_{113}	b_{359}	b_{684}
b_{113}	b_{383}	$b_{694} + b_{696}$
b_{113}	b_{539}	$b_{715} + b_{716}$
b_{113}	b_{559}	b_{718}
b_{113}	b_{574}	b_{718}
b_{113}	b_{587}	b_{718}
b_{114}	b_{374}	b_{694}
b_{114}	b_{390}	b_{694}
b_{114}	b_{510}	$b_{711} + b_{712} + b_{713}$
b_{114}	b_{535}	$b_{715} + b_{716}$
b_{114}	b_{544}	$b_{715} + b_{716}$
b_{114}	b_{547}	$b_{715} + b_{717}$
b_{114}	b_{553}	$b_{716} + b_{717}$
b_{114}	b_{565}	b_{718}
b_{114}	b_{568}	b_{718}
b_{114}	b_{577}	b_{718}
b_{114}	b_{586}	b_{718}
b_{115}	b_{510}	$b_{711} + b_{712} + b_{713}$
b_{115}	b_{535}	$b_{715} + b_{717}$
b_{115}	b_{547}	$b_{715} + b_{716}$
b_{115}	b_{552}	$b_{716} + b_{717}$
b_{115}	b_{568}	b_{718}
b_{115}	b_{576}	b_{718}
b_{115}	b_{585}	b_{718}
b_{116}	b_{321}	b_{689}
b_{116}	b_{386}	b_{696}
b_{116}	b_{546}	$b_{715} + b_{717}$
b_{116}	b_{567}	b_{718}
b_{116}	b_{584}	b_{718}
b_{117}	b_{136}	b_{583}
b_{117}	b_{359}	b_{675}
b_{117}	b_{383}	b_{692}
b_{117}	b_{419}	b_{702}
b_{117}	b_{437}	b_{705}

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{117}	b_{474}	b_{711}
b_{117}	b_{489}	b_{710}
b_{117}	b_{522}	b_{716}
b_{117}	b_{523}	b_{715}
b_{117}	b_{566}	b_{718}
b_{118}	b_{321}	b_{685}
b_{118}	b_{386}	b_{691}
b_{118}	b_{582}	b_{718}
b_{119}	b_{359}	b_{680}
b_{119}	b_{383}	$b_{694} + b_{695}$
b_{119}	b_{557}	b_{718}
b_{119}	b_{574}	b_{718}
b_{120}	b_{546}	b_{715}
b_{120}	b_{567}	b_{718}
b_{121}	b_{321}	b_{688}
b_{121}	b_{359}	b_{674}
b_{122}	b_{359}	b_{683}
b_{122}	b_{383}	b_{696}
b_{122}	b_{539}	$b_{716} + b_{717}$
b_{122}	b_{559}	b_{718}
b_{122}	b_{579}	b_{718}
b_{124}	b_{374}	b_{695}
b_{124}	b_{390}	b_{691}
b_{124}	b_{544}	b_{717}
b_{124}	b_{565}	b_{718}
b_{125}	b_{359}	b_{679}
b_{125}	b_{383}	b_{695}
b_{125}	b_{557}	b_{718}
b_{126}	b_{165}	b_{554}
b_{126}	b_{321}	b_{681}
b_{126}	b_{386}	b_{698}
b_{126}	b_{424}	b_{702}
b_{126}	b_{455}	b_{708}
b_{126}	b_{483}	b_{714}
b_{126}	b_{493}	b_{711}
b_{126}	b_{514}	b_{716}
b_{126}	b_{543}	b_{715}
b_{126}	b_{564}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{127}	b_{546}	b_{718}
b_{128}	b_{321}	b_{694}
b_{129}	b_{510}	$b_{715} + b_{716}$
b_{129}	b_{541}	b_{718}
b_{129}	b_{550}	b_{718}
b_{129}	b_{553}	b_{718}
b_{130}	b_{510}	$b_{716} + b_{717}$
b_{130}	b_{550}	b_{718}
b_{130}	b_{552}	b_{718}
b_{131}	b_{403}	b_{703}
b_{131}	b_{457}	b_{712}
b_{131}	b_{505}	b_{717}
b_{131}	b_{507}	b_{715}
b_{131}	b_{549}	b_{718}
b_{132}	b_{539}	b_{718}
b_{133}	b_{510}	$b_{715} + b_{716}$
b_{133}	b_{544}	b_{718}
b_{133}	b_{547}	b_{718}
b_{133}	b_{553}	b_{718}
b_{134}	b_{510}	$b_{715} + b_{717}$
b_{134}	b_{547}	b_{718}
b_{134}	b_{552}	b_{718}
b_{135}	b_{321}	b_{696}
b_{135}	b_{546}	b_{718}
b_{136}	b_{136}	$b_{602} + b_{607}$
b_{136}	b_{189}	$b_{630} + b_{652}$
b_{136}	b_{233}	b_{671}
b_{136}	b_{240}	b_{653}
b_{136}	b_{281}	b_{688}
b_{136}	b_{302}	b_{683}
b_{136}	b_{306}	b_{675}
b_{136}	b_{309}	$b_{695} + b_{696}$
b_{136}	b_{330}	b_{694}
b_{136}	b_{338}	b_{696}
b_{136}	b_{357}	b_{692}
b_{136}	b_{396}	b_{702}
b_{136}	b_{409}	b_{705}
b_{136}	b_{451}	b_{711}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{136}	b_{453}	$b_{713} + b_{714}$
b_{136}	b_{461}	b_{710}
b_{136}	b_{462}	b_{710}
b_{136}	b_{501}	b_{716}
b_{136}	b_{502}	b_{715}
b_{136}	b_{503}	b_{715}
b_{136}	b_{504}	$b_{716} + b_{717}$
b_{136}	b_{545}	b_{718}
b_{136}	b_{548}	b_{718}
b_{137}	b_{321}	b_{691}
b_{138}	b_{510}	$b_{715} + b_{716}$
b_{138}	b_{537}	b_{718}
b_{138}	b_{547}	b_{718}
b_{138}	b_{550}	b_{718}
b_{139}	b_{321}	b_{695}
b_{140}	b_{539}	b_{718}
b_{141}	b_{537}	b_{718}
b_{142}	b_{510}	$b_{715} + b_{717}$
b_{142}	b_{535}	b_{718}
b_{142}	b_{553}	b_{718}
b_{143}	b_{510}	$b_{715} + b_{716}$
b_{143}	b_{535}	b_{718}
b_{143}	b_{552}	b_{718}
b_{144}	b_{321}	b_{699}
b_{144}	b_{386}	$b_{704} + b_{709}$
b_{144}	b_{442}	b_{713}
b_{144}	b_{455}	$b_{713} + b_{714}$
b_{144}	b_{483}	b_{716}
b_{144}	b_{508}	$b_{716} + b_{717}$
b_{144}	b_{533}	b_{718}
b_{144}	b_{551}	b_{718}
b_{145}	b_{359}	b_{694}
b_{147}	b_{390}	b_{704}
b_{147}	b_{459}	b_{713}
b_{147}	b_{487}	b_{716}
b_{147}	b_{509}	b_{717}
b_{147}	b_{534}	b_{718}
b_{148}	b_{359}	b_{693}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{148}	b_{383}	$b_{703} + b_{706}$
b_{148}	b_{431}	b_{712}
b_{148}	b_{437}	$b_{710} + b_{712}$
b_{148}	b_{485}	$b_{715} + b_{717}$
b_{148}	b_{489}	b_{715}
b_{148}	b_{529}	b_{718}
b_{148}	b_{531}	b_{718}
b_{149}	b_{478}	b_{716}
b_{149}	b_{490}	b_{715}
b_{149}	b_{524}	b_{718}
b_{149}	b_{526}	b_{718}
b_{150}	b_{374}	b_{704}
b_{150}	b_{425}	b_{713}
b_{150}	b_{476}	b_{717}
b_{150}	b_{477}	b_{716}
b_{150}	b_{525}	b_{718}
b_{151}	b_{510}	$b_{716} + b_{717}$
b_{151}	b_{535}	b_{718}
b_{151}	b_{547}	b_{718}
b_{152}	b_{546}	b_{718}
b_{153}	b_{359}	b_{692}
b_{153}	b_{383}	$b_{702} + b_{705}$
b_{153}	b_{419}	b_{711}
b_{153}	b_{437}	$b_{710} + b_{711}$
b_{153}	b_{474}	$b_{715} + b_{716}$
b_{153}	b_{489}	b_{715}
b_{153}	b_{522}	b_{718}
b_{153}	b_{523}	b_{718}
b_{154}	b_{544}	b_{718}
b_{155}	b_{321}	b_{698}
b_{155}	b_{386}	$b_{702} + b_{708}$
b_{155}	b_{424}	b_{711}
b_{155}	b_{455}	$b_{711} + b_{714}$
b_{155}	b_{483}	b_{716}
b_{155}	b_{493}	$b_{715} + b_{716}$
b_{155}	b_{514}	b_{718}
b_{155}	b_{543}	b_{718}
b_{156}	b_{321}	b_{701}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{156}	b_{386}	$b_{707} + b_{708} + b_{709}$
b_{156}	b_{424}	$b_{713} + b_{714}$
b_{156}	b_{442}	$b_{711} + b_{714}$
b_{156}	b_{455}	$b_{711} + b_{712} + b_{713}$
b_{156}	b_{481}	b_{716}
b_{156}	b_{483}	$b_{715} + b_{717}$
b_{156}	b_{493}	$b_{716} + b_{717}$
b_{156}	b_{508}	$b_{715} + b_{716}$
b_{156}	b_{514}	b_{718}
b_{156}	b_{533}	b_{718}
b_{156}	b_{542}	b_{718}
b_{157}	b_{532}	b_{718}
b_{158}	b_{359}	b_{691}
b_{159}	b_{359}	b_{697}
b_{159}	b_{383}	$b_{705} + b_{706} + b_{707}$
b_{159}	b_{419}	$b_{710} + b_{712}$
b_{159}	b_{431}	$b_{710} + b_{711}$
b_{159}	b_{437}	$b_{711} + b_{712} + b_{713}$
b_{159}	b_{465}	b_{715}
b_{159}	b_{474}	$b_{715} + b_{717}$
b_{159}	b_{485}	$b_{715} + b_{716}$
b_{159}	b_{489}	$b_{716} + b_{717}$
b_{159}	b_{516}	b_{718}
b_{159}	b_{523}	b_{718}
b_{159}	b_{531}	b_{718}
b_{160}	b_{359}	b_{696}
b_{160}	b_{539}	b_{718}
b_{161}	b_{374}	$b_{705} + b_{708}$
b_{161}	b_{425}	$b_{710} + b_{711}$
b_{161}	b_{446}	$b_{711} + b_{714}$
b_{161}	b_{467}	b_{716}
b_{161}	b_{477}	b_{715}
b_{161}	b_{494}	$b_{715} + b_{716}$
b_{161}	b_{515}	b_{718}
b_{161}	b_{538}	b_{718}
b_{162}	b_{359}	b_{695}
b_{163}	b_{482}	b_{716}
b_{163}	b_{500}	b_{715}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{163}	b_{513}	b_{718}
b_{163}	b_{521}	b_{718}
b_{164}	b_{374}	b_{703}
b_{164}	b_{446}	b_{712}
b_{164}	b_{467}	b_{715}
b_{164}	b_{499}	b_{717}
b_{164}	b_{520}	b_{718}
b_{165}	b_{165}	$b_{593} + b_{608}$
b_{165}	b_{189}	$b_{629} + b_{638}$
b_{165}	b_{233}	b_{654}
b_{165}	b_{256}	b_{660}
b_{165}	b_{285}	b_{674}
b_{165}	b_{298}	b_{681}
b_{165}	b_{303}	b_{689}
b_{165}	b_{339}	b_{696}
b_{165}	b_{340}	$b_{691} + b_{696}$
b_{165}	b_{341}	b_{694}
b_{165}	b_{350}	b_{698}
b_{165}	b_{373}	b_{702}
b_{165}	b_{404}	b_{708}
b_{165}	b_{430}	b_{714}
b_{165}	b_{432}	b_{714}
b_{165}	b_{445}	b_{711}
b_{165}	b_{449}	$b_{710} + b_{712}$
b_{165}	b_{464}	b_{716}
b_{165}	b_{466}	b_{716}
b_{165}	b_{472}	$b_{715} + b_{717}$
b_{165}	b_{498}	b_{715}
b_{165}	b_{511}	b_{718}
b_{165}	b_{519}	b_{718}
b_{166}	b_{510}	b_{718}
b_{167}	b_{510}	b_{718}
b_{168}	b_{321}	b_{704}
b_{168}	b_{386}	b_{713}
b_{168}	b_{442}	b_{717}
b_{168}	b_{455}	b_{716}
b_{168}	b_{508}	b_{718}
b_{169}	b_{510}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{170}	b_{403}	b_{712}
b_{170}	b_{457}	$b_{715} + b_{717}$
b_{170}	b_{505}	b_{718}
b_{170}	b_{507}	b_{718}
b_{171}	b_{453}	b_{716}
b_{171}	b_{462}	b_{715}
b_{171}	b_{503}	b_{718}
b_{171}	b_{504}	b_{718}
b_{172}	b_{510}	b_{718}
b_{174}	b_{189}	b_{671}
b_{174}	b_{233}	b_{688}
b_{174}	b_{302}	b_{696}
b_{174}	b_{306}	b_{692}
b_{174}	b_{357}	$b_{702} + b_{705}$
b_{174}	b_{396}	b_{711}
b_{174}	b_{409}	$b_{710} + b_{711}$
b_{174}	b_{451}	$b_{715} + b_{716}$
b_{174}	b_{453}	$b_{716} + b_{717}$
b_{174}	b_{461}	b_{715}
b_{174}	b_{501}	b_{718}
b_{174}	b_{502}	b_{718}
b_{174}	b_{504}	b_{718}
b_{176}	b_{321}	b_{702}
b_{176}	b_{386}	b_{711}
b_{176}	b_{424}	b_{715}
b_{176}	b_{455}	b_{716}
b_{176}	b_{493}	b_{718}
b_{177}	b_{321}	b_{707}
b_{177}	b_{386}	$b_{711} + b_{712} + b_{713}$
b_{177}	b_{424}	$b_{716} + b_{717}$
b_{177}	b_{442}	$b_{715} + b_{716}$
b_{177}	b_{455}	$b_{715} + b_{717}$
b_{177}	b_{481}	b_{718}
b_{177}	b_{493}	b_{718}
b_{177}	b_{508}	b_{718}
b_{179}	b_{403}	$b_{710} + b_{711}$
b_{179}	b_{444}	b_{715}
b_{179}	b_{457}	$b_{715} + b_{716}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{179}	b_{495}	b_{718}
b_{179}	b_{507}	b_{718}
b_{181}	b_{374}	$b_{711} + b_{714}$
b_{181}	b_{425}	$b_{715} + b_{716}$
b_{181}	b_{446}	b_{716}
b_{181}	b_{477}	b_{718}
b_{181}	b_{494}	b_{718}
b_{183}	b_{439}	b_{717}
b_{183}	b_{491}	b_{718}
b_{184}	b_{510}	b_{718}
b_{185}	b_{390}	b_{713}
b_{185}	b_{459}	$b_{716} + b_{717}$
b_{185}	b_{487}	b_{718}
b_{185}	b_{509}	b_{718}
b_{186}	b_{321}	b_{709}
b_{186}	b_{386}	$b_{713} + b_{714}$
b_{186}	b_{442}	b_{716}
b_{186}	b_{455}	$b_{716} + b_{717}$
b_{186}	b_{483}	b_{718}
b_{186}	b_{508}	b_{718}
b_{188}	b_{359}	b_{706}
b_{188}	b_{383}	$b_{710} + b_{712}$
b_{188}	b_{431}	b_{715}
b_{188}	b_{437}	$b_{715} + b_{717}$
b_{188}	b_{485}	b_{718}
b_{188}	b_{489}	b_{718}
b_{189}	b_{200}	b_{654}
b_{189}	b_{202}	$b_{653} + b_{654} + b_{660} + b_{671}$
b_{189}	b_{217}	b_{688}
b_{189}	b_{223}	b_{688}
b_{189}	b_{240}	$b_{679} + b_{680} + b_{683} + b_{684}$
b_{189}	b_{249}	b_{674}
b_{189}	b_{253}	b_{674}
b_{189}	b_{256}	$b_{677} + b_{684} + b_{685} + b_{689}$
b_{189}	b_{265}	$b_{695} + b_{696}$
b_{189}	b_{267}	b_{694}
b_{189}	b_{269}	b_{696}
b_{189}	b_{276}	$b_{694} + b_{696}$

continued on next page...

