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## **$3jm$ and $6j$ tables for some bases of $SU_6$ and $SU_3$**

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**Abstract.** Tables of  $6j$  symbols for  $SU_6$  and  $SU_3$  and tables of  $3jm$  factors for  $SU_6 \supset SU_2 \times SU_3$ ,  $SU_3 \supset U_1 \times SU_2$  and  $SU_3 \supset SO_3$  are presented. The tables are computer produced, using a program that implements the building up principle in a general form. Our tables are useful for calculations in high energy, nuclear and solid state physics. Some other tabulations contain errors, and none uses all the symmetries available. The  $n$  independence of our  $SU_n$  results is discussed by using the various symmetric group–unitary group duality relations.

### **1. Introduction**

It was recognised long ago (Wigner 1931) that the quantum theory of angular momentum is intimately related to the three-dimensional rotation group. Many aspects of this theory may be generalised to other groups. Griffith (1961) and Koster *et al* (1963) calculated coupling coefficients for point groups, which have many applications in solid state and molecular physics calculations. Racah's (1949) work on fractional parentage coefficients (CFP) showed that groups larger than  $SO_3$  are useful for classifying and constructing atomic states, and much use has been made of these methods in nuclear theory. More recently  $SU_3$  and other unitary groups have been applied to hadron model calculations.

The highly symmetric  $3jm$  and  $6j$  symbols introduced by Wigner (1940) have many advantages over the less symmetric coupling and recoupling coefficients calculated by Griffith (1961) and Koster *et al* (1963) for point groups, de Swart (1963) for  $SU_3$  and Cook and Murtaza (1965), Schülke (1965) and Carter *et al* (1965) for  $SU_6$ . The calculation of the coefficients is greatly simplified, the tabulation is much more compact and the various applications involve the use of more symmetrical equations.  $3jm$ 's and  $6j$ 's can be defined for any group (Derome and Sharp 1965, Butler 1975) but many authors still calculate unsymmetrised coefficients, for example Akiyama and Draayer (1973) and Draayer and Akiyama (1973) for  $SU_3$ , and Machacek and Tomozawa (1976) and So and Strottman (1979) for  $SU_6$ .

Several methods have been used to calculate  $3jm$ 's and  $6j$ 's (or coupling and recoupling coefficients). These include projection-operator construction of states, which often involves a transformation from a known basis (such as Akiyama and Draayer's construction of the  $SU_3 \supset SO_3$  basis from the  $SU_3 \supset U_1 \times SU_2$  basis), ladder operator techniques, which make use of matrix elements and generators (the usual angular momentum approach see Louck and Biedenharn (1973) for  $U_n$  and Alisauskas and Norvaisas (1980) for  $SU_n \supset SO_n$ ) and the building-up method we use here. The

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building-up process was shown by Butler and Wybourne (1976) to have the advantage of requiring only a knowledge of character theory, chiefly product and branching rules. This is particularly useful for groups with irreps of large dimension such as  $E_7$  (Butler *et al* 1978, 1979), where the other methods are impractical because they involve the construction of very large matrices.

The unitary groups, especially  $SU_3$  and  $SU_6$ , have been used extensively since Jahn's (1950) extension of Racah's (1949) CFP work. Harmonic oscillator calculations involve  $SU_3$  (Wybourne 1974, ch 20), and  $SU_3$  and  $SU_6$  occur in particle physics, particularly in the application of the Wigner-Eckart theorem to the colour hyperfine interaction. Some of the tables presented here have been used by Bickerstaff and Wybourne (1980, 1981) and Black and Wybourne (1981) for multi-quark hadron calculations. Likewise, crystal field calculations in the 'strong-field' parentage scheme (Tanabe and Sugano 1954a, b, 1956, Kustov 1977) use the  $SU_6 \supset SU_2 \times SU_3$  and  $SU_3 \supset SO_3$  bases.

Some previous tabulations contain errors and none displays all known symmetries. Further, there is the vexing problem of consistency between various tables (for some relevant comments see Bickerstaff (1982)). We present tabulations of  $6j$  symbols for  $SU_3$  and  $SU_6$  and  $3jm$  factors for  $SU_6 \supset SU_2 \times SU_3$ ,  $SU_3 \supset U_1 \times SU_2$  and  $SU_3 \supset SO_3$  which are consistent with our  $6j$  tables and the standard  $SU_2$  tables of Rotenberg *et al* (1959). So and Strottman's (1979) tables for  $U_6$  are not applicable to  $SU_6$  because their phase prescription results in different phases for coefficients which are equivalent under  $SU_6$ , while Hogaasen and Sorba (1978) contains normalisation errors. Kustov's (1977)  $SU_6$  and  $SU_3$  tables contain errors because he has overlooked the question of product multiplicity in  $SU_3$ . Our values are given as exact complex numbers rather than the floating-point values used in Akiyama and Draayer's (1973) calculations for  $SU_3$ .