TABLE 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{189}	b_{292}	$b_{694} + b_{695}$
b_{189}	b_{293}	$b_{694} + b_{696}$
b_{189}	b_{301}	b_{696}
b_{189}	b_{304}	b_{694}
b_{189}	b_{305}	$b_{691} + b_{694}$
b_{189}	b_{307}	$b_{691} + b_{696}$
b_{189}	b_{324}	b_{702}
b_{189}	b_{356}	$b_{705} + b_{708}$
b_{189}	b_{384}	b_{711}
b_{189}	b_{385}	$b_{710} + b_{712}$
b_{189}	b_{387}	$b_{710} + b_{711}$
b_{189}	b_{405}	$b_{711} + b_{714}$
b_{189}	b_{406}	$b_{713} + b_{714}$
b_{189}	b_{407}	$b_{711} + b_{712} + b_{713}$
b_{189}	b_{433}	b_{716}
b_{189}	b_{434}	b_{716}
b_{189}	b_{435}	$b_{715} + b_{717}$
b_{189}	b_{438}	b_{715}
b_{189}	b_{440}	b_{715}
b_{189}	b_{456}	$b_{715} + b_{716}$
b_{189}	b_{458}	$b_{716} + b_{717}$
b_{189}	b_{484}	b_{718}
b_{189}	b_{486}	b_{718}
b_{189}	b_{506}	b_{718}
b_{190}	b_{359}	b_{703}
b_{190}	b_{383}	b_{712}
b_{190}	b_{431}	b_{717}
b_{190}	b_{437}	b_{715}
b_{190}	b_{485}	b_{718}
b_{191}	b_{460}	b_{717}
b_{191}	b_{488}	b_{718}
b_{192}	b_{321}	b_{703}
b_{192}	b_{386}	b_{712}
b_{192}	b_{424}	b_{715}
b_{192}	b_{442}	b_{717}
b_{192}	b_{481}	b_{718}
b_{193}	b_{478}	b_{718}
b_{194}	b_{374}	b_{713}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{194}	b_{425}	$b_{716} + b_{717}$
b_{194}	b_{476}	b_{718}
b_{194}	b_{477}	b_{718}
b_{195}	b_{490}	b_{718}
b_{196}	b_{359}	b_{705}
b_{196}	b_{383}	$b_{710} + b_{711}$
b_{196}	b_{419}	b_{715}
b_{196}	b_{437}	$b_{715} + b_{716}$
b_{196}	b_{474}	b_{718}
b_{196}	b_{489}	b_{718}
b_{197}	b_{359}	b_{702}
b_{197}	b_{383}	b_{711}
b_{197}	b_{419}	b_{716}
b_{197}	b_{437}	b_{715}
b_{197}	b_{474}	b_{718}
b_{198}	b_{500}	b_{718}
b_{199}	b_{374}	b_{712}
b_{199}	b_{446}	$b_{715} + b_{717}$
b_{199}	b_{467}	b_{718}
b_{199}	b_{499}	b_{718}
b_{200}	b_{233}	b_{674}
b_{200}	b_{298}	b_{698}
b_{200}	b_{303}	b_{696}
b_{200}	b_{350}	$b_{702} + b_{708}$
b_{200}	b_{373}	b_{711}
b_{200}	b_{404}	$b_{711} + b_{714}$
b_{200}	b_{432}	b_{716}
b_{200}	b_{445}	$b_{715} + b_{716}$
b_{200}	b_{449}	$b_{715} + b_{717}$
b_{200}	b_{466}	b_{718}
b_{200}	b_{472}	b_{718}
b_{200}	b_{498}	b_{718}
b_{201}	b_{390}	$b_{711} + b_{714}$
b_{201}	b_{428}	b_{716}
b_{201}	b_{459}	$b_{715} + b_{716}$
b_{201}	b_{487}	b_{718}
b_{201}	b_{497}	b_{718}
b_{202}	b_{233}	$b_{674} + b_{688}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{202}	b_{420}	$b_{715} + b_{716}$
b_{202}	b_{422}	$b_{715} + b_{717}$
b_{202}	b_{447}	$b_{716} + b_{717}$
b_{202}	b_{448}	$b_{715} + b_{716}$
b_{202}	b_{468}	b_{718}
b_{202}	b_{470}	b_{718}
b_{202}	b_{475}	b_{718}
b_{202}	b_{496}	b_{718}
b_{203}	b_{359}	b_{707}
b_{203}	b_{383}	$b_{711} + b_{712} + b_{713}$
b_{203}	b_{419}	$b_{715} + b_{717}$
b_{203}	b_{431}	$b_{715} + b_{716}$
b_{203}	b_{437}	$b_{716} + b_{717}$
b_{203}	b_{465}	b_{718}
b_{203}	b_{474}	b_{718}
b_{203}	b_{485}	b_{718}
b_{204}	b_{374}	$b_{710} + b_{711}$
b_{204}	b_{425}	b_{715}
b_{204}	b_{446}	$b_{715} + b_{716}$
b_{204}	b_{467}	b_{718}
b_{204}	b_{494}	b_{718}
b_{205}	b_{321}	b_{708}
b_{205}	b_{386}	$b_{711} + b_{714}$
b_{205}	b_{424}	b_{716}
b_{205}	b_{455}	$b_{715} + b_{716}$
b_{205}	b_{483}	b_{718}
b_{205}	b_{493}	b_{718}
b_{206}	b_{482}	b_{718}
b_{207}	b_{359}	b_{704}
b_{207}	b_{383}	b_{713}
b_{207}	b_{419}	b_{716}
b_{207}	b_{431}	b_{717}
b_{207}	b_{465}	b_{718}
b_{208}	b_{430}	b_{716}
b_{208}	b_{449}	b_{715}
b_{208}	b_{464}	b_{718}
b_{208}	b_{472}	b_{718}
b_{210}	b_{390}	b_{717}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{210}	b_{459}	b_{718}
b_{211}	b_{321}	b_{713}
b_{211}	b_{386}	$b_{716} + b_{717}$
b_{211}	b_{442}	b_{718}
b_{211}	b_{455}	b_{718}
b_{212}	b_{403}	b_{715}
b_{212}	b_{457}	b_{718}
b_{213}	b_{240}	$b_{694} + b_{695}$
b_{213}	b_{256}	$b_{691} + b_{696}$
b_{213}	b_{356}	$b_{711} + b_{714}$
b_{213}	b_{387}	$b_{715} + b_{716}$
b_{213}	b_{405}	b_{716}
b_{213}	b_{406}	b_{716}
b_{213}	b_{407}	$b_{715} + b_{717}$
b_{213}	b_{440}	b_{718}
b_{213}	b_{456}	b_{718}
b_{213}	b_{458}	b_{718}
b_{214}	b_{403}	b_{717}
b_{214}	b_{457}	b_{718}
b_{215}	b_{453}	b_{718}
b_{216}	b_{462}	b_{718}
b_{217}	b_{306}	b_{705}
b_{217}	b_{357}	$b_{710} + b_{711}$
b_{217}	b_{396}	b_{715}
b_{217}	b_{409}	$b_{715} + b_{716}$
b_{217}	b_{451}	b_{718}
b_{217}	b_{461}	b_{718}
b_{218}	b_{306}	b_{702}
b_{218}	b_{357}	b_{711}
b_{218}	b_{396}	b_{716}
b_{218}	b_{409}	b_{715}
b_{218}	b_{451}	b_{718}
b_{218}	b_{453}	b_{718}
b_{220}	b_{374}	b_{717}
b_{220}	b_{446}	b_{718}
b_{221}	b_{298}	b_{702}
b_{221}	b_{350}	b_{711}
b_{221}	b_{373}	b_{715}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{221}	b_{404}	b_{716}
b_{221}	b_{445}	b_{718}
b_{221}	b_{449}	b_{718}
b_{222}	b_{390}	$b_{715} + b_{716}$
b_{222}	b_{428}	b_{718}
b_{222}	b_{459}	b_{718}
b_{223}	b_{447}	b_{718}
b_{223}	b_{448}	b_{718}
b_{224}	b_{403}	$b_{715} + b_{716}$
b_{224}	b_{444}	b_{718}
b_{224}	b_{457}	b_{718}
b_{225}	b_{374}	$b_{715} + b_{716}$
b_{225}	b_{425}	b_{718}
b_{225}	b_{446}	b_{718}
b_{226}	b_{321}	b_{711}
b_{226}	b_{386}	$b_{715} + b_{716}$
b_{226}	b_{424}	b_{718}
b_{226}	b_{455}	b_{718}
b_{227}	b_{403}	b_{717}
b_{227}	b_{444}	b_{718}
b_{228}	b_{439}	b_{718}
b_{230}	b_{359}	b_{710}
b_{230}	b_{383}	b_{715}
b_{230}	b_{437}	b_{718}
b_{231}	b_{460}	b_{718}
b_{232}	b_{390}	b_{716}
b_{232}	b_{459}	b_{718}
b_{233}	b_{240}	$b_{694} + b_{696}$
b_{233}	b_{256}	$b_{694} + b_{696}$
b_{233}	b_{324}	b_{711}
b_{233}	b_{384}	$b_{715} + b_{716}$
b_{233}	b_{385}	$b_{715} + b_{717}$
b_{233}	b_{406}	$b_{716} + b_{717}$
b_{233}	b_{407}	$b_{715} + b_{716}$
b_{233}	b_{434}	b_{718}
b_{233}	b_{435}	b_{718}
b_{233}	b_{438}	b_{718}
b_{233}	b_{458}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{234}	b_{359}	b_{712}
b_{234}	b_{383}	$b_{715} + b_{717}$
b_{234}	b_{431}	b_{718}
b_{234}	b_{437}	b_{718}
b_{235}	b_{240}	$b_{695} + b_{696}$
b_{235}	b_{256}	$b_{691} + b_{694}$
b_{235}	b_{356}	$b_{710} + b_{711}$
b_{235}	b_{385}	b_{715}
b_{235}	b_{387}	b_{715}
b_{235}	b_{405}	$b_{715} + b_{716}$
b_{235}	b_{407}	$b_{716} + b_{717}$
b_{235}	b_{433}	b_{718}
b_{235}	b_{435}	b_{718}
b_{235}	b_{456}	b_{718}
b_{236}	b_{321}	b_{714}
b_{236}	b_{386}	b_{716}
b_{236}	b_{455}	b_{718}
b_{238}	b_{321}	b_{712}
b_{238}	b_{386}	$b_{715} + b_{717}$
b_{238}	b_{424}	b_{718}
b_{238}	b_{442}	b_{718}
b_{239}	b_{390}	b_{717}
b_{239}	b_{428}	b_{718}
b_{240}	b_{240}	$b_{691} + 2b_{694} + 2b_{695} + b_{696}$
b_{240}	b_{302}	$b_{705} + b_{706} + b_{707}$
b_{240}	b_{309}	$b_{710} + b_{711}$
b_{240}	b_{330}	$b_{711} + b_{712} + b_{713}$
b_{240}	b_{338}	$b_{710} + b_{712}$
b_{240}	b_{349}	$b_{711} + b_{712} + b_{713}$
b_{240}	b_{353}	$b_{710} + b_{711}$
b_{240}	b_{372}	b_{715}
b_{240}	b_{375}	b_{715}
b_{240}	b_{376}	$b_{716} + b_{717}$
b_{240}	b_{388}	$b_{715} + b_{716}$
b_{240}	b_{400}	$b_{715} + b_{717}$
b_{240}	b_{401}	$b_{715} + b_{716}$
b_{240}	b_{411}	$b_{716} + b_{717}$
b_{240}	b_{426}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{240}	b_{427}	b_{718}
b_{240}	b_{441}	b_{718}
b_{240}	b_{454}	b_{718}
b_{242}	b_{374}	b_{716}
b_{242}	b_{425}	b_{718}
b_{243}	b_{374}	b_{717}
b_{243}	b_{425}	b_{718}
b_{244}	b_{420}	b_{718}
b_{244}	b_{422}	b_{718}
b_{245}	b_{359}	b_{711}
b_{245}	b_{383}	$b_{715} + b_{716}$
b_{245}	b_{419}	b_{718}
b_{245}	b_{437}	b_{718}
b_{246}	b_{420}	b_{718}
b_{246}	b_{436}	b_{718}
b_{247}	b_{449}	b_{718}
b_{249}	b_{422}	b_{718}
b_{249}	b_{448}	b_{718}
b_{251}	b_{420}	b_{718}
b_{251}	b_{447}	b_{718}
b_{252}	b_{374}	b_{715}
b_{252}	b_{446}	b_{718}
b_{253}	b_{298}	b_{708}
b_{253}	b_{350}	$b_{711} + b_{714}$
b_{253}	b_{373}	b_{716}
b_{253}	b_{404}	$b_{715} + b_{716}$
b_{253}	b_{432}	b_{718}
b_{253}	b_{445}	b_{718}
b_{254}	b_{359}	b_{713}
b_{254}	b_{383}	$b_{716} + b_{717}$
b_{254}	b_{419}	b_{718}
b_{254}	b_{431}	b_{718}
b_{255}	b_{430}	b_{718}
b_{256}	b_{256}	$2b_{691} + 2b_{694} + b_{695} + b_{696}$
b_{256}	b_{303}	$b_{707} + b_{708} + b_{709}$
b_{256}	b_{325}	$b_{711} + b_{714}$
b_{256}	b_{339}	$b_{713} + b_{714}$
b_{256}	b_{340}	$b_{711} + b_{714}$

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{256}	b_{341}	$b_{711} + b_{712} + b_{713}$
b_{256}	b_{355}	$b_{711} + b_{712} + b_{713}$
b_{256}	b_{361}	$b_{715} + b_{716}$
b_{256}	b_{367}	b_{716}
b_{256}	b_{371}	b_{716}
b_{256}	b_{377}	$b_{715} + b_{717}$
b_{256}	b_{391}	$b_{716} + b_{717}$
b_{256}	b_{392}	$b_{715} + b_{717}$
b_{256}	b_{402}	$b_{715} + b_{716}$
b_{256}	b_{412}	b_{718}
b_{256}	b_{414}	b_{718}
b_{256}	b_{429}	b_{718}
b_{256}	b_{443}	b_{718}
b_{258}	b_{306}	b_{710}
b_{258}	b_{357}	b_{715}
b_{258}	b_{409}	b_{718}
b_{260}	b_{390}	b_{718}
b_{261}	b_{406}	b_{718}
b_{261}	b_{407}	b_{718}
b_{262}	b_{403}	b_{718}
b_{263}	b_{356}	$b_{715} + b_{716}$
b_{263}	b_{387}	b_{718}
b_{263}	b_{405}	b_{718}
b_{263}	b_{407}	b_{718}
b_{264}	b_{321}	b_{716}
b_{264}	b_{386}	b_{718}
b_{265}	b_{302}	$b_{710} + b_{711}$
b_{265}	b_{309}	b_{715}
b_{265}	b_{330}	$b_{716} + b_{717}$
b_{265}	b_{338}	b_{715}
b_{265}	b_{349}	$b_{715} + b_{716}$
b_{265}	b_{400}	b_{718}
b_{265}	b_{401}	b_{718}
b_{265}	b_{411}	b_{718}
b_{267}	b_{309}	$b_{716} + b_{717}$
b_{267}	b_{330}	$b_{715} + b_{716}$
b_{267}	b_{397}	b_{718}
b_{267}	b_{399}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{267}	b_{401}	b_{718}
b_{268}	b_{306}	b_{711}
b_{268}	b_{357}	$b_{715} + b_{716}$
b_{268}	b_{396}	b_{718}
b_{268}	b_{409}	b_{718}
b_{269}	b_{309}	b_{715}
b_{269}	b_{397}	b_{718}
b_{269}	b_{408}	b_{718}
b_{273}	b_{374}	b_{718}
b_{274}	b_{298}	b_{711}
b_{274}	b_{350}	$b_{715} + b_{716}$
b_{274}	b_{373}	b_{718}
b_{274}	b_{404}	b_{718}
b_{275}	b_{403}	b_{718}
b_{276}	b_{303}	$b_{711} + b_{712} + b_{713}$
b_{276}	b_{325}	$b_{715} + b_{716}$
b_{276}	b_{339}	$b_{716} + b_{717}$
b_{276}	b_{341}	$b_{715} + b_{716}$
b_{276}	b_{355}	$b_{715} + b_{717}$
b_{276}	b_{371}	b_{718}
b_{276}	b_{391}	b_{718}
b_{276}	b_{392}	b_{718}
b_{276}	b_{402}	b_{718}
b_{277}	b_{321}	b_{717}
b_{277}	b_{386}	b_{718}
b_{278}	b_{302}	$b_{710} + b_{712}$
b_{278}	b_{349}	$b_{715} + b_{717}$
b_{278}	b_{353}	b_{715}
b_{278}	b_{388}	b_{718}
b_{278}	b_{411}	b_{718}
b_{279}	b_{356}	b_{716}
b_{279}	b_{387}	b_{718}
b_{281}	b_{324}	b_{715}
b_{281}	b_{384}	b_{718}
b_{281}	b_{385}	b_{718}
b_{282}	b_{359}	b_{715}
b_{282}	b_{383}	b_{718}
b_{284}	b_{385}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{284}	b_{407}	b_{718}
b_{285}	b_{324}	b_{716}
b_{285}	b_{384}	b_{718}
b_{285}	b_{406}	b_{718}
b_{286}	b_{356}	b_{715}
b_{286}	b_{405}	b_{718}
b_{287}	b_{298}	b_{714}
b_{287}	b_{350}	b_{716}
b_{287}	b_{404}	b_{718}
b_{288}	b_{359}	b_{717}
b_{288}	b_{383}	b_{718}
b_{290}	b_{303}	$b_{713} + b_{714}$
b_{290}	b_{325}	b_{716}
b_{290}	b_{355}	$b_{716} + b_{717}$
b_{290}	b_{377}	b_{718}
b_{290}	b_{402}	b_{718}
b_{291}	b_{390}	b_{718}
b_{292}	b_{309}	$b_{715} + b_{716}$
b_{292}	b_{330}	$b_{715} + b_{717}$
b_{292}	b_{375}	b_{718}
b_{292}	b_{376}	b_{718}
b_{292}	b_{401}	b_{718}
b_{293}	b_{302}	$b_{711} + b_{712} + b_{713}$
b_{293}	b_{330}	$b_{715} + b_{716}$
b_{293}	b_{338}	$b_{715} + b_{717}$
b_{293}	b_{349}	$b_{716} + b_{717}$
b_{293}	b_{353}	$b_{715} + b_{716}$
b_{293}	b_{372}	b_{718}
b_{293}	b_{376}	b_{718}
b_{293}	b_{388}	b_{718}
b_{293}	b_{400}	b_{718}
b_{294}	b_{374}	b_{718}
b_{295}	b_{321}	b_{715}
b_{295}	b_{386}	b_{718}
b_{298}	b_{315}	b_{716}
b_{298}	b_{346}	b_{715}
b_{298}	b_{369}	b_{718}
b_{300}	b_{359}	b_{716}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{300}	b_{383}	b_{718}
b_{301}	b_{340}	b_{716}
b_{301}	b_{368}	b_{718}
b_{301}	b_{382}	b_{718}
b_{302}	b_{308}	b_{715}
b_{302}	b_{319}	$b_{715} + b_{716}$
b_{302}	b_{331}	$b_{715} + b_{717}$
b_{302}	b_{347}	$b_{716} + b_{717}$
b_{302}	b_{366}	b_{718}
b_{302}	b_{370}	b_{718}
b_{302}	b_{381}	b_{718}
b_{303}	b_{307}	$b_{711} + b_{714}$
b_{303}	b_{317}	$b_{716} + b_{717}$
b_{303}	b_{328}	$b_{715} + b_{716}$
b_{303}	b_{342}	b_{716}
b_{303}	b_{348}	$b_{715} + b_{717}$
b_{303}	b_{364}	b_{718}
b_{303}	b_{380}	b_{718}
b_{303}	b_{394}	b_{718}
b_{304}	b_{340}	$b_{715} + b_{717}$
b_{304}	b_{341}	$b_{715} + b_{716}$
b_{304}	b_{361}	b_{718}
b_{304}	b_{368}	b_{718}
b_{304}	b_{393}	b_{718}
b_{305}	b_{340}	$b_{715} + b_{716}$
b_{305}	b_{341}	$b_{716} + b_{717}$
b_{305}	b_{361}	b_{718}
b_{305}	b_{367}	b_{718}
b_{305}	b_{392}	b_{718}
b_{306}	b_{310}	b_{715}
b_{306}	b_{323}	b_{716}
b_{306}	b_{362}	b_{718}
b_{307}	b_{339}	b_{716}
b_{307}	b_{340}	b_{716}
b_{307}	b_{341}	$b_{715} + b_{717}$
b_{307}	b_{355}	$b_{715} + b_{716}$
b_{307}	b_{361}	b_{718}
b_{307}	b_{377}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{307}	b_{391}	b_{718}
b_{308}	b_{349}	b_{718}
b_{309}	b_{318}	b_{718}
b_{309}	b_{322}	b_{718}
b_{309}	b_{344}	b_{718}
b_{310}	b_{357}	b_{718}
b_{314}	b_{356}	b_{718}
b_{315}	b_{350}	b_{718}
b_{317}	b_{325}	b_{718}
b_{317}	b_{355}	b_{718}
b_{318}	b_{330}	b_{718}
b_{319}	b_{330}	b_{718}
b_{319}	b_{338}	b_{718}
b_{319}	b_{349}	b_{718}
b_{320}	b_{330}	b_{718}
b_{321}	b_{333}	b_{718}
b_{323}	b_{357}	b_{718}
b_{324}	b_{335}	b_{718}
b_{324}	b_{354}	b_{718}
b_{325}	b_{348}	b_{718}
b_{326}	b_{341}	b_{718}
b_{327}	b_{341}	b_{718}
b_{328}	b_{339}	b_{718}
b_{328}	b_{341}	b_{718}
b_{328}	b_{355}	b_{718}
b_{330}	b_{343}	b_{718}
b_{331}	b_{349}	b_{718}
b_{331}	b_{353}	b_{718}
b_{332}	b_{356}	b_{718}
b_{336}	b_{359}	b_{718}
b_{338}	b_{347}	b_{718}
b_{339}	b_{348}	b_{718}
b_{340}	b_{351}	b_{718}
b_{340}	b_{352}	b_{718}
b_{340}	b_{358}	b_{718}
b_{341}	b_{358}	b_{718}
b_{342}	b_{355}	b_{718}
b_{346}	b_{350}	b_{718}

continued on next page...

Table 35. Multiplication table for E_6/P_4 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{347}	b_{353}	b_{718}

Table 36. Schubert classes for E_6/P_5

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_{215}	$(1,1,1,1,1,1)$
5	b_1	1	0	b_{214}	$(1,1,1,2,-1,2)$
45	b_2	2	0	b_{213}	$(1,3,3,-2,1,2)$
65	b_3	2	0	b_{212}	$(1,1,1,2,1,-2)$
245	b_4	3	0	b_{211}	$(1,-3,3,1,1,2)$
345	b_5	3	0	b_{210}	$(4,3,-3,1,1,2)$
465	b_6	3	0	b_{209}	$(1,3,3,-2,3,-2)$
1345	b_7	4	0	b_{208}	$(-4,3,1,1,1,2)$
2345	b_8	4	0	b_{207}	$(4,-3,-3,4,1,2)$
2465	b_9	4	0	b_{206}	$(1,-3,3,1,3,-2)$
3465	b_{10}	4	0	b_{205}	$(4,3,-3,1,3,-2)$
5465	b_{11}	4	0	b_{204}	$(1,3,3,1,-3,1)$
12345	b_{12}	5	0	b_{203}	$(-4,-3,1,4,1,2)$
13465	b_{13}	5	0	b_{202}	$(-4,3,1,1,3,-2)$
23465	b_{14}	5	0	b_{201}	$(4,-3,-3,4,3,-2)$
25465	b_{15}	5	0	b_{200}	$(1,-3,3,4,-3,1)$
35465	b_{16}	5	0	b_{199}	$(4,3,-3,4,-3,1)$
42345	b_{17}	5	0	b_{198}	$(4,1,1,-4,5,2)$
123465	b_{18}	6	0	b_{197}	$(-4,-3,1,4,3,-2)$
135465	b_{19}	6	0	b_{196}	$(-4,3,1,4,-3,1)$
142345	b_{20}	6	0	b_{195}	$(-4,1,5,-4,5,2)$
235465	b_{21}	6	0	b_{194}	$(4,-3,-3,7,-3,1)$
423465	b_{22}	6	0	b_{193}	$(4,1,1,-4,7,-2)$
425465	b_{23}	6	0	b_{192}	$(1,1,7,-4,1,1)$
435465	b_{24}	6	0	b_{191}	$(4,7,1,-4,1,1)$
542345	b_{25}	6	0	b_{190}	$(4,1,1,1,-5,7)$
1235465	b_{26}	7	0	b_{189}	$(-4,-3,1,7,-3,1)$
1423465	b_{27}	7	0	b_{188}	$(-4,1,5,-4,7,-2)$
1435465	b_{28}	7	0	b_{187}	$(-4,7,5,-4,1,1)$
1542345	b_{29}	7	0	b_{186}	$(-4,1,5,1,-5,7)$
2435465	b_{30}	7	1	b_{185}	$(4,-7,1,3,1,1)$
3142345	b_{31}	7	0	b_{184}	$(1,1,-5,1,5,2)$
3425465	b_{32}	7	1	b_{183}	$(8,1,-7,3,1,1)$

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Table 36. Schubert classes for E_6/P_5 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
4235465	b_{33}	7	1	b_{182}	$(4,4,4,-7,4,1)$
5423465	b_{34}	7	1	b_{181}	$(4,1,1,3,-7,5)$
6542345	b_{35}	7	1	b_{180}	$(4,1,1,1,2,-7)$
12435465	b_{36}	8	1	b_{179}	$(-4,-7,5,3,1,1)$
13425465	b_{37}	8	2	b_{178}	$(-8,1,1,3,1,1)$
14235465	b_{38}	8	1	b_{177}	$(-4,4,8,-7,4,1)$
15423465	b_{39}	8	1	b_{176}	$(-4,1,5,3,-7,5)$
16542345	b_{40}	8	1	b_{175}	$(-4,1,5,1,2,-7)$
24235465	b_{41}	8	1	b_{174}	$(4,-4,4,-3,4,1)$
31423465	b_{42}	8	0	b_{173}	$(1,1,-5,1,7,-2)$
31435465	b_{43}	8	0	b_{172}	$(1,7,-5,1,1,1)$
31542345	b_{44}	8	0	b_{171}	$(1,1,-5,6,-5,7)$
34235465	b_{45}	8	1	b_{170}	$(8,4,-4,-3,4,1)$
45423465	b_{46}	8	1	b_{169}	$(4,4,4,-3,-4,5)$
56542345	b_{47}	8	1	b_{168}	$(4,1,1,3,-2,-5)$
124235465	b_{48}	9	1	b_{167}	$(-4,-4,8,-3,4,1)$
134235465	b_{49}	9	2	b_{166}	$(-8,4,4,-3,4,1)$
145423465	b_{50}	9	1	b_{165}	$(-4,4,8,-3,-4,5)$
156542345	b_{51}	9	1	b_{164}	$(-4,1,5,3,-2,-5)$
231435465	b_{52}	9	1	b_{163}	$(1,-7,-5,8,1,1)$
234235465	b_{53}	9	1	b_{162}	$(8,-4,-4,1,4,1)$
245423465	b_{54}	9	1	b_{161}	$(4,-4,4,1,-4,5)$
314235465	b_{55}	9	2	b_{160}	$(4,4,-8,1,4,1)$
315423465	b_{56}	9	1	b_{159}	$(1,1,-5,8,-7,5)$
316542345	b_{57}	9	1	b_{158}	$(1,1,-5,6,2,-7)$
345423465	b_{58}	9	1	b_{157}	$(8,4,-4,1,-4,5)$
431542345	b_{59}	9	0	b_{156}	$(1,7,1,-6,1,7)$
456542345	b_{60}	9	1	b_{155}	$(4,4,4,-3,1,-5)$
1234235465	b_{61}	10	2	b_{154}	$(-8,-4,4,1,4,1)$
1245423465	b_{62}	10	1	b_{153}	$(-4,-4,8,1,-4,5)$
1314235465	b_{63}	10	2	b_{152}	$(-4,4,-4,1,4,1)$
1345423465	b_{64}	10	2	b_{151}	$(-8,4,4,1,-4,5)$
1456542345	b_{65}	10	1	b_{150}	$(-4,4,8,-3,1,-5)$
2314235465	b_{66}	10	2	b_{149}	$(4,-4,-8,5,4,1)$
2345423465	b_{67}	10	1	b_{148}	$(8,-4,-4,5,-4,5)$
2431542345	b_{68}	10	0	b_{147}	$(1,-7,1,1,1,7)$
2456542345	b_{69}	10	1	b_{146}	$(4,-4,4,1,1,-5)$
3145423465	b_{70}	10	2	b_{145}	$(4,4,-8,5,-4,5)$

continued on next page...

Table 36. Schubert classes for E_6/P_5 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
3156542345	b_{71}	10	1	b_{144}	$(1,1,-5,8,-2,-5)$
3456542345	b_{72}	10	1	b_{143}	$(8,4,-4,1,1,-5)$
4231435465	b_{73}	10	2	b_{142}	$(1,1,3,-8,9,1)$
4315423465	b_{74}	10	2	b_{141}	$(1,9,3,-8,1,5)$
4316542345	b_{75}	10	1	b_{140}	$(1,7,1,-6,8,-7)$
12314235465	b_{76}	11	2	b_{139}	$(-4,-4,-4,5,4,1)$
12345423465	b_{77}	11	2	b_{138}	$(-8,-4,4,5,-4,5)$
12456542345	b_{78}	11	1	b_{137}	$(-4,-4,8,1,1,-5)$
13145423465	b_{79}	11	2	b_{136}	$(-4,4,-4,5,-4,5)$
13456542345	b_{80}	11	2	b_{135}	$(-8,4,4,1,1,-5)$
23145423465	b_{81}	11	2	b_{134}	$(4,-4,-8,9,-4,5)$
23456542345	b_{82}	11	1	b_{133}	$(8,-4,-4,5,1,-5)$
24315423465	b_{83}	11	3	b_{132}	$(1,-9,3,1,1,5)$
24316542345	b_{84}	11	1	b_{131}	$(1,-7,1,1,8,-7)$
31456542345	b_{85}	11	2	b_{130}	$(4,4,-8,5,1,-5)$
34231435465	b_{86}	11	2	b_{129}	$(4,1,-3,-5,9,1)$
34315423465	b_{87}	11	2	b_{128}	$(4,9,-3,-5,1,5)$
42345423465	b_{88}	11	1	b_{127}	$(8,1,1,-5,1,5)$
43156542345	b_{89}	11	2	b_{126}	$(1,9,3,-8,6,-5)$
54231435465	b_{90}	11	3	b_{125}	$(1,1,3,1,-9,10)$
54316542345	b_{91}	11	2	b_{124}	$(1,7,1,2,-8,1)$
123145423465	b_{92}	12	2	b_{123}	$(-4,-4,-4,9,-4,5)$
123456542345	b_{93}	12	2	b_{122}	$(-8,-4,4,5,1,-5)$
131456542345	b_{94}	12	2	b_{121}	$(-4,4,-4,5,1,-5)$
134231435465	b_{95}	12	2	b_{120}	$(-4,1,1,-5,9,1)$
134315423465	b_{96}	12	2	b_{119}	$(-4,9,1,-5,1,5)$
142345423465	b_{97}	12	2	b_{118}	$(-8,1,9,-5,1,5)$
231456542345	b_{98}	12	2	b_{117}	$(4,-4,-8,9,1,-5)$
234315423465	b_{99}	12	3	b_{116}	$(4,-9,-3,4,1,5)$
243156542345	b_{100}	12	3	b_{115}	$(1,-9,3,1,6,-5)$
254316542345	b_{101}	12	2	b_{114}	$(1,-7,1,9,-8,1)$
343156542345	b_{102}	12	2	b_{113}	$(4,9,-3,-5,6,-5)$
354231435465	b_{103}	12	3	b_{112}	$(4,1,-3,4,-9,10)$
423145423465	b_{104}	12	3	b_{111}	$(4,5,1,-9,5,5)$
423456542345	b_{105}	12	1	b_{110}	$(8,1,1,-5,6,-5)$
454316542345	b_{106}	12	2	b_{109}	$(1,9,3,-2,-6,1)$
654231435465	b_{107}	12	4	b_{108}	$(1,1,3,1,1,-10)$
5423456542345	b_{108}	13	1	b_{107}	$(8,1,1,1,-6,1)$
continued on next page...					

TABLE 36. Schubert classes for E_6/P_5 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
2454316542345	b_{109}	13	3	b_{106}	$(1,-9,3,7,-6,1)$
3654231435465	b_{110}	13	4	b_{105}	$(4,1,-3,4,1,-10)$
1231456542345	b_{111}	13	2	b_{104}	$(-4,-4,-4,9,1,-5)$
1423456542345	b_{112}	13	2	b_{103}	$(-8,1,9,-5,6,-5)$
2343156542345	b_{113}	13	3	b_{102}	$(4,-9,-3,4,6,-5)$
4254316542345	b_{114}	13	3	b_{101}	$(1,2,10,-9,1,1)$
3454316542345	b_{115}	13	2	b_{100}	$(4,9,-3,1,-6,1)$
1343156542345	b_{116}	13	2	b_{99}	$(-4,9,1,-5,6,-5)$
4231456542345	b_{117}	13	3	b_{98}	$(4,5,1,-9,10,-5)$
1354231435465	b_{118}	13	3	b_{97}	$(-4,1,1,4,-9,10)$
1234315423465	b_{119}	13	3	b_{96}	$(-4,-9,1,4,1,5)$
3142345423465	b_{120}	13	3	b_{95}	$(1,1,-9,4,1,5)$
2423145423465	b_{121}	13	3	b_{94}	$(4,-5,1,-4,5,5)$
4354231435465	b_{122}	13	3	b_{93}	$(4,5,1,-4,-5,10)$
1423145423465	b_{123}	13	3	b_{92}	$(-4,5,5,-9,5,5)$
24254316542345	b_{124}	14	3	b_{91}	$(1,-2,10,-7,1,1)$
15423456542345	b_{125}	14	2	b_{90}	$(-8,1,9,1,-6,1)$
23454316542345	b_{126}	14	3	b_{89}	$(4,-9,-3,10,-6,1)$
13654231435465	b_{127}	14	4	b_{88}	$(-4,1,1,4,1,-10)$
12343156542345	b_{128}	14	3	b_{87}	$(-4,-9,1,4,6,-5)$
31423456542345	b_{129}	14	3	b_{86}	$(1,1,-9,4,6,-5)$
24231456542345	b_{130}	14	3	b_{85}	$(4,-5,1,-4,10,-5)$
34254316542345	b_{131}	14	4	b_{84}	$(11,2,-10,1,1,1)$
13454316542345	b_{132}	14	2	b_{83}	$(-4,9,1,1,-6,1)$
43654231435465	b_{133}	14	4	b_{82}	$(4,5,1,-4,5,-10)$
14231456542345	b_{134}	14	3	b_{81}	$(-4,5,5,-9,10,-5)$
24354231435465	b_{135}	14	3	b_{80}	$(4,-5,1,1,-5,10)$
12423145423465	b_{136}	14	3	b_{79}	$(-4,-5,5,-4,5,5)$
54231456542345	b_{137}	14	4	b_{78}	$(4,5,1,1,-10,5)$
14354231435465	b_{138}	14	3	b_{77}	$(-4,5,5,-4,-5,10)$
31423145423465	b_{139}	14	3	b_{76}	$(1,5,-5,-4,5,5)$
234254316542345	b_{140}	15	4	b_{75}	$(11,-2,-10,3,1,1)$
123454316542345	b_{141}	15	3	b_{74}	$(-4,-9,1,10,-6,1)$
315423456542345	b_{142}	15	3	b_{73}	$(1,1,-9,10,-6,1)$
243654231435465	b_{143}	15	4	b_{72}	$(4,-5,1,1,5,-10)$
423454316542345	b_{144}	15	4	b_{71}	$(4,1,7,-10,4,1)$
124231456542345	b_{145}	15	3	b_{70}	$(-4,-5,5,-4,10,-5)$
543654231435465	b_{146}	15	4	b_{69}	$(4,5,1,1,-5,-5)$

continued on next page...