## 2. The building-up method of calculation

The theory of the generalised Racah-Wigner algebra has been given by Derome and Sharp (1965) and Butler (1975). Butler and Wybourne (1976) recognised that sufficient recursion relations exist in the algebra to allow the calculation of  $6j$  symbols and then  $3jm$  factors, up to the phase and multiplicity freedoms allowed by Schur's lemmas. This building-up process was used by Butler (1981) to generate tables for all point groups.

The continuous groups we consider here have an infinite number of irreps. In the absence of closed analytic formulae (such as Racah's (1942) formulae for  $SO_3$  and  $SO_3 \supset SO_2$ ) we are restricted to calculating a finite number of  $6j$  symbols and  $3jm$  factors. In deciding which symbols to include, the concept of power is used. We choose a faithful irrep,  $\varepsilon$  (the irrep  $\{1\}$  for  $SU_3$  and  $SU_6$ ), and call it the primitive. The power of  $\lambda$  is defined to be the smallest  $p$  for which  $(\varepsilon + \varepsilon^*)^p \supset \lambda$ . The building-up method may be used to calculate all  $6j$  symbols and  $3jm$  factors up to a certain power: our tables include all irreps up to power 3 in  $SU_3$  and  $SU_6$ .

All the groups we consider are quasi-ambivalent and no non-simple phase irreps occur in the  $6j$ 's and  $3jm$ 's we have calculated (see Butler (1975) for a definition of these terms).  $SU_3$  has no non-simple phase irreps (Derome 1967) and the first known non-simple phase irrep of  $SU_6$  is  $\{432^2 1\}$  which is power 6 (Butler and King 1974). Because of these simplifications the equations and the symmetries of Butler (1975) may be simplified to those of the point groups (see Butler (1981) and § 3). We stress that tables which fail, via their phase choices, to employ all possible symmetries require

more complicated equations. Indeed, compare the expression for a 9j symbol as a sum of 6j symbols (Butler 1981, equation (3.3.37)) with Millener's (1978) calculations of unsymmetrised coefficients of SU<sub>3</sub>. The choice that Derome and Sharp's (1965) *A* matrix is unity, forces some 6j and 3jm values to be imaginary. It is known that even without this choice some 3jm factors for some imbeddings are always complex. Butler (1980, 1981) gives a simple example for  $T \supset D_2$ .

Butler (1981) and Bickerstaff and Wybourne (1981) have given a detailed account of the phase and multiplicity freedoms in the 6j symbols and 3jm factors. Phase choices analogous to Reid and Butler's (1980) 'orientation' choices occur in each of the 3jm factor tables presented here. The distinguishing feature of an orientation choice is that the transformation between two sets of 3jm factors with different orientation choices requires primitive transformation factors which are not unity. For point groups this restriction is equivalent to a rotation of the axes.

Some choices of multiplicity separation lead to large prime numbers appearing in the tables. Our choices are based on the *ad hoc* requirement that numbers should be as simple as possible. Butler and Ford (1979) used a special symmetry of the octahedral group to simplify the numerical values of the 6j symbols for that group, but no such symmetries exist for SU<sub>*n*</sub>.

### 3. Guide to the tables

The 6j and 3jm tables were calculated by the computer program which generated the point group tables of Butler (1981). The tables are computer typeset to preserve accuracy.

Schur-function notation (namely partitions) is used to label irreps (Wybourne 1970, 1974). For U<sub>1</sub> both positive and negative integers occur. The spin covering group of SO<sub>3</sub> is SU<sub>2</sub> and so one has a choice of labelling: either integers and half-integers, *j*, for SO<sub>3</sub>, or integers *k* for SU<sub>2</sub>, where  $k = 2j$ . The 6j symbols of SO<sub>3</sub> (and therefore for SU<sub>2</sub>) are tabulated by Rotenberg *et al* (1959). They include the 3jm factors for SO<sub>3</sub>  $\supset$  SO<sub>2</sub> (SU<sub>2</sub>  $\supset$  U<sub>1</sub>) under the name '3j symbols'. For our table SU<sub>3</sub>  $\supset$  SO<sub>3</sub> we use the SO<sub>3</sub> labels, while for SU<sub>3</sub>  $\supset$  U<sub>1</sub>  $\times$  SU<sub>2</sub> and SU<sub>6</sub>  $\supset$  SU<sub>2</sub>  $\times$  SU<sub>3</sub> we use the SU<sub>2</sub> labels.