Table 36. Schubert classes for E_6/P_5 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
134254316542345	b_{147}	15	5	b_{68}	$(-11, 2, 1, 1, 1, 1)$
143654231435465	b_{148}	15	4	b_{67}	$(-4, 5, 5, -4, 5, -10)$
314231456542345	b_{149}	15	3	b_{66}	$(1, 5, -5, -4, 10, -5)$
254231456542345	b_{150}	15	4	b_{65}	$(4, -5, 1, 6, -10, 5)$
124354231435465	b_{151}	15	3	b_{64}	$(-4, -5, 5, 1, -5, 10)$
231423145423465	b_{152}	15	3	b_{63}	$(1, -5, -5, 1, 5, 5)$
154231456542345	b_{153}	15	4	b_{62}	$(-4, 5, 5, 1, -10, 5)$
314354231435465	b_{154}	15	3	b_{61}	$(1, 5, -5, 1, -5, 10)$
2543654231435465	b_{155}	16	4	b_{60}	$(4, -5, 1, 6, -5, -5)$
1234254316542345	b_{156}	16	5	b_{59}	$(-11, -2, 1, 3, 1, 1)$
1243654231435465	b_{157}	16	4	b_{58}	$(-4, -5, 5, 1, 5, -10)$
3423454316542345	b_{158}	16	4	b_{57}	$(11, 1, -7, -3, 4, 1)$
1423454316542345	b_{159}	16	4	b_{56}	$(-4, 1, 11, -10, 4, 1)$
2314231456542345	b_{160}	16	3	b_{55}	$(1, -5, -5, 1, 10, -5)$
1543654231435465	b_{161}	16	4	b_{54}	$(-4, 5, 5, 1, -5, -5)$
3143654231435465	b_{162}	16	4	b_{53}	$(1, 5, -5, 1, 5, -10)$
4315423456542345	b_{163}	16	4	b_{52}	$(1, 11, 1, -10, 4, 1)$
4254231456542345	b_{164}	16	4	b_{51}	$(4, 1, 7, -6, -4, 5)$
1254231456542345	b_{165}	16	4	b_{50}	$(-4, -5, 5, 6, -10, 5)$
2314354231435465	b_{166}	16	3	b_{49}	$(1, -5, -5, 6, -5, 10)$
3154231456542345	b_{167}	16	4	b_{48}	$(1, 5, -5, 6, -10, 5)$
42543654231435465	b_{168}	17	4	b_{47}	$(4, 1, 7, -6, 1, -5)$
12543654231435465	b_{169}	17	4	b_{46}	$(-4, -5, 5, 6, -5, -5)$
23143654231435465	b_{170}	17	4	b_{45}	$(1, -5, -5, 6, 5, -10)$
13423454316542345	b_{171}	17	5	b_{44}	$(-11, 1, 4, -3, 4, 1)$
24315423456542345	b_{172}	17	5	b_{43}	$(1, -11, 1, 1, 4, 1)$
31423454316542345	b_{173}	17	5	b_{42}	$(7, 1, -11, 1, 4, 1)$
31543654231435465	b_{174}	17	4	b_{41}	$(1, 5, -5, 6, -5, -5)$
34254231456542345	b_{175}	17	4	b_{40}	$(11, 1, -7, 1, -4, 5)$
14254231456542345	b_{176}	17	4	b_{39}	$(-4, 1, 11, -6, -4, 5)$
23154231456542345	b_{177}	17	4	b_{38}	$(1, -5, -5, 11, -10, 5)$
42314354231435465	b_{178}	17	3	b_{37}	$(1, 1, 1, -6, 1, 10)$
43154231456542345	b_{179}	17	4	b_{36}	$(1, 11, 1, -6, -4, 5)$
342543654231435465	b_{180}	18	4	b_{35}	$(11, 1, -7, 1, 1, -5)$
142543654231435465	b_{181}	18	4	b_{34}	$(-4, 1, 11, -6, 1, -5)$
231543654231435465	b_{182}	18	4	b_{33}	$(1, -5, -5, 11, -5, -5)$
423143654231435465	b_{183}	18	4	b_{32}	$(1, 1, 1, -6, 11, -10)$
131423454316542345	b_{184}	18	5	b_{31}	$(-7, 1, -4, 1, 4, 1)$

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Table 36. Schubert classes for E_6/P_5 continued...

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
4315436542314354 65	b_{185}	18	4	b_{30}	$(1, 11, 1, -6, 1, -5)$
134254231456542345	b_{186}	18	5	b_{29}	$(-11, 1, 4, 1, -4, 5)$
243154231456542345	b_{187}	18	5	b_{28}	$(1, -11, 1, 5, -4, 5)$
314254231456542345	b_{188}	18	5	b_{27}	$(7, 1, -11, 5, -4, 5)$
423154231456542345	b_{189}	18	5	b_{26}	$(1, 6, 6, -11, 1, 5)$
1342543654231435465	b_{190}	19	5	b_{25}	$(-11, 1, 4, 1, 1, -5)$
2431543654231435465	b_{191}	19	5	b_{24}	$(1, -11, 1, 5, 1, -5)$
5423143654231435465	b_{192}	19	5	b_{23}	$(1, 1, 1, 5, -11, 1)$
3142543654231435465	b_{193}	19	5	b_{22}	$(7, 1, -11, 5, 1, -5)$
4231543654231435465	b_{194}	19	5	b_{21}	$(1, 6, 6, -11, 6, -5)$
1314254231456542345	b_{195}	19	5	b_{20}	$(-7, 1, -4, 5, -4, 5)$
2423154231456542345	b_{196}	19	5	b_{19}	$(1, -6, 6, -5, 1, 5)$
3423154231456542345	b_{197}	19	5	b_{18}	$(7, 6, -6, -5, 1, 5)$
13142543654231435465	b_{198}	20	5	b_{17}	$(-7, 1, -4, 5, 1, -5)$
24231543654231435465	b_{199}	20	5	b_{16}	$(1, -6, 6, -5, 6, -5)$
45423143654231435465	b_{200}	20	5	b_{15}	$(1, 6, 6, -5, -6, 1)$
34231543654231435465	b_{201}	20	5	b_{14}	$(7, 6, -6, -5, 6, -5)$
23423154231456542345	b_{202}	20	5	b_{13}	$(7, -6, -6, 1, 1, 5)$
13423154231456542345	b_{203}	20	5	b_{12}	$(-7, 6, 1, -5, 1, 5)$
245423143654231435465	b_{204}	21	5	b_{11}	$(1, -6, 6, 1, -6, 1)$
234231543654231435465	b_{205}	21	5	b_{10}	$(7, -6, -6, 1, 6, -5)$
345423143654231435465	b_{206}	21	5	b_9	$(7, 6, -6, 1, -6, 1)$
134231543654231435465	b_{207}	21	5	b_8	$(-7, 6, 1, -5, 6, -5)$
123423154231456542345	b_{208}	21	5	b_7	$(-7, -6, 1, 1, 1, 5)$
2345423143654231435465	b_{209}	22	5	b_6	$(7, -6, -6, 7, -6, 1)$
1234231543654231435465	b_{210}	22	5	b_5	$(-7, -6, 1, 1, 6, -5)$
1345423143654231435465	b_{211}	22	5	b_4	$(-7, 6, 1, 1, -6, 1)$
42345423143654231435465	b_{212}	23	5	b_3	$(7, 1, 1, -7, 1, 1)$
12345423143654231435465	b_{213}	23	5	b_2	$(-7, -6, 1, 7, -6, 1)$
142345423143654231435465	b_{214}	24	5	b_1	$(-7, 1, 8, -7, 1, 1)$
3142345423143654231435465	b_{215}	25	5	b_0	$(1, 1, -8, 1, 1, 1)$

Table 37. Multiplication table for E_6/P_5

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	$b_2 + b_3$
b_1	b_2	$b_4 + b_5 + b_6$
b_1	b_3	b_6
continued on next page...		

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_4	$b_8 + b_9$
b_1	b_5	$b_7 + b_8 + b_{10}$
b_1	b_6	$b_9 + b_{10} + b_{11}$
b_1	b_7	$b_{12} + b_{13}$
b_1	b_8	$b_{12} + b_{14} + b_{17}$
b_1	b_9	$b_{14} + b_{15}$
b_1	b_{10}	$b_{13} + b_{14} + b_{16}$
b_1	b_{11}	$b_{15} + b_{16}$
b_1	b_{12}	$b_{18} + b_{20}$
b_1	b_{13}	$b_{18} + b_{19}$
b_1	b_{14}	$b_{18} + b_{21} + b_{22}$
b_1	b_{15}	$b_{21} + b_{23}$
b_1	b_{16}	$b_{19} + b_{21} + b_{24}$
b_1	b_{17}	$b_{20} + b_{22} + b_{25}$
b_1	b_{18}	$b_{26} + b_{27}$
b_1	b_{19}	$b_{26} + b_{28}$
b_1	b_{20}	$b_{27} + b_{29} + b_{31}$
b_1	b_{21}	b_{26}
b_1	b_{22}	b_{27}
b_1	b_{24}	b_{28}
b_1	b_{25}	b_{29}
b_1	b_{27}	b_{42}
b_1	b_{28}	b_{43}
b_1	b_{29}	b_{44}
b_1	b_{30}	$b_{36} + b_{41}$
b_1	b_{31}	$b_{42} + b_{44}$
b_1	b_{32}	b_{45}
b_1	b_{33}	$b_{38} + b_{41} + b_{45} + b_{46}$
b_1	b_{34}	$b_{39} + b_{46} + b_{47}$
b_1	b_{35}	$b_{40} + b_{47}$
b_1	b_{36}	$b_{48} + b_{52}$
b_1	b_{37}	b_{49}
b_1	b_{38}	$b_{48} + b_{50}$
b_1	b_{39}	$b_{50} + b_{51} + b_{56}$
b_1	b_{40}	$b_{51} + b_{57}$
b_1	b_{41}	$b_{48} + b_{53} + b_{54}$
b_1	b_{44}	b_{59}
b_1	b_{45}	$b_{53} + b_{58}$
continued on next page...		

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{46}	$b_{50} + b_{54} + b_{58} + b_{60}$
b_1	b_{47}	$b_{51} + b_{60}$
b_1	b_{48}	b_{62}
b_1	b_{49}	$b_{61} + b_{63} + b_{64}$
b_1	b_{50}	$b_{62} + b_{65}$
b_1	b_{51}	$b_{65} + b_{71}$
b_1	b_{53}	b_{67}
b_1	b_{54}	$b_{62} + b_{67} + b_{69}$
b_1	b_{55}	$b_{63} + b_{66} + b_{70}$
b_1	b_{56}	b_{71}
b_1	b_{57}	$b_{71} + b_{75}$
b_1	b_{58}	$b_{67} + b_{72}$
b_1	b_{59}	b_{68}
b_1	b_{60}	$b_{65} + b_{69} + b_{72}$
b_1	b_{61}	$b_{76} + b_{77}$
b_1	b_{62}	b_{78}
b_1	b_{63}	$b_{76} + b_{79}$
b_1	b_{64}	$b_{77} + b_{79} + b_{80}$
b_1	b_{65}	b_{78}
b_1	b_{66}	$b_{76} + b_{81} + b_{86}$
b_1	b_{67}	$b_{82} + b_{88}$
b_1	b_{69}	$b_{78} + b_{82}$
b_1	b_{70}	$b_{79} + b_{81} + b_{85} + b_{87}$
b_1	b_{72}	b_{82}
b_1	b_{73}	b_{86}
b_1	b_{74}	$b_{87} + b_{89}$
b_1	b_{75}	b_{84}
b_1	b_{76}	$b_{92} + b_{95}$
b_1	b_{77}	$b_{92} + b_{93} + b_{97}$
b_1	b_{79}	$b_{92} + b_{94} + b_{96}$
b_1	b_{80}	$b_{93} + b_{94}$
b_1	b_{81}	$b_{92} + b_{98}$
b_1	b_{82}	b_{105}
b_1	b_{83}	$b_{99} + b_{100}$
b_1	b_{85}	$b_{94} + b_{98} + b_{102}$
b_1	b_{86}	b_{95}
b_1	b_{87}	$b_{96} + b_{102}$
b_1	b_{88}	b_{105}

continued on next page...

TABLE 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{89}	$b_{102} + b_{106}$
b_1	b_{90}	b_{103}
b_1	b_{91}	$b_{101} + b_{106}$
b_1	b_{92}	b_{111}
b_1	b_{93}	$b_{111} + b_{112}$
b_1	b_{94}	$b_{111} + b_{116}$
b_1	b_{96}	b_{116}
b_1	b_{97}	b_{112}
b_1	b_{98}	b_{111}
b_1	b_{99}	$b_{113} + b_{119} + b_{121}$
b_1	b_{100}	$b_{109} + b_{113}$
b_1	b_{102}	$b_{115} + b_{116}$
b_1	b_{103}	$b_{118} + b_{122}$
b_1	b_{104}	$b_{117} + b_{121} + b_{122} + b_{123}$
b_1	b_{105}	b_{108}
b_1	b_{106}	b_{115}
b_1	b_{107}	b_{110}
b_1	b_{109}	$b_{124} + b_{126}$
b_1	b_{110}	$b_{127} + b_{133}$
b_1	b_{112}	b_{125}
b_1	b_{113}	$b_{126} + b_{128} + b_{130}$
b_1	b_{114}	b_{124}
b_1	b_{115}	b_{132}
b_1	b_{116}	b_{132}
b_1	b_{117}	$b_{130} + b_{134}$
b_1	b_{118}	b_{138}
b_1	b_{119}	$b_{128} + b_{136}$
b_1	b_{120}	$b_{129} + b_{139}$
b_1	b_{121}	$b_{130} + b_{135} + b_{136}$
b_1	b_{122}	$b_{135} + b_{138}$
b_1	b_{123}	$b_{134} + b_{136} + b_{138} + b_{139}$
b_1	b_{126}	b_{141}
b_1	b_{127}	b_{148}
b_1	b_{128}	$b_{141} + b_{145}$
b_1	b_{129}	$b_{142} + b_{149}$
b_1	b_{130}	b_{145}
b_1	b_{131}	b_{140}
b_1	b_{133}	$b_{143} + b_{146} + b_{148}$

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{134}	$b_{145} + b_{149}$
b_1	b_{135}	b_{151}
b_1	b_{136}	$b_{145} + b_{151} + b_{152}$
b_1	b_{137}	$b_{146} + b_{150} + b_{153}$
b_1	b_{138}	$b_{151} + b_{154}$
b_1	b_{139}	$b_{149} + b_{152} + b_{154}$
b_1	b_{140}	b_{158}
b_1	b_{143}	$b_{155} + b_{157}$
b_1	b_{144}	$b_{158} + b_{159} + b_{164}$
b_1	b_{145}	b_{160}
b_1	b_{146}	$b_{155} + b_{161}$
b_1	b_{147}	b_{156}
b_1	b_{148}	$b_{157} + b_{161} + b_{162}$
b_1	b_{149}	b_{160}
b_1	b_{150}	$b_{155} + b_{164} + b_{165}$
b_1	b_{151}	b_{166}
b_1	b_{152}	$b_{160} + b_{166}$
b_1	b_{153}	$b_{161} + b_{165} + b_{167}$
b_1	b_{154}	b_{166}
b_1	b_{155}	$b_{168} + b_{169}$
b_1	b_{156}	b_{171}
b_1	b_{157}	$b_{169} + b_{170}$
b_1	b_{158}	b_{175}
b_1	b_{159}	b_{176}
b_1	b_{161}	$b_{169} + b_{174}$
b_1	b_{162}	$b_{170} + b_{174}$
b_1	b_{163}	b_{179}
b_1	b_{164}	$b_{168} + b_{175} + b_{176}$
b_1	b_{165}	$b_{169} + b_{176} + b_{177}$
b_1	b_{166}	b_{178}
b_1	b_{167}	$b_{174} + b_{177} + b_{179}$
b_1	b_{168}	$b_{180} + b_{181}$
b_1	b_{169}	$b_{181} + b_{182}$
b_1	b_{170}	$b_{182} + b_{183}$
b_1	b_{171}	$b_{184} + b_{186}$
b_1	b_{172}	b_{187}
b_1	b_{173}	$b_{184} + b_{188}$
b_1	b_{174}	$b_{182} + b_{185}$

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_{175}	b_{180}
b_1	b_{176}	b_{181}
b_1	b_{177}	b_{182}
b_1	b_{179}	b_{185}
b_1	b_{184}	b_{195}
b_1	b_{186}	$b_{190} + b_{195}$
b_1	b_{187}	$b_{191} + b_{196}$
b_1	b_{188}	$b_{193} + b_{195} + b_{197}$
b_1	b_{189}	$b_{194} + b_{196} + b_{197}$
b_1	b_{190}	b_{198}
b_1	b_{191}	b_{199}
b_1	b_{192}	b_{200}
b_1	b_{193}	$b_{198} + b_{201}$
b_1	b_{194}	$b_{199} + b_{200} + b_{201}$
b_1	b_{195}	$b_{198} + b_{203}$
b_1	b_{196}	$b_{199} + b_{202}$
b_1	b_{197}	$b_{201} + b_{202} + b_{203}$
b_1	b_{198}	b_{207}
b_1	b_{199}	$b_{204} + b_{205}$
b_1	b_{200}	$b_{204} + b_{206}$
b_1	b_{201}	$b_{205} + b_{206} + b_{207}$
b_1	b_{202}	$b_{205} + b_{208}$
b_1	b_{203}	$b_{207} + b_{208}$
b_1	b_{204}	b_{209}
b_1	b_{205}	$b_{209} + b_{210}$
b_1	b_{206}	$b_{209} + b_{211}$
b_1	b_{207}	$b_{210} + b_{211}$
b_1	b_{208}	b_{210}
b_1	b_{209}	$b_{212} + b_{213}$
b_1	b_{210}	b_{213}
b_1	b_{211}	b_{213}
b_1	b_{212}	b_{214}
b_1	b_{213}	b_{214}
b_2	b_2	$b_7 + 2b_8 + b_9 + b_{10} + b_{11}$
b_2	b_3	$b_9 + b_{10}$
b_2	b_4	$b_{12} + b_{14} + b_{15} + b_{17}$
b_2	b_5	$2b_{12} + b_{13} + b_{14} + b_{16} + b_{17}$
b_2	b_6	$b_{13} + 2b_{14} + b_{15} + b_{16}$

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_7	$b_{18} + b_{19} + b_{20}$
b_2	b_8	$b_{18} + 2b_{20} + b_{21} + b_{22} + b_{25}$
b_2	b_9	$b_{18} + b_{21} + b_{22} + b_{23}$
b_2	b_{10}	$2b_{18} + b_{19} + b_{21} + b_{22} + b_{24}$
b_2	b_{11}	$b_{19} + 2b_{21}$
b_2	b_{12}	$b_{26} + b_{27} + b_{29} + b_{31}$
b_2	b_{13}	$b_{26} + b_{27} + b_{28}$
b_2	b_{14}	$b_{26} + 2b_{27}$
b_2	b_{15}	b_{26}
b_2	b_{16}	$2b_{26} + b_{28}$
b_2	b_{17}	$b_{27} + 2b_{29} + b_{31}$
b_2	b_{18}	b_{42}
b_2	b_{19}	b_{43}
b_2	b_{20}	$b_{42} + 2b_{44}$
b_2	b_{22}	b_{42}
b_2	b_{25}	b_{44}
b_2	b_{29}	b_{59}
b_2	b_{30}	$2b_{48} + b_{54}$
b_2	b_{31}	b_{59}
b_2	b_{32}	b_{58}
b_2	b_{33}	$b_{48} + 2b_{50} + 2b_{53} + b_{54} + b_{58} + b_{60}$
b_2	b_{34}	$b_{50} + 2b_{51} + b_{54} + b_{56} + b_{58} + b_{60}$
b_2	b_{35}	$b_{51} + b_{57} + b_{60}$
b_2	b_{36}	b_{62}
b_2	b_{37}	$b_{63} + b_{64}$
b_2	b_{38}	$b_{62} + b_{65}$
b_2	b_{39}	$b_{62} + b_{65} + 2b_{71}$
b_2	b_{40}	$b_{65} + b_{71} + b_{75}$
b_2	b_{41}	$2b_{62} + b_{67} + b_{69}$
b_2	b_{44}	b_{68}
b_2	b_{45}	$b_{67} + b_{72}$
b_2	b_{46}	$b_{62} + 2b_{65} + 2b_{67} + b_{69} + b_{72}$
b_2	b_{47}	$b_{65} + b_{69} + b_{71} + b_{72}$
b_2	b_{48}	b_{78}
b_2	b_{49}	$b_{76} + b_{77} + 2b_{79} + b_{80}$
b_2	b_{50}	b_{78}
b_2	b_{51}	b_{78}
b_2	b_{53}	b_{82}

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{54}	$2b_{78} + b_{82} + b_{88}$
b_2	b_{55}	$2b_{76} + b_{79} + b_{81} + b_{85} + b_{86} + b_{87}$
b_2	b_{57}	b_{84}
b_2	b_{58}	$b_{82} + b_{88}$
b_2	b_{60}	$b_{78} + 2b_{82}$
b_2	b_{61}	$2b_{92} + b_{93}$
b_2	b_{63}	$b_{92} + b_{94} + b_{95} + b_{96}$
b_2	b_{64}	$b_{92} + b_{93} + 2b_{94} + b_{96} + b_{97}$
b_2	b_{66}	$b_{92} + 2b_{95} + b_{98}$
b_2	b_{67}	b_{105}
b_2	b_{69}	b_{105}
b_2	b_{70}	$2b_{92} + b_{94} + b_{96} + b_{98} + 2b_{102}$
b_2	b_{72}	b_{105}
b_2	b_{74}	$b_{96} + b_{102} + b_{106}$
b_2	b_{76}	b_{111}
b_2	b_{77}	$2b_{111} + b_{112}$
b_2	b_{79}	$b_{111} + 2b_{116}$
b_2	b_{80}	$b_{111} + b_{112} + b_{116}$
b_2	b_{81}	b_{111}
b_2	b_{82}	b_{108}
b_2	b_{83}	$b_{109} + b_{113} + b_{119} + b_{121}$
b_2	b_{85}	$2b_{111} + b_{115} + b_{116}$
b_2	b_{87}	$b_{115} + b_{116}$
b_2	b_{89}	$b_{115} + b_{116}$
b_2	b_{90}	b_{122}
b_2	b_{91}	b_{115}
b_2	b_{93}	b_{125}
b_2	b_{94}	b_{132}
b_2	b_{96}	b_{132}
b_2	b_{99}	$b_{126} + b_{128} + b_{130} + b_{135} + 2b_{136}$
b_2	b_{100}	$b_{124} + b_{126} + b_{128} + b_{130}$
b_2	b_{102}	b_{132}
b_2	b_{103}	$b_{135} + b_{138}$
b_2	b_{104}	$2b_{130} + b_{134} + b_{135} + b_{136} + 2b_{138} + b_{139}$
b_2	b_{106}	b_{132}
b_2	b_{107}	b_{133}
b_2	b_{109}	b_{141}
b_2	b_{110}	$b_{143} + b_{146} + b_{148}$
continued on next page...		

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{113}	$b_{141} + 2b_{145}$
b_2	b_{117}	$b_{145} + b_{149}$
b_2	b_{118}	b_{151}
b_2	b_{119}	$b_{141} + b_{145} + b_{151} + b_{152}$
b_2	b_{120}	$2b_{149} + b_{152}$
b_2	b_{121}	$b_{145} + 2b_{151} + b_{152}$
b_2	b_{122}	$b_{151} + b_{154}$
b_2	b_{123}	$2b_{145} + b_{149} + b_{151} + b_{152} + 2b_{154}$
b_2	b_{127}	$b_{157} + b_{161}$
b_2	b_{128}	b_{160}
b_2	b_{129}	b_{160}
b_2	b_{130}	b_{160}
b_2	b_{131}	b_{158}
b_2	b_{133}	$2b_{155} + b_{157} + b_{161} + b_{162}$
b_2	b_{134}	b_{160}
b_2	b_{135}	b_{166}
b_2	b_{136}	$b_{160} + 2b_{166}$
b_2	b_{137}	$b_{155} + 2b_{161} + b_{164} + b_{165} + b_{167}$
b_2	b_{138}	b_{166}
b_2	b_{139}	$2b_{160} + b_{166}$
b_2	b_{140}	b_{175}
b_2	b_{143}	$b_{168} + b_{169} + b_{170}$
b_2	b_{144}	$b_{168} + b_{175} + 2b_{176}$
b_2	b_{146}	$b_{168} + b_{169} + b_{174}$
b_2	b_{147}	b_{171}
b_2	b_{148}	$2b_{169} + b_{170} + b_{174}$
b_2	b_{150}	$b_{168} + 2b_{169} + b_{175} + b_{176} + b_{177}$
b_2	b_{151}	b_{178}
b_2	b_{152}	b_{178}
b_2	b_{153}	$b_{169} + 2b_{174} + b_{176} + b_{177} + b_{179}$
b_2	b_{155}	$b_{180} + b_{181} + b_{182}$
b_2	b_{156}	$b_{184} + b_{186}$
b_2	b_{157}	$b_{181} + b_{182} + b_{183}$
b_2	b_{158}	b_{180}
b_2	b_{159}	b_{181}
b_2	b_{161}	$b_{181} + b_{182} + b_{185}$
b_2	b_{162}	$2b_{182}$
b_2	b_{164}	$b_{180} + 2b_{181}$

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{165}	$b_{181} + 2b_{182}$
b_2	b_{167}	$b_{182} + 2b_{185}$
b_2	b_{171}	$b_{190} + 2b_{195}$
b_2	b_{172}	b_{196}
b_2	b_{173}	$b_{193} + b_{195} + b_{197}$
b_2	b_{184}	$b_{198} + b_{203}$
b_2	b_{186}	$2b_{198} + b_{203}$
b_2	b_{187}	$b_{199} + b_{202}$
b_2	b_{188}	$b_{198} + 2b_{201} + b_{202} + b_{203}$
b_2	b_{189}	$2b_{199} + b_{200} + b_{201} + b_{202} + b_{203}$
b_2	b_{190}	b_{207}
b_2	b_{191}	b_{205}
b_2	b_{192}	b_{206}
b_2	b_{193}	$b_{205} + b_{206} + b_{207}$
b_2	b_{194}	$2b_{204} + b_{205} + b_{206} + b_{207}$
b_2	b_{195}	$2b_{207} + b_{208}$
b_2	b_{196}	$b_{204} + b_{205} + b_{208}$
b_2	b_{197}	$2b_{205} + b_{206} + b_{207} + b_{208}$
b_2	b_{198}	$b_{210} + b_{211}$
b_2	b_{199}	$b_{209} + b_{210}$
b_2	b_{200}	$b_{209} + b_{211}$
b_2	b_{201}	$2b_{209} + b_{210} + b_{211}$
b_2	b_{202}	$b_{209} + b_{210}$
b_2	b_{203}	$2b_{210} + b_{211}$
b_2	b_{204}	b_{213}
b_2	b_{205}	$b_{212} + b_{213}$
b_2	b_{206}	$b_{212} + b_{213}$
b_2	b_{207}	$2b_{213}$
b_2	b_{208}	b_{213}
b_2	b_{209}	b_{214}
b_2	b_{210}	b_{214}
b_2	b_{211}	b_{214}
b_3	b_3	b_{11}
b_3	b_4	b_{14}
b_3	b_5	$b_{13} + b_{14}$
b_3	b_6	$b_{15} + b_{16}$
b_3	b_7	b_{18}
b_3	b_8	$b_{18} + b_{22}$

continued on next page...

TABLE 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_9	b_{21}
b_3	b_{10}	$b_{19} + b_{21}$
b_3	b_{11}	$b_{23} + b_{24}$
b_3	b_{12}	b_{27}
b_3	b_{13}	b_{26}
b_3	b_{14}	b_{26}
b_3	b_{16}	b_{28}
b_3	b_{17}	b_{27}
b_3	b_{20}	b_{42}
b_3	b_{24}	b_{43}
b_3	b_{30}	$b_{52} + b_{53}$
b_3	b_{32}	b_{53}
b_3	b_{33}	$b_{48} + b_{54} + b_{58}$
b_3	b_{34}	$b_{50} + b_{60}$
b_3	b_{35}	b_{51}
b_3	b_{37}	b_{61}
b_3	b_{38}	b_{62}
b_3	b_{39}	b_{65}
b_3	b_{40}	b_{71}
b_3	b_{41}	b_{67}
b_3	b_{45}	b_{67}
b_3	b_{46}	$b_{62} + b_{69} + b_{72}$
b_3	b_{47}	b_{65}
b_3	b_{49}	$b_{76} + b_{77}$
b_3	b_{50}	b_{78}
b_3	b_{53}	b_{88}
b_3	b_{54}	b_{82}
b_3	b_{55}	$b_{79} + b_{81}$
b_3	b_{58}	b_{82}
b_3	b_{60}	b_{78}
b_3	b_{61}	$b_{95} + b_{97}$
b_3	b_{63}	b_{92}
b_3	b_{64}	$b_{92} + b_{93}$
b_3	b_{66}	b_{92}
b_3	b_{67}	b_{105}
b_3	b_{70}	$b_{94} + b_{96} + b_{98}$
b_3	b_{73}	b_{95}
b_3	b_{74}	b_{102}

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{77}	b_{112}
b_3	b_{79}	b_{111}
b_3	b_{80}	b_{111}
b_3	b_{81}	b_{111}
b_3	b_{83}	b_{113}
b_3	b_{85}	b_{116}
b_3	b_{87}	b_{116}
b_3	b_{88}	b_{108}
b_3	b_{89}	b_{115}
b_3	b_{90}	b_{118}
b_3	b_{97}	b_{125}
b_3	b_{99}	$b_{128} + b_{130}$
b_3	b_{100}	b_{126}
b_3	b_{102}	b_{132}
b_3	b_{103}	b_{138}
b_3	b_{104}	$b_{134} + b_{135} + b_{136}$
b_3	b_{107}	b_{127}
b_3	b_{110}	b_{148}
b_3	b_{113}	b_{141}
b_3	b_{117}	b_{145}
b_3	b_{118}	b_{154}
b_3	b_{119}	b_{145}
b_3	b_{120}	$b_{142} + b_{154}$
b_3	b_{121}	b_{145}
b_3	b_{122}	b_{151}
b_3	b_{123}	$b_{149} + b_{151} + b_{152}$
b_3	b_{127}	b_{162}
b_3	b_{133}	$b_{157} + b_{161}$
b_3	b_{134}	b_{160}
b_3	b_{136}	b_{160}
b_3	b_{137}	$b_{155} + b_{165}$
b_3	b_{138}	b_{166}
b_3	b_{139}	b_{166}
b_3	b_{143}	b_{169}
b_3	b_{144}	b_{175}
b_3	b_{146}	b_{169}
b_3	b_{148}	$b_{170} + b_{174}$
b_3	b_{150}	$b_{168} + b_{176}$

continued on next page...

TABLE 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_3	b_{153}	$b_{169} + b_{177}$
b_3	b_{154}	b_{178}
b_3	b_{155}	b_{181}
b_3	b_{157}	b_{182}
b_3	b_{161}	b_{182}
b_3	b_{162}	$b_{183} + b_{185}$
b_3	b_{163}	b_{185}
b_3	b_{164}	b_{180}
b_3	b_{165}	b_{181}
b_3	b_{167}	b_{182}
b_3	b_{172}	b_{191}
b_3	b_{173}	b_{195}
b_3	b_{187}	b_{199}
b_3	b_{188}	$b_{198} + b_{203}$
b_3	b_{189}	$b_{201} + b_{202}$
b_3	b_{191}	b_{204}
b_3	b_{192}	b_{204}
b_3	b_{193}	b_{207}
b_3	b_{194}	$b_{205} + b_{206}$
b_3	b_{196}	b_{205}
b_3	b_{197}	$b_{207} + b_{208}$
b_3	b_{199}	b_{209}
b_3	b_{200}	b_{209}
b_3	b_{201}	$b_{210} + b_{211}$
b_3	b_{202}	b_{210}
b_3	b_{204}	b_{212}
b_3	b_{205}	b_{213}
b_3	b_{206}	b_{213}
b_3	b_{209}	b_{214}
b_4	b_4	$b_{20} + b_{22} + b_{23}$
b_4	b_5	$b_{18} + b_{20} + b_{21} + b_{25}$
b_4	b_6	$b_{18} + b_{21} + b_{22}$
b_4	b_7	$b_{26} + b_{29}$
b_4	b_8	$b_{27} + b_{29} + b_{31}$
b_4	b_9	b_{27}
b_4	b_{10}	$b_{26} + b_{27}$
b_4	b_{11}	b_{26}
b_4	b_{12}	b_{44}

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Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{14}	b_{42}
b_4	b_{17}	$b_{42} + b_{44}$
b_4	b_{20}	b_{59}
b_4	b_{30}	$b_{62} + b_{69}$
b_4	b_{31}	b_{68}
b_4	b_{33}	$b_{62} + b_{65} + b_{67} + b_{72}$
b_4	b_{34}	$b_{65} + b_{67} + b_{69} + b_{71}$
b_4	b_{35}	$b_{71} + b_{72}$
b_4	b_{36}	b_{78}
b_4	b_{37}	b_{79}
b_4	b_{39}	b_{78}
b_4	b_{41}	$b_{78} + b_{82}$
b_4	b_{46}	$b_{78} + b_{82} + b_{88}$
b_4	b_{47}	b_{82}
b_4	b_{49}	$b_{92} + b_{94} + b_{96}$
b_4	b_{54}	b_{105}
b_4	b_{55}	$b_{92} + b_{94} + b_{95} + b_{102}$
b_4	b_{60}	b_{105}
b_4	b_{61}	b_{111}
b_4	b_{63}	b_{116}
b_4	b_{64}	$b_{111} + b_{116}$
b_4	b_{66}	b_{111}
b_4	b_{69}	b_{108}
b_4	b_{70}	$b_{111} + b_{115} + b_{116}$
b_4	b_{79}	b_{132}
b_4	b_{83}	$b_{124} + b_{130} + b_{136}$
b_4	b_{85}	b_{132}
b_4	b_{91}	b_{132}
b_4	b_{99}	$b_{145} + b_{151} + b_{152}$
b_4	b_{100}	b_{145}
b_4	b_{104}	$b_{145} + b_{149} + b_{151} + b_{154}$
b_4	b_{107}	b_{146}
b_4	b_{110}	$b_{155} + b_{161}$
b_4	b_{113}	b_{160}
b_4	b_{119}	b_{166}
b_4	b_{120}	b_{160}
b_4	b_{121}	$b_{160} + b_{166}$
b_4	b_{123}	$b_{160} + b_{166}$

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{127}	b_{169}
b_4	b_{133}	$b_{168} + b_{169} + b_{174}$
b_4	b_{136}	b_{178}
b_4	b_{137}	$b_{169} + b_{174} + b_{176} + b_{179}$
b_4	b_{143}	$b_{180} + b_{182}$
b_4	b_{144}	$b_{180} + b_{181}$
b_4	b_{146}	$b_{181} + b_{185}$
b_4	b_{147}	b_{184}
b_4	b_{148}	$b_{181} + b_{182}$
b_4	b_{150}	$b_{181} + b_{182}$
b_4	b_{153}	$b_{182} + b_{185}$
b_4	b_{156}	b_{195}
b_4	b_{171}	$b_{198} + b_{203}$
b_4	b_{173}	$b_{198} + b_{201}$
b_4	b_{184}	b_{207}
b_4	b_{186}	$b_{207} + b_{208}$
b_4	b_{188}	$b_{205} + b_{206} + b_{207}$
b_4	b_{189}	$b_{204} + b_{205} + b_{208}$
b_4	b_{190}	b_{210}
b_4	b_{192}	b_{211}
b_4	b_{193}	$b_{209} + b_{211}$
b_4	b_{194}	$b_{209} + b_{210}$
b_4	b_{195}	$b_{210} + b_{211}$
b_4	b_{197}	$b_{209} + b_{210}$
b_4	b_{198}	b_{213}
b_4	b_{200}	b_{213}
b_4	b_{201}	$b_{212} + b_{213}$
b_4	b_{203}	b_{213}
b_4	b_{206}	b_{214}
b_4	b_{207}	b_{214}
b_5	b_5	$b_{18} + b_{19} + 2b_{20} + b_{22} + b_{24}$
b_5	b_6	$2b_{18} + b_{19} + b_{21} + b_{22}$
b_5	b_7	$b_{27} + b_{28} + b_{31}$
b_5	b_8	$b_{26} + b_{27} + 2b_{29} + b_{31}$
b_5	b_9	$b_{26} + b_{27}$
b_5	b_{10}	$b_{26} + 2b_{27} + b_{28}$
b_5	b_{11}	$2b_{26}$
b_5	b_{12}	$b_{42} + b_{44}$

continued on next page...

TABLE 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_5	b_{13}	$b_{42} + b_{43}$
b_5	b_{14}	b_{42}
b_5	b_{17}	$2b_{44}$
b_5	b_{20}	b_{59}
b_5	b_{25}	b_{59}
b_5	b_{29}	b_{68}
b_5	b_{30}	$2b_{62}$
b_5	b_{32}	b_{72}
b_5	b_{33}	$b_{62} + 2b_{65} + b_{67} + b_{69}$
b_5	b_{34}	$b_{62} + b_{65} + b_{67} + 2b_{71} + b_{72}$
b_5	b_{35}	$b_{65} + b_{69} + b_{75}$
b_5	b_{37}	$b_{79} + b_{80}$
b_5	b_{38}	b_{78}
b_5	b_{40}	$b_{78} + b_{84}$
b_5	b_{41}	$2b_{78}$
b_5	b_{45}	b_{82}
b_5	b_{46}	$b_{78} + b_{82} + b_{88}$
b_5	b_{47}	$b_{78} + b_{82}$
b_5	b_{49}	$b_{92} + b_{93} + 2b_{94} + b_{96}$
b_5	b_{55}	$b_{92} + 2b_{95} + b_{96} + b_{98} + b_{102}$
b_5	b_{58}	b_{105}
b_5	b_{60}	b_{105}
b_5	b_{61}	$2b_{111}$
b_5	b_{63}	$b_{111} + b_{116}$
b_5	b_{64}	$b_{111} + b_{112} + 2b_{116}$
b_5	b_{70}	$b_{111} + b_{115} + b_{116}$
b_5	b_{72}	b_{108}
b_5	b_{74}	$b_{115} + b_{116}$
b_5	b_{79}	b_{132}
b_5	b_{80}	$b_{125} + b_{132}$
b_5	b_{83}	$b_{126} + b_{128} + b_{135} + b_{136}$
b_5	b_{87}	b_{132}
b_5	b_{89}	b_{132}
b_5	b_{90}	b_{135}
b_5	b_{99}	$b_{141} + b_{145} + 2b_{151} + b_{152}$
b_5	b_{100}	$b_{141} + b_{145}$
b_5	b_{103}	b_{151}
b_5	b_{104}	$b_{145} + b_{151} + b_{152} + 2b_{154}$

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_5	b_{107}	b_{143}
b_5	b_{110}	$b_{155} + b_{157}$
b_5	b_{113}	b_{160}
b_5	b_{117}	b_{160}
b_5	b_{119}	$b_{160} + b_{166}$
b_5	b_{120}	$2b_{160}$
b_5	b_{121}	$2b_{166}$
b_5	b_{122}	b_{166}
b_5	b_{123}	$b_{160} + b_{166}$
b_5	b_{127}	b_{169}
b_5	b_{131}	b_{175}
b_5	b_{133}	$b_{168} + b_{169} + b_{170}$
b_5	b_{135}	b_{178}
b_5	b_{136}	b_{178}
b_5	b_{137}	$b_{168} + b_{169} + 2b_{174} + b_{175} + b_{177}$
b_5	b_{140}	b_{180}
b_5	b_{143}	$b_{181} + b_{183}$
b_5	b_{144}	$2b_{181}$
b_5	b_{146}	$b_{180} + b_{182}$
b_5	b_{147}	b_{186}
b_5	b_{148}	$b_{181} + b_{182}$
b_5	b_{150}	$b_{180} + b_{181} + 2b_{182}$
b_5	b_{153}	$b_{181} + b_{182} + 2b_{185}$
b_5	b_{156}	$b_{190} + b_{195}$
b_5	b_{171}	$2b_{198} + b_{203}$
b_5	b_{172}	b_{202}
b_5	b_{173}	$b_{201} + b_{202} + b_{203}$
b_5	b_{184}	$b_{207} + b_{208}$
b_5	b_{186}	$2b_{207}$
b_5	b_{187}	$b_{205} + b_{208}$
b_5	b_{188}	$2b_{205} + b_{206} + b_{207} + b_{208}$
b_5	b_{189}	$2b_{204} + b_{205} + b_{206} + b_{207}$
b_5	b_{190}	b_{211}
b_5	b_{191}	b_{210}
b_5	b_{193}	$b_{209} + b_{210}$
b_5	b_{194}	$b_{209} + b_{211}$
b_5	b_{195}	$2b_{210} + b_{211}$
b_5	b_{196}	$b_{209} + b_{210}$

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_5	b_{197}	$2b_{209} + b_{210} + b_{211}$
b_5	b_{198}	b_{213}
b_5	b_{199}	b_{213}
b_5	b_{201}	$b_{212} + b_{213}$
b_5	b_{202}	$b_{212} + b_{213}$
b_5	b_{203}	$2b_{213}$
b_5	b_{205}	b_{214}
b_5	b_{207}	b_{214}
b_5	b_{208}	b_{214}
b_6	b_6	$b_{19} + 2b_{21} + b_{23} + b_{24}$
b_6	b_7	$b_{26} + b_{27}$
b_6	b_8	$b_{26} + 2b_{27}$
b_6	b_9	b_{26}
b_6	b_{10}	$2b_{26} + b_{28}$
b_6	b_{11}	b_{28}
b_6	b_{12}	b_{42}
b_6	b_{16}	b_{43}
b_6	b_{17}	b_{42}
b_6	b_{30}	b_{67}
b_6	b_{32}	b_{67}
b_6	b_{33}	$2b_{62} + 2b_{67} + b_{69} + b_{72}$
b_6	b_{34}	$b_{62} + 2b_{65} + b_{69} + b_{72}$
b_6	b_{35}	$b_{65} + b_{71}$
b_6	b_{37}	$b_{76} + b_{77}$
b_6	b_{38}	b_{78}
b_6	b_{39}	b_{78}
b_6	b_{41}	$b_{82} + b_{88}$
b_6	b_{45}	$b_{82} + b_{88}$
b_6	b_{46}	$2b_{78} + 2b_{82}$
b_6	b_{47}	b_{78}
b_6	b_{49}	$2b_{92} + b_{93} + b_{95} + b_{97}$
b_6	b_{53}	b_{105}
b_6	b_{54}	b_{105}
b_6	b_{55}	$2b_{92} + b_{94} + b_{96} + b_{98}$
b_6	b_{58}	b_{105}
b_6	b_{61}	b_{112}
b_6	b_{63}	b_{111}
b_6	b_{64}	$2b_{111} + b_{112}$

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Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_6	b_{66}	b_{111}
b_6	b_{67}	b_{108}
b_6	b_{70}	$2b_{111} + 2b_{116}$
b_6	b_{74}	$b_{115} + b_{116}$
b_6	b_{77}	b_{125}
b_6	b_{83}	$b_{126} + b_{128} + b_{130}$
b_6	b_{85}	b_{132}
b_6	b_{87}	b_{132}
b_6	b_{89}	b_{132}
b_6	b_{90}	b_{138}
b_6	b_{99}	$b_{141} + 2b_{145}$
b_6	b_{100}	b_{141}
b_6	b_{103}	$b_{151} + b_{154}$
b_6	b_{104}	$2b_{145} + b_{149} + 2b_{151} + b_{152}$
b_6	b_{107}	b_{148}
b_6	b_{110}	$b_{157} + b_{161} + b_{162}$
b_6	b_{117}	b_{160}
b_6	b_{118}	b_{166}
b_6	b_{119}	b_{160}
b_6	b_{120}	b_{166}
b_6	b_{121}	b_{160}
b_6	b_{122}	b_{166}
b_6	b_{123}	$2b_{160} + 2b_{166}$
b_6	b_{127}	$b_{170} + b_{174}$
b_6	b_{133}	$2b_{169} + b_{170} + b_{174}$
b_6	b_{137}	$b_{168} + 2b_{169} + b_{176} + b_{177}$
b_6	b_{138}	b_{178}
b_6	b_{139}	b_{178}
b_6	b_{143}	$b_{181} + b_{182}$
b_6	b_{144}	b_{180}
b_6	b_{146}	$b_{181} + b_{182}$
b_6	b_{148}	$2b_{182} + b_{183} + b_{185}$
b_6	b_{150}	$b_{180} + 2b_{181}$
b_6	b_{153}	$b_{181} + 2b_{182}$
b_6	b_{172}	b_{199}
b_6	b_{173}	$b_{198} + b_{203}$
b_6	b_{187}	$b_{204} + b_{205}$
b_6	b_{188}	$2b_{207} + b_{208}$

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Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_6	b_{189}	$2b_{205} + b_{206} + b_{207} + b_{208}$
b_6	b_{191}	b_{209}
b_6	b_{192}	b_{209}
b_6	b_{193}	$b_{210} + b_{211}$
b_6	b_{194}	$2b_{209} + b_{210} + b_{211}$
b_6	b_{196}	$b_{209} + b_{210}$
b_6	b_{197}	$2b_{210} + b_{211}$
b_6	b_{199}	$b_{212} + b_{213}$
b_6	b_{200}	$b_{212} + b_{213}$
b_6	b_{201}	$2b_{213}$
b_6	b_{202}	b_{213}
b_6	b_{204}	b_{214}
b_6	b_{205}	b_{214}
b_6	b_{206}	b_{214}
b_7	b_7	$b_{42} + b_{43}$
b_7	b_8	b_{44}
b_7	b_{10}	b_{42}
b_7	b_{17}	b_{59}
b_7	b_{25}	b_{68}
b_7	b_{33}	b_{78}
b_7	b_{35}	$b_{78} + b_{84}$
b_7	b_{37}	b_{94}
b_7	b_{49}	$b_{111} + b_{116}$
b_7	b_{64}	b_{132}
b_7	b_{74}	b_{132}
b_7	b_{83}	$b_{141} + b_{151}$
b_7	b_{99}	b_{166}
b_7	b_{104}	b_{166}
b_7	b_{121}	b_{178}
b_7	b_{131}	b_{180}
b_7	b_{137}	$b_{180} + b_{182}$
b_7	b_{147}	b_{190}
b_7	b_{156}	b_{198}
b_7	b_{171}	b_{207}
b_7	b_{172}	b_{208}
b_7	b_{173}	$b_{205} + b_{208}$
b_7	b_{184}	b_{210}
b_7	b_{186}	b_{211}

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_7	b_{187}	b_{210}
b_7	b_{188}	$b_{209} + b_{210}$
b_7	b_{189}	$b_{209} + b_{211}$
b_7	b_{195}	b_{213}
b_7	b_{196}	b_{213}
b_7	b_{197}	$b_{212} + b_{213}$
b_7	b_{202}	b_{214}
b_7	b_{203}	b_{214}
b_8	b_8	$b_{42} + 2b_{44}$
b_8	b_9	b_{42}
b_8	b_{10}	b_{42}
b_8	b_{12}	b_{59}
b_8	b_{17}	b_{59}
b_8	b_{20}	b_{68}
b_8	b_{30}	$2b_{78}$
b_8	b_{33}	$b_{78} + b_{82}$
b_8	b_{34}	$b_{78} + b_{82} + b_{88}$
b_8	b_{35}	b_{82}
b_8	b_{37}	$b_{94} + b_{96}$
b_8	b_{46}	b_{105}
b_8	b_{47}	b_{105}
b_8	b_{49}	$b_{111} + 2b_{116}$
b_8	b_{55}	$b_{111} + b_{115} + b_{116}$
b_8	b_{60}	b_{108}
b_8	b_{63}	b_{132}
b_8	b_{64}	b_{132}
b_8	b_{70}	b_{132}
b_8	b_{83}	$b_{145} + b_{151} + b_{152}$
b_8	b_{99}	$b_{160} + 2b_{166}$
b_8	b_{100}	b_{160}
b_8	b_{104}	$b_{160} + b_{166}$
b_8	b_{107}	b_{155}
b_8	b_{110}	$b_{168} + b_{169}$
b_8	b_{119}	b_{178}
b_8	b_{121}	b_{178}
b_8	b_{127}	b_{181}
b_8	b_{133}	$b_{180} + b_{181} + b_{182}$
b_8	b_{137}	$b_{181} + b_{182} + 2b_{185}$

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Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_8	b_{147}	b_{195}
b_8	b_{156}	$b_{198} + b_{203}$
b_8	b_{171}	$2b_{207} + b_{208}$
b_8	b_{173}	$b_{205} + b_{206} + b_{207}$
b_8	b_{184}	$b_{210} + b_{211}$
b_8	b_{186}	$2b_{210} + b_{211}$
b_8	b_{188}	$2b_{209} + b_{210} + b_{211}$
b_8	b_{189}	$b_{209} + b_{210}$
b_8	b_{190}	b_{213}
b_8	b_{193}	$b_{212} + b_{213}$
b_8	b_{194}	b_{213}
b_8	b_{195}	$2b_{213}$
b_8	b_{197}	$b_{212} + b_{213}$
b_8	b_{198}	b_{214}
b_8	b_{201}	b_{214}
b_8	b_{203}	b_{214}
b_9	b_{30}	b_{82}
b_9	b_{33}	$b_{78} + b_{82} + b_{88}$
b_9	b_{34}	$b_{78} + b_{82}$
b_9	b_{37}	b_{92}
b_9	b_{41}	b_{105}
b_9	b_{46}	b_{105}
b_9	b_{49}	b_{111}
b_9	b_{54}	b_{108}
b_9	b_{55}	$b_{111} + b_{116}$
b_9	b_{70}	b_{132}
b_9	b_{83}	b_{145}
b_9	b_{99}	b_{160}
b_9	b_{104}	$b_{160} + b_{166}$
b_9	b_{107}	b_{161}
b_9	b_{110}	$b_{169} + b_{174}$
b_9	b_{123}	b_{178}
b_9	b_{127}	b_{182}
b_9	b_{133}	$b_{181} + b_{182} + b_{185}$
b_9	b_{137}	$b_{181} + b_{182}$
b_9	b_{173}	b_{207}
b_9	b_{188}	$b_{210} + b_{211}$
b_9	b_{189}	$b_{209} + b_{210}$

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Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_9	b_{192}	b_{213}
b_9	b_{193}	b_{213}
b_9	b_{194}	$b_{212} + b_{213}$
b_9	b_{197}	b_{213}
b_9	b_{200}	b_{214}
b_9	b_{201}	b_{214}
b_{10}	b_{10}	b_{43}
b_{10}	b_{32}	b_{82}
b_{10}	b_{33}	$2b_{78} + b_{82} + b_{88}$
b_{10}	b_{34}	$b_{78} + b_{82}$
b_{10}	b_{35}	b_{78}
b_{10}	b_{37}	$b_{92} + b_{93}$
b_{10}	b_{45}	b_{105}
b_{10}	b_{46}	b_{105}
b_{10}	b_{49}	$2b_{111} + b_{112}$
b_{10}	b_{55}	$b_{111} + b_{116}$
b_{10}	b_{58}	b_{108}
b_{10}	b_{64}	b_{125}
b_{10}	b_{70}	b_{132}
b_{10}	b_{74}	b_{132}
b_{10}	b_{83}	$b_{141} + b_{145}$
b_{10}	b_{90}	b_{151}
b_{10}	b_{99}	b_{160}
b_{10}	b_{103}	b_{166}
b_{10}	b_{104}	$b_{160} + 2b_{166}$
b_{10}	b_{107}	b_{157}
b_{10}	b_{110}	$b_{169} + b_{170}$
b_{10}	b_{122}	b_{178}
b_{10}	b_{123}	b_{178}
b_{10}	b_{127}	b_{182}
b_{10}	b_{133}	$b_{181} + b_{182} + b_{183}$
b_{10}	b_{137}	$b_{180} + b_{181} + 2b_{182}$
b_{10}	b_{172}	b_{205}
b_{10}	b_{173}	$b_{207} + b_{208}$
b_{10}	b_{187}	$b_{209} + b_{210}$
b_{10}	b_{188}	$2b_{210} + b_{211}$
b_{10}	b_{189}	$2b_{209} + b_{210} + b_{211}$
b_{10}	b_{191}	b_{213}

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{10}	b_{193}	b_{213}
b_{10}	b_{194}	$b_{212} + b_{213}$
b_{10}	b_{196}	$b_{212} + b_{213}$
b_{10}	b_{197}	$2b_{213}$
b_{10}	b_{199}	b_{214}
b_{10}	b_{201}	b_{214}
b_{10}	b_{202}	b_{214}
b_{11}	b_{11}	b_{43}
b_{11}	b_{30}	b_{88}
b_{11}	b_{32}	b_{88}
b_{11}	b_{33}	$2b_{82}$
b_{11}	b_{34}	$2b_{78}$
b_{11}	b_{37}	$b_{95} + b_{97}$
b_{11}	b_{41}	b_{105}
b_{11}	b_{45}	b_{105}
b_{11}	b_{49}	b_{112}
b_{11}	b_{53}	b_{108}
b_{11}	b_{55}	$2b_{111}$
b_{11}	b_{61}	b_{125}
b_{11}	b_{74}	b_{132}
b_{11}	b_{83}	b_{141}
b_{11}	b_{90}	b_{154}
b_{11}	b_{103}	b_{166}
b_{11}	b_{104}	$2b_{160}$
b_{11}	b_{107}	b_{162}
b_{11}	b_{110}	$b_{170} + b_{174}$
b_{11}	b_{118}	b_{178}
b_{11}	b_{120}	b_{178}
b_{11}	b_{127}	$b_{183} + b_{185}$
b_{11}	b_{133}	$2b_{182}$
b_{11}	b_{137}	$2b_{181}$
b_{11}	b_{172}	b_{204}
b_{11}	b_{187}	b_{209}
b_{11}	b_{189}	$2b_{210} + b_{211}$
b_{11}	b_{191}	b_{212}
b_{11}	b_{192}	b_{212}
b_{11}	b_{194}	$2b_{213}$
b_{11}	b_{196}	b_{213}

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{11}	b_{199}	b_{214}
b_{11}	b_{200}	b_{214}
b_{12}	b_{17}	b_{68}
b_{12}	b_{37}	b_{116}
b_{12}	b_{49}	b_{132}
b_{12}	b_{83}	b_{166}
b_{12}	b_{99}	b_{178}
b_{12}	b_{147}	b_{198}
b_{12}	b_{156}	b_{207}
b_{12}	b_{171}	$b_{210} + b_{211}$
b_{12}	b_{173}	$b_{209} + b_{210}$
b_{12}	b_{184}	b_{213}
b_{12}	b_{186}	b_{213}
b_{12}	b_{188}	$b_{212} + b_{213}$
b_{12}	b_{189}	b_{213}
b_{12}	b_{195}	b_{214}
b_{12}	b_{197}	b_{214}
b_{13}	b_{37}	b_{111}
b_{13}	b_{104}	b_{178}
b_{13}	b_{172}	b_{210}
b_{13}	b_{173}	b_{210}
b_{13}	b_{187}	b_{213}
b_{13}	b_{188}	b_{213}
b_{13}	b_{189}	$b_{212} + b_{213}$
b_{13}	b_{196}	b_{214}
b_{13}	b_{197}	b_{214}
b_{14}	b_{33}	b_{105}
b_{14}	b_{34}	b_{105}
b_{14}	b_{37}	b_{111}
b_{14}	b_{46}	b_{108}
b_{14}	b_{55}	b_{132}
b_{14}	b_{83}	b_{160}
b_{14}	b_{104}	b_{178}
b_{14}	b_{107}	b_{169}
b_{14}	b_{110}	$b_{181} + b_{182}$
b_{14}	b_{173}	$b_{210} + b_{211}$
b_{14}	b_{188}	$2b_{213}$
b_{14}	b_{189}	$b_{212} + b_{213}$

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{14}	b_{193}	b_{214}
b_{14}	b_{194}	b_{214}
b_{14}	b_{197}	b_{214}
b_{15}	b_{30}	b_{105}
b_{15}	b_{33}	b_{105}
b_{15}	b_{41}	b_{108}
b_{15}	b_{107}	b_{174}
b_{15}	b_{110}	$b_{182} + b_{185}$
b_{15}	b_{189}	b_{213}
b_{15}	b_{192}	b_{214}
b_{15}	b_{194}	b_{214}
b_{16}	b_{32}	b_{105}
b_{16}	b_{33}	b_{105}
b_{16}	b_{37}	b_{112}
b_{16}	b_{45}	b_{108}
b_{16}	b_{49}	b_{125}
b_{16}	b_{90}	b_{166}
b_{16}	b_{103}	b_{178}
b_{16}	b_{107}	b_{170}
b_{16}	b_{110}	$b_{182} + b_{183}$
b_{16}	b_{172}	b_{209}
b_{16}	b_{187}	$b_{212} + b_{213}$
b_{16}	b_{189}	$2b_{213}$
b_{16}	b_{191}	b_{214}
b_{16}	b_{194}	b_{214}
b_{16}	b_{196}	b_{214}
b_{17}	b_{34}	b_{105}
b_{17}	b_{35}	b_{105}
b_{17}	b_{37}	b_{116}
b_{17}	b_{47}	b_{108}
b_{17}	b_{49}	b_{132}
b_{17}	b_{55}	b_{132}
b_{17}	b_{83}	$b_{160} + b_{166}$
b_{17}	b_{99}	b_{178}
b_{17}	b_{107}	b_{168}
b_{17}	b_{110}	$b_{180} + b_{181}$
b_{17}	b_{147}	b_{203}
b_{17}	b_{156}	$b_{207} + b_{208}$

continued on next page...

TABLE 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{17}	b_{171}	$2b_{210} + b_{211}$
b_{17}	b_{173}	$b_{209} + b_{211}$
b_{17}	b_{184}	b_{213}
b_{17}	b_{186}	$2b_{213}$
b_{17}	b_{188}	$b_{212} + b_{213}$
b_{17}	b_{190}	b_{214}
b_{17}	b_{193}	b_{214}
b_{17}	b_{195}	b_{214}
b_{18}	b_{173}	b_{213}
b_{18}	b_{188}	b_{214}
b_{18}	b_{189}	b_{214}
b_{19}	b_{172}	b_{213}
b_{19}	b_{187}	b_{214}
b_{19}	b_{189}	b_{214}
b_{20}	b_{37}	b_{132}
b_{20}	b_{83}	b_{178}
b_{20}	b_{147}	b_{207}
b_{20}	b_{156}	$b_{210} + b_{211}$
b_{20}	b_{171}	$2b_{213}$
b_{20}	b_{173}	$b_{212} + b_{213}$
b_{20}	b_{184}	b_{214}
b_{20}	b_{186}	b_{214}
b_{20}	b_{188}	b_{214}
b_{21}	b_{33}	b_{108}
b_{21}	b_{107}	b_{182}
b_{21}	b_{189}	b_{214}
b_{22}	b_{34}	b_{108}
b_{22}	b_{107}	b_{181}
b_{22}	b_{173}	b_{213}
b_{22}	b_{188}	b_{214}
b_{23}	b_{30}	b_{108}
b_{23}	b_{107}	b_{185}
b_{24}	b_{32}	b_{108}
b_{24}	b_{37}	b_{125}
b_{24}	b_{90}	b_{178}
b_{24}	b_{107}	b_{183}
b_{24}	b_{172}	b_{212}
b_{24}	b_{187}	b_{214}
continued on next page...		

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{25}	b_{35}	b_{108}
b_{25}	b_{107}	b_{180}
b_{25}	b_{147}	b_{208}
b_{25}	b_{156}	b_{210}
b_{25}	b_{171}	b_{213}
b_{25}	b_{186}	b_{214}
b_{27}	b_{173}	b_{214}
b_{28}	b_{172}	b_{214}
b_{29}	b_{147}	b_{210}
b_{29}	b_{156}	b_{213}
b_{29}	b_{171}	b_{214}
b_{30}	b_{32}	$2b_{125}$
b_{30}	b_{37}	$b_{142} + b_{154}$
b_{30}	b_{49}	b_{166}
b_{30}	b_{55}	b_{160}
b_{30}	b_{61}	b_{178}
b_{30}	b_{73}	b_{178}
b_{30}	b_{90}	$2b_{183}$
b_{30}	b_{107}	b_{192}
b_{30}	b_{110}	b_{200}
b_{30}	b_{127}	b_{204}
b_{30}	b_{133}	b_{206}
b_{30}	b_{137}	$2b_{207}$
b_{30}	b_{146}	b_{211}
b_{30}	b_{148}	b_{209}
b_{30}	b_{153}	$2b_{210} + b_{211}$
b_{30}	b_{161}	b_{213}
b_{30}	b_{162}	b_{212}
b_{30}	b_{163}	b_{212}
b_{30}	b_{167}	$2b_{213}$
b_{30}	b_{174}	b_{214}
b_{30}	b_{179}	b_{214}
b_{31}	b_{147}	b_{211}
b_{31}	b_{156}	b_{213}
b_{31}	b_{171}	b_{214}
b_{31}	b_{173}	b_{214}
b_{32}	b_{37}	b_{154}
b_{32}	b_{49}	b_{166}

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{32}	b_{55}	$2b_{160}$
b_{32}	b_{61}	b_{178}
b_{32}	b_{90}	$2b_{185}$
b_{32}	b_{107}	b_{191}
b_{32}	b_{110}	b_{199}
b_{32}	b_{127}	b_{204}
b_{32}	b_{133}	b_{205}
b_{32}	b_{143}	b_{210}
b_{32}	b_{148}	b_{209}
b_{32}	b_{157}	b_{213}
b_{32}	b_{162}	b_{212}
b_{32}	b_{170}	b_{214}
b_{33}	b_{33}	$3b_{125}$
b_{33}	b_{34}	b_{132}
b_{33}	b_{35}	b_{132}
b_{33}	b_{37}	$b_{149} + b_{151} + b_{152}$
b_{33}	b_{49}	$2b_{160} + 2b_{166}$
b_{33}	b_{55}	$2b_{160} + 2b_{166}$
b_{33}	b_{63}	b_{178}
b_{33}	b_{64}	b_{178}
b_{33}	b_{66}	b_{178}
b_{33}	b_{83}	$b_{180} + b_{181}$
b_{33}	b_{90}	$3b_{182}$
b_{33}	b_{107}	b_{194}
b_{33}	b_{110}	$b_{199} + b_{200} + b_{201}$
b_{33}	b_{127}	$b_{205} + b_{206}$
b_{33}	b_{133}	$2b_{204} + b_{205} + b_{206} + b_{207}$
b_{33}	b_{137}	$2b_{205} + b_{206} + b_{207} + b_{208}$
b_{33}	b_{143}	$b_{209} + b_{211}$
b_{33}	b_{146}	$b_{209} + b_{210}$
b_{33}	b_{148}	$2b_{209} + b_{210} + b_{211}$
b_{33}	b_{150}	$2b_{210} + b_{211}$
b_{33}	b_{153}	$2b_{209} + b_{210} + b_{211}$
b_{33}	b_{155}	b_{213}
b_{33}	b_{157}	$b_{212} + b_{213}$
b_{33}	b_{161}	$b_{212} + b_{213}$
b_{33}	b_{162}	$2b_{213}$
b_{33}	b_{165}	$2b_{213}$

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{33}	b_{167}	$b_{212} + b_{213}$
b_{33}	b_{169}	b_{214}
b_{33}	b_{170}	b_{214}
b_{33}	b_{174}	b_{214}
b_{33}	b_{177}	b_{214}
b_{34}	b_{34}	$2b_{125} + b_{132}$
b_{34}	b_{37}	b_{145}
b_{34}	b_{49}	b_{160}
b_{34}	b_{55}	$b_{160} + b_{166}$
b_{34}	b_{70}	b_{178}
b_{34}	b_{83}	$b_{181} + b_{182}$
b_{34}	b_{90}	$2b_{181}$
b_{34}	b_{107}	b_{193}
b_{34}	b_{110}	$b_{198} + b_{201}$
b_{34}	b_{127}	b_{207}
b_{34}	b_{133}	$b_{205} + b_{206} + b_{207}$
b_{34}	b_{137}	$2b_{204} + b_{205} + b_{206} + b_{207}$
b_{34}	b_{143}	$b_{209} + b_{210}$
b_{34}	b_{144}	$2b_{210} + b_{211}$
b_{34}	b_{146}	$b_{209} + b_{211}$
b_{34}	b_{148}	$b_{210} + b_{211}$
b_{34}	b_{150}	$2b_{209} + b_{210} + b_{211}$
b_{34}	b_{153}	$b_{209} + b_{210}$
b_{34}	b_{155}	$b_{212} + b_{213}$
b_{34}	b_{157}	b_{213}
b_{34}	b_{159}	b_{213}
b_{34}	b_{161}	b_{213}
b_{34}	b_{164}	$2b_{213}$
b_{34}	b_{165}	$b_{212} + b_{213}$
b_{34}	b_{168}	b_{214}
b_{34}	b_{169}	b_{214}
b_{34}	b_{176}	b_{214}
b_{35}	b_{35}	$b_{125} + b_{132}$
b_{35}	b_{83}	$b_{180} + b_{182}$
b_{35}	b_{90}	b_{180}
b_{35}	b_{107}	b_{190}
b_{35}	b_{110}	b_{198}
b_{35}	b_{131}	b_{208}
continued on next page...		

TABLE 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{35}	b_{133}	b_{207}
b_{35}	b_{137}	$b_{205} + b_{208}$
b_{35}	b_{140}	b_{210}
b_{35}	b_{143}	b_{211}
b_{35}	b_{144}	$b_{209} + b_{211}$
b_{35}	b_{146}	b_{210}
b_{35}	b_{150}	$b_{209} + b_{210}$
b_{35}	b_{155}	b_{213}
b_{35}	b_{158}	b_{213}
b_{35}	b_{164}	$b_{212} + b_{213}$
b_{35}	b_{168}	b_{214}
b_{35}	b_{175}	b_{214}
b_{36}	b_{137}	b_{211}
b_{36}	b_{153}	b_{213}
b_{36}	b_{163}	b_{214}
b_{36}	b_{167}	b_{214}
b_{37}	b_{37}	b_{162}
b_{37}	b_{38}	b_{160}
b_{37}	b_{41}	b_{166}
b_{37}	b_{45}	b_{166}
b_{37}	b_{46}	b_{160}
b_{37}	b_{49}	$b_{170} + b_{174}$
b_{37}	b_{53}	b_{178}
b_{37}	b_{55}	$b_{169} + b_{177}$
b_{37}	b_{61}	$b_{183} + b_{185}$
b_{37}	b_{63}	b_{182}
b_{37}	b_{64}	b_{182}
b_{37}	b_{66}	b_{182}
b_{37}	b_{70}	b_{181}
b_{37}	b_{73}	b_{185}
b_{37}	b_{83}	b_{195}
b_{37}	b_{90}	b_{191}
b_{37}	b_{99}	$b_{198} + b_{203}$
b_{37}	b_{103}	b_{199}
b_{37}	b_{104}	$b_{201} + b_{202}$
b_{37}	b_{118}	b_{204}
b_{37}	b_{119}	b_{207}
b_{37}	b_{120}	b_{204}

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{37}	b_{121}	$b_{207} + b_{208}$
b_{37}	b_{122}	b_{205}
b_{37}	b_{123}	$b_{205} + b_{206}$
b_{37}	b_{135}	b_{210}
b_{37}	b_{136}	$b_{210} + b_{211}$
b_{37}	b_{138}	b_{209}
b_{37}	b_{139}	b_{209}
b_{37}	b_{151}	b_{213}
b_{37}	b_{152}	b_{213}
b_{37}	b_{154}	b_{212}
b_{37}	b_{166}	b_{214}
b_{38}	b_{55}	b_{178}
b_{38}	b_{137}	$b_{209} + b_{210}$
b_{38}	b_{150}	b_{213}
b_{38}	b_{153}	$b_{212} + b_{213}$
b_{38}	b_{165}	b_{214}
b_{38}	b_{167}	b_{214}
b_{39}	b_{137}	$b_{209} + b_{211}$
b_{39}	b_{144}	$2b_{213}$
b_{39}	b_{150}	$b_{212} + b_{213}$
b_{39}	b_{153}	b_{213}
b_{39}	b_{159}	b_{214}
b_{39}	b_{164}	b_{214}
b_{39}	b_{165}	b_{214}
b_{40}	b_{131}	b_{210}
b_{40}	b_{137}	b_{210}
b_{40}	b_{140}	b_{213}
b_{40}	b_{144}	$b_{212} + b_{213}$
b_{40}	b_{150}	b_{213}
b_{40}	b_{158}	b_{214}
b_{40}	b_{164}	b_{214}
b_{41}	b_{49}	b_{178}
b_{41}	b_{107}	b_{200}
b_{41}	b_{110}	$b_{204} + b_{206}$
b_{41}	b_{127}	b_{209}
b_{41}	b_{133}	$b_{209} + b_{211}$
b_{41}	b_{137}	$2b_{210} + b_{211}$
b_{41}	b_{146}	b_{213}
continued on next page...		

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{41}	b_{148}	$b_{212} + b_{213}$
b_{41}	b_{153}	$2b_{213}$
b_{41}	b_{161}	b_{214}
b_{41}	b_{162}	b_{214}
b_{41}	b_{167}	b_{214}
b_{44}	b_{147}	b_{213}
b_{44}	b_{156}	b_{214}
b_{45}	b_{49}	b_{178}
b_{45}	b_{107}	b_{199}
b_{45}	b_{110}	$b_{204} + b_{205}$
b_{45}	b_{127}	b_{209}
b_{45}	b_{133}	$b_{209} + b_{210}$
b_{45}	b_{143}	b_{213}
b_{45}	b_{148}	$b_{212} + b_{213}$
b_{45}	b_{157}	b_{214}
b_{45}	b_{162}	b_{214}
b_{46}	b_{55}	b_{178}
b_{46}	b_{107}	b_{201}
b_{46}	b_{110}	$b_{205} + b_{206} + b_{207}$
b_{46}	b_{127}	$b_{210} + b_{211}$
b_{46}	b_{133}	$2b_{209} + b_{210} + b_{211}$
b_{46}	b_{137}	$2b_{209} + b_{210} + b_{211}$
b_{46}	b_{143}	$b_{212} + b_{213}$
b_{46}	b_{146}	$b_{212} + b_{213}$
b_{46}	b_{148}	$2b_{213}$
b_{46}	b_{150}	$2b_{213}$
b_{46}	b_{153}	$b_{212} + b_{213}$
b_{46}	b_{155}	b_{214}
b_{46}	b_{157}	b_{214}
b_{46}	b_{161}	b_{214}
b_{46}	b_{165}	b_{214}
b_{47}	b_{107}	b_{198}
b_{47}	b_{110}	b_{207}
b_{47}	b_{133}	$b_{210} + b_{211}$
b_{47}	b_{137}	$b_{209} + b_{210}$
b_{47}	b_{143}	b_{213}
b_{47}	b_{144}	b_{213}
b_{47}	b_{146}	b_{213}

continued on next page...

TABLE 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{47}	b_{150}	$b_{212} + b_{213}$
b_{47}	b_{155}	b_{214}
b_{47}	b_{164}	b_{214}
b_{48}	b_{137}	b_{213}
b_{48}	b_{153}	b_{214}
b_{49}	b_{49}	$2b_{182} + b_{183} + b_{185}$
b_{49}	b_{55}	$b_{181} + 2b_{182}$
b_{49}	b_{83}	$b_{198} + b_{203}$
b_{49}	b_{90}	b_{199}
b_{49}	b_{99}	$2b_{207} + b_{208}$
b_{49}	b_{103}	$b_{204} + b_{205}$
b_{49}	b_{104}	$2b_{205} + b_{206} + b_{207} + b_{208}$
b_{49}	b_{118}	b_{209}
b_{49}	b_{119}	$b_{210} + b_{211}$
b_{49}	b_{120}	b_{209}
b_{49}	b_{121}	$2b_{210} + b_{211}$
b_{49}	b_{122}	$b_{209} + b_{210}$
b_{49}	b_{123}	$2b_{209} + b_{210} + b_{211}$
b_{49}	b_{135}	b_{213}
b_{49}	b_{136}	$2b_{213}$
b_{49}	b_{138}	$b_{212} + b_{213}$
b_{49}	b_{139}	$b_{212} + b_{213}$
b_{49}	b_{151}	b_{214}
b_{49}	b_{152}	b_{214}
b_{49}	b_{154}	b_{214}
b_{50}	b_{137}	$b_{212} + b_{213}$
b_{50}	b_{150}	b_{214}
b_{50}	b_{153}	b_{214}
b_{51}	b_{137}	b_{213}
b_{51}	b_{144}	b_{214}
b_{51}	b_{150}	b_{214}
b_{53}	b_{107}	b_{204}
b_{53}	b_{110}	b_{209}
b_{53}	b_{127}	b_{212}
b_{53}	b_{133}	b_{213}
b_{53}	b_{148}	b_{214}
b_{54}	b_{107}	b_{206}
b_{54}	b_{110}	$b_{209} + b_{211}$

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{54}	b_{127}	b_{213}
b_{54}	b_{133}	$b_{212} + b_{213}$
b_{54}	b_{137}	$2b_{213}$
b_{54}	b_{146}	b_{214}
b_{54}	b_{148}	b_{214}
b_{54}	b_{153}	b_{214}
b_{55}	b_{55}	$b_{181} + 2b_{182} + 2b_{183} + b_{185}$
b_{55}	b_{83}	$b_{198} + b_{201}$
b_{55}	b_{99}	$b_{205} + b_{206} + b_{207}$
b_{55}	b_{100}	b_{207}
b_{55}	b_{104}	$2b_{204} + b_{205} + b_{206} + b_{207}$
b_{55}	b_{113}	$b_{210} + b_{211}$
b_{55}	b_{117}	$b_{209} + b_{210}$
b_{55}	b_{119}	$b_{209} + b_{210}$
b_{55}	b_{120}	$2b_{210} + b_{211}$
b_{55}	b_{121}	$b_{209} + b_{211}$
b_{55}	b_{123}	$2b_{209} + b_{210} + b_{211}$
b_{55}	b_{128}	b_{213}
b_{55}	b_{129}	b_{213}
b_{55}	b_{130}	b_{213}
b_{55}	b_{134}	$b_{212} + b_{213}$
b_{55}	b_{136}	$b_{212} + b_{213}$
b_{55}	b_{139}	$2b_{213}$
b_{55}	b_{145}	b_{214}
b_{55}	b_{149}	b_{214}
b_{55}	b_{152}	b_{214}
b_{56}	b_{144}	b_{214}
b_{57}	b_{131}	b_{213}
b_{57}	b_{140}	b_{214}
b_{57}	b_{144}	b_{214}
b_{58}	b_{107}	b_{205}
b_{58}	b_{110}	$b_{209} + b_{210}$
b_{58}	b_{127}	b_{213}
b_{58}	b_{133}	$b_{212} + b_{213}$
b_{58}	b_{143}	b_{214}
b_{58}	b_{148}	b_{214}
b_{59}	b_{147}	b_{214}
b_{60}	b_{107}	b_{207}

continued on next page...

TABLE 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{60}	b_{110}	$b_{210} + b_{211}$
b_{60}	b_{133}	$2b_{213}$
b_{60}	b_{137}	$b_{212} + b_{213}$
b_{60}	b_{143}	b_{214}
b_{60}	b_{146}	b_{214}
b_{60}	b_{150}	b_{214}
b_{61}	b_{90}	b_{204}
b_{61}	b_{103}	b_{209}
b_{61}	b_{104}	$2b_{210} + b_{211}$
b_{61}	b_{118}	b_{212}
b_{61}	b_{120}	b_{212}
b_{61}	b_{122}	b_{213}
b_{61}	b_{123}	$2b_{213}$
b_{61}	b_{138}	b_{214}
b_{61}	b_{139}	b_{214}
b_{62}	b_{137}	b_{214}
b_{63}	b_{83}	b_{207}
b_{63}	b_{99}	$b_{210} + b_{211}$
b_{63}	b_{104}	$b_{209} + b_{210}$
b_{63}	b_{119}	b_{213}
b_{63}	b_{120}	b_{213}
b_{63}	b_{121}	b_{213}
b_{63}	b_{123}	$b_{212} + b_{213}$
b_{63}	b_{136}	b_{214}
b_{63}	b_{139}	b_{214}
b_{64}	b_{83}	$b_{207} + b_{208}$
b_{64}	b_{90}	b_{205}
b_{64}	b_{99}	$2b_{210} + b_{211}$
b_{64}	b_{103}	$b_{209} + b_{210}$
b_{64}	b_{104}	$2b_{209} + b_{210} + b_{211}$
b_{64}	b_{118}	b_{213}
b_{64}	b_{119}	b_{213}
b_{64}	b_{121}	$2b_{213}$
b_{64}	b_{122}	$b_{212} + b_{213}$
b_{64}	b_{123}	$b_{212} + b_{213}$
b_{64}	b_{135}	b_{214}
b_{64}	b_{136}	b_{214}
b_{64}	b_{138}	b_{214}

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{65}	b_{137}	b_{214}
b_{66}	b_{104}	$b_{209} + b_{211}$
b_{66}	b_{117}	b_{213}
b_{66}	b_{120}	$2b_{213}$
b_{66}	b_{123}	$b_{212} + b_{213}$
b_{66}	b_{129}	b_{214}
b_{66}	b_{134}	b_{214}
b_{66}	b_{139}	b_{214}
b_{67}	b_{107}	b_{209}
b_{67}	b_{110}	$b_{212} + b_{213}$
b_{67}	b_{127}	b_{214}
b_{67}	b_{133}	b_{214}
b_{69}	b_{107}	b_{211}
b_{69}	b_{110}	b_{213}
b_{69}	b_{133}	b_{214}
b_{69}	b_{137}	b_{214}
b_{70}	b_{83}	$b_{205} + b_{206} + b_{207}$
b_{70}	b_{99}	$2b_{209} + b_{210} + b_{211}$
b_{70}	b_{100}	$b_{210} + b_{211}$
b_{70}	b_{104}	$2b_{209} + b_{210} + b_{211}$
b_{70}	b_{113}	$2b_{213}$
b_{70}	b_{117}	$b_{212} + b_{213}$
b_{70}	b_{119}	$b_{212} + b_{213}$
b_{70}	b_{121}	$b_{212} + b_{213}$
b_{70}	b_{123}	$2b_{213}$
b_{70}	b_{128}	b_{214}
b_{70}	b_{130}	b_{214}
b_{70}	b_{134}	b_{214}
b_{70}	b_{136}	b_{214}
b_{72}	b_{107}	b_{210}
b_{72}	b_{110}	b_{213}
b_{72}	b_{133}	b_{214}
b_{73}	b_{120}	b_{212}
b_{73}	b_{129}	b_{214}
b_{74}	b_{83}	$b_{204} + b_{205} + b_{208}$
b_{74}	b_{99}	$b_{209} + b_{210}$
b_{74}	b_{100}	$b_{209} + b_{210}$
b_{74}	b_{109}	b_{213}

continued on next page...

Table 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{74}	b_{113}	$b_{212} + b_{213}$
b_{74}	b_{119}	b_{213}
b_{74}	b_{126}	b_{214}
b_{74}	b_{128}	b_{214}
b_{75}	b_{131}	b_{214}
b_{76}	b_{104}	b_{213}
b_{76}	b_{120}	b_{214}
b_{76}	b_{123}	b_{214}
b_{77}	b_{90}	b_{209}
b_{77}	b_{103}	$b_{212} + b_{213}$
b_{77}	b_{104}	$2b_{213}$
b_{77}	b_{118}	b_{214}
b_{77}	b_{122}	b_{214}
b_{77}	b_{123}	b_{214}
b_{79}	b_{83}	$b_{210} + b_{211}$
b_{79}	b_{99}	$2b_{213}$
b_{79}	b_{104}	$b_{212} + b_{213}$
b_{79}	b_{119}	b_{214}
b_{79}	b_{121}	b_{214}
b_{79}	b_{123}	b_{214}
b_{80}	b_{83}	b_{210}
b_{80}	b_{90}	b_{210}
b_{80}	b_{99}	b_{213}
b_{80}	b_{103}	b_{213}
b_{80}	b_{104}	$b_{212} + b_{213}$
b_{80}	b_{121}	b_{214}
b_{80}	b_{122}	b_{214}
b_{81}	b_{104}	$b_{212} + b_{213}$
b_{81}	b_{117}	b_{214}
b_{81}	b_{123}	b_{214}
b_{82}	b_{107}	b_{213}
b_{82}	b_{110}	b_{214}
b_{83}	b_{85}	$b_{209} + b_{211}$
b_{83}	b_{87}	$b_{209} + b_{210}$
b_{83}	b_{89}	$b_{209} + b_{210}$
b_{83}	b_{91}	b_{211}
b_{83}	b_{94}	b_{213}
b_{83}	b_{96}	b_{213}

continued on next page...

TABLE 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{83}	b_{102}	$b_{212} + b_{213}$
b_{83}	b_{106}	b_{213}
b_{83}	b_{115}	b_{214}
b_{83}	b_{116}	b_{214}
b_{85}	b_{99}	$b_{212} + b_{213}$
b_{85}	b_{100}	b_{213}
b_{85}	b_{104}	$2b_{213}$
b_{85}	b_{113}	b_{214}
b_{85}	b_{117}	b_{214}
b_{85}	b_{121}	b_{214}
b_{86}	b_{120}	b_{214}
b_{87}	b_{99}	$b_{212} + b_{213}$
b_{87}	b_{100}	b_{213}
b_{87}	b_{113}	b_{214}
b_{87}	b_{119}	b_{214}
b_{88}	b_{107}	b_{212}
b_{88}	b_{110}	b_{214}
b_{89}	b_{99}	b_{213}
b_{89}	b_{100}	$b_{212} + b_{213}$
b_{89}	b_{109}	b_{214}
b_{89}	b_{113}	b_{214}
b_{90}	b_{93}	b_{213}
b_{90}	b_{97}	b_{212}
b_{90}	b_{112}	b_{214}
b_{91}	b_{100}	b_{213}
b_{91}	b_{109}	b_{214}
b_{91}	b_{114}	b_{214}
b_{92}	b_{104}	b_{214}
b_{93}	b_{103}	b_{214}
b_{93}	b_{104}	b_{214}
b_{94}	b_{99}	b_{214}
b_{94}	b_{104}	b_{214}
b_{96}	b_{99}	b_{214}
b_{97}	b_{103}	b_{214}
b_{98}	b_{104}	b_{214}
b_{99}	b_{102}	b_{214}
b_{100}	b_{102}	b_{214}
b_{100}	b_{106}	b_{214}

continued on next page...

TABLE 37. Multiplication table for E_6/P_5 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_{105}	b_{107}	b_{214}

TABLE 38. Schubert classes for E_6/P_6

$w \in W^P$	ϵ_w	$\ell(w)$	$d(w)$	PD	$b(w)$
e	b_0	0	0	b_{26}	$(1,1,1,1,1,1)$
6	b_1	1	0	b_{25}	$(1,1,1,1,2,-1)$
56	b_2	2	0	b_{24}	$(1,1,1,3,-2,1)$
456	b_3	3	0	b_{23}	$(1,4,4,-3,1,1)$
2456	b_4	4	0	b_{22}	$(1,-4,4,1,1,1)$
3456	b_5	4	0	b_{21}	$(5,4,-4,1,1,1)$
13456	b_6	5	0	b_{20}	$(-5,4,1,1,1,1)$
23456	b_7	5	0	b_{19}	$(5,-4,-4,5,1,1)$
123456	b_8	6	0	b_{18}	$(-5,-4,1,5,1,1)$
423456	b_9	6	0	b_{17}	$(5,1,1,-5,6,1)$
1423456	b_{10}	7	0	b_{16}	$(-5,1,6,-5,6,1)$
5423456	b_{11}	7	0	b_{15}	$(5,1,1,1,-6,7)$
15423456	b_{12}	8	0	b_{12}	$(-5,1,6,1,-6,7)$
31423456	b_{13}	8	0	b_{13}	$(1,1,-6,1,6,1)$
65423456	b_{14}	8	0	b_{14}	$(5,1,1,1,1,-7)$
165423456	b_{15}	9	0	b_{11}	$(-5,1,6,1,1,-7)$
315423456	b_{16}	9	0	b_{10}	$(1,1,-6,7,-6,7)$
3165423456	b_{17}	10	0	b_9	$(1,1,-6,7,1,-7)$
4315423456	b_{18}	10	0	b_8	$(1,8,1,-7,1,7)$
43165423456	b_{19}	11	0	b_7	$(1,8,1,-7,8,-7)$
24315423456	b_{20}	11	0	b_6	$(1,-8,1,1,1,7)$
243165423456	b_{21}	12	0	b_5	$(1,-8,1,1,8,-7)$
543165423456	b_{22}	12	0	b_4	$(1,8,1,1,-8,1)$
2543165423456	b_{23}	13	0	b_3	$(1,-8,1,9,-8,1)$
42543165423456	b_{24}	14	0	b_2	$(1,1,10,-9,1,1)$
342543165423456	b_{25}	15	0	b_1	$(11,1,-10,1,1,1)$
1342543165423456	b_{26}	16	0	b_0	$(-11,1,1,1,1,1)$

TABLE 39. Multiplication table for E_6/P_6

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_1	b_2
b_1	b_2	b_3
continued on next page...		

Table 39. Multiplication table for E_6/P_6 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_1	b_3	$b_4 + b_5$
b_1	b_4	b_7
b_1	b_5	$b_6 + b_7$
b_1	b_6	b_8
b_1	b_7	$b_8 + b_9$
b_1	b_8	b_{10}
b_1	b_9	$b_{10} + b_{11}$
b_1	b_{10}	$b_{12} + b_{13}$
b_1	b_{11}	$b_{12} + b_{14}$
b_1	b_{12}	$b_{15} + b_{16}$
b_1	b_{13}	b_{16}
b_1	b_{14}	b_{15}
b_1	b_{15}	b_{17}
b_1	b_{16}	$b_{17} + b_{18}$
b_1	b_{17}	b_{19}
b_1	b_{18}	$b_{19} + b_{20}$
b_1	b_{19}	$b_{21} + b_{22}$
b_1	b_{20}	b_{21}
b_1	b_{21}	b_{23}
b_1	b_{22}	b_{23}
b_1	b_{23}	b_{24}
b_1	b_{24}	b_{25}
b_2	b_2	$b_4 + b_5$
b_2	b_3	$b_6 + 2b_7$
b_2	b_4	$b_8 + b_9$
b_2	b_5	$2b_8 + b_9$
b_2	b_6	b_{10}
b_2	b_7	$2b_{10} + b_{11}$
b_2	b_8	$b_{12} + b_{13}$
b_2	b_9	$2b_{12} + b_{13} + b_{14}$
b_2	b_{10}	$b_{15} + 2b_{16}$
b_2	b_{11}	$2b_{15} + b_{16}$
b_2	b_{12}	$2b_{17} + b_{18}$
b_2	b_{13}	$b_{17} + b_{18}$
b_2	b_{14}	b_{17}
b_2	b_{15}	b_{19}
b_2	b_{16}	$2b_{19} + b_{20}$
b_2	b_{17}	$b_{21} + b_{22}$

continued on next page...

Table 39. Multiplication table for E_6/P_6 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_2	b_{18}	$2b_{21} + b_{22}$
b_2	b_{19}	$2b_{23}$
b_2	b_{20}	b_{23}
b_2	b_{21}	b_{24}
b_2	b_{22}	b_{24}
b_2	b_{23}	b_{25}
b_3	b_3	$3b_8 + 2b_9$
b_3	b_4	$2b_{10} + b_{11}$
b_3	b_5	$3b_{10} + b_{11}$
b_3	b_6	$b_{12} + b_{13}$
b_3	b_7	$3b_{12} + 2b_{13} + b_{14}$
b_3	b_8	$b_{15} + 2b_{16}$
b_3	b_9	$3b_{15} + 3b_{16}$
b_3	b_{10}	$3b_{17} + 2b_{18}$
b_3	b_{11}	$3b_{17} + b_{18}$
b_3	b_{12}	$3b_{19} + b_{20}$
b_3	b_{13}	$2b_{19} + b_{20}$
b_3	b_{14}	b_{19}
b_3	b_{15}	$b_{21} + b_{22}$
b_3	b_{16}	$3b_{21} + 2b_{22}$
b_3	b_{17}	$2b_{23}$
b_3	b_{18}	$3b_{23}$
b_3	b_{19}	$2b_{24}$
b_3	b_{20}	b_{24}
b_3	b_{21}	b_{25}
b_3	b_{22}	b_{25}
b_4	b_4	$b_{12} + b_{13} + b_{14}$
b_4	b_5	$2b_{12} + b_{13}$
b_4	b_6	b_{16}
b_4	b_7	$2b_{15} + 2b_{16}$
b_4	b_8	$b_{17} + b_{18}$
b_4	b_9	$3b_{17} + b_{18}$
b_4	b_{10}	$2b_{19} + b_{20}$
b_4	b_{11}	$2b_{19}$
b_4	b_{12}	$2b_{21} + b_{22}$
b_4	b_{13}	$b_{21} + b_{22}$
b_4	b_{14}	b_{22}
b_4	b_{15}	b_{23}

continued on next page...

Table 39. Multiplication table for E_6/P_6 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_4	b_{16}	$2b_{23}$
b_4	b_{17}	b_{24}
b_4	b_{18}	b_{24}
b_4	b_{19}	b_{25}
b_5	b_5	$2b_{12} + 2b_{13} + b_{14}$
b_5	b_6	$b_{15} + b_{16}$
b_5	b_7	$2b_{15} + 3b_{16}$
b_5	b_8	$2b_{17} + b_{18}$
b_5	b_9	$3b_{17} + 2b_{18}$
b_5	b_{10}	$3b_{19} + b_{20}$
b_5	b_{11}	$2b_{19} + b_{20}$
b_5	b_{12}	$2b_{21} + 2b_{22}$
b_5	b_{13}	$2b_{21} + b_{22}$
b_5	b_{14}	b_{21}
b_5	b_{15}	b_{23}
b_5	b_{16}	$3b_{23}$
b_5	b_{17}	b_{24}
b_5	b_{18}	$2b_{24}$
b_5	b_{19}	b_{25}
b_5	b_{20}	b_{25}
b_6	b_6	b_{17}
b_6	b_7	$b_{17} + b_{18}$
b_6	b_8	b_{19}
b_6	b_9	$b_{19} + b_{20}$
b_6	b_{10}	$b_{21} + b_{22}$
b_6	b_{11}	b_{21}
b_6	b_{12}	b_{23}
b_6	b_{13}	b_{23}
b_6	b_{16}	b_{24}
b_6	b_{18}	b_{25}
b_7	b_7	$4b_{17} + 2b_{18}$
b_7	b_8	$2b_{19} + b_{20}$
b_7	b_9	$4b_{19} + b_{20}$
b_7	b_{10}	$3b_{21} + 2b_{22}$
b_7	b_{11}	$2b_{21} + 2b_{22}$
b_7	b_{12}	$3b_{23}$
b_7	b_{13}	$2b_{23}$
b_7	b_{14}	b_{23}
continued on next page...		

Table 39. Multiplication table for E_6/P_6 continued...

ϵ	η	$\epsilon \odot_0 \eta$
b_7	b_{15}	b_{24}
b_7	b_{16}	$2b_{24}$
b_7	b_{17}	b_{25}
b_7	b_{18}	b_{25}
b_8	b_8	$b_{21} + b_{22}$
b_8	b_9	$2b_{21} + b_{22}$
b_8	b_{10}	$2b_{23}$
b_8	b_{11}	b_{23}
b_8	b_{12}	b_{24}
b_8	b_{13}	b_{24}
b_8	b_{16}	b_{25}
b_9	b_9	$3b_{21} + 3b_{22}$
b_9	b_{10}	$3b_{23}$
b_9	b_{11}	$3b_{23}$
b_9	b_{12}	$2b_{24}$
b_9	b_{13}	b_{24}
b_9	b_{14}	b_{24}
b_9	b_{15}	b_{25}
b_9	b_{16}	b_{25}
b_{10}	b_{10}	$2b_{24}$
b_{10}	b_{11}	b_{24}
b_{10}	b_{12}	b_{25}
b_{10}	b_{13}	b_{25}
b_{11}	b_{11}	$2b_{24}$
b_{11}	b_{12}	b_{25}
b_{11}	b_{14}	b_{25}

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