Table 1 lists the irreps of SU<sub>3</sub>, up to power 3, giving complex conjugation properties and dimensions. Table 2 contains similar information for SU<sub>6</sub>.

The Kronecker product rules are specified by means of triads. If  $\lambda_1 \times \lambda_2 \supset \lambda_3^*$  then  $\lambda_1 \times \lambda_2 \times \lambda_3 \supset 0$ , where 0 is the identity irrep and \* denotes complex conjugation. A triad is the set of three irrep labels,  $\lambda_1$ ,  $\lambda_2$  and  $\lambda_3$ , together with a multiplicity index *r*. The *r* labels any multiple occurrence of the identity irrep. The triad structure of SO<sub>3</sub> is well known, but the SO<sub>2</sub> structure of the '3j symbols' is often ignored: if three irreps  $m_1 m_2 m_3$  of U<sub>1</sub> (or SO<sub>2</sub>) are to form a triad (multiplicity zero only) then  $m_1 + m_2 + m_3 = 0$ . All 6j symbols of U<sub>1</sub> (and SO<sub>2</sub>) are chosen to be +1. Each triad has an associated phase, the 3j phase, which gives the symmetry on reordering coupled products. All

**Table 1.** Irreps of SU<sub>3</sub>.

Irrep	0	1	1 <sup>2</sup>	2	2 <sup>2</sup>	21	3	3 <sup>2</sup>	31	32
Complex conjugate	0	1 <sup>2</sup>	1	2 <sup>2</sup>	2	21	3 <sup>2</sup>	3	32	31
Dimension	1	3	3	6	6	8	10	10	15	15

**Table 2.** Irreps of  $SU_6$ .

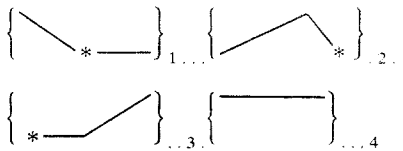
Irrep	0	1	1 <sup>5</sup>	1 <sup>2</sup>	1 <sup>4</sup>	2	2 <sup>5</sup>	21 <sup>4</sup>	1 <sup>3</sup>
Complex conjugate	0	1 <sup>5</sup>	1	1 <sup>4</sup>	1 <sup>2</sup>	2 <sup>5</sup>	2	21 <sup>4</sup>	1 <sup>3</sup>
Dimension	1	6	6	15	15	21	21	35	20
Irrep	21	2 <sup>4</sup> 1	21 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	3	3 <sup>5</sup>	31 <sup>4</sup>	32 <sup>4</sup>	
Complex conjugate	2 <sup>4</sup> 1	21	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>3</sup>	3 <sup>5</sup>	3	32 <sup>4</sup>	31 <sup>4</sup>	
Dimension	70	70	84	84	56	56	120	120	

relevant  $3j$ 's  $\{\lambda_1 \lambda_2 \lambda_3 r\}$  of  $SU_3$  and  $SU_6$  are tabulated in tables 3 and 5 respectively. For  $SO_3$  one has  $\{j_1 j_2 j_3 0\} = (-1)^{j_1+j_2+j_3}$ .

The  $6j$  symbol is related to recouplings between a set of six irreps, by means of four couplings. The triads occur in the  $6j$

$$\left\{ \begin{matrix} \lambda_1 & \lambda_2 & \lambda_3 \\ \mu_1 & \mu_2 & \mu_3 \end{matrix} \right\}_{r_1 r_2 r_3 r_4}$$

in the order



that is,  $\{\lambda_1 \mu_2^* \mu_3 r_1\}$ ,  $\{\mu_1 \lambda_2 \mu_3^* r_2\}$ ,  $\{\mu_1^* \mu_2 \lambda_3 r_3\}$ ,  $\{\lambda_1 \lambda_2 \lambda_3 r_4\}$ .

Symmetries are used to reduce the size of the tables. The full symmetries are given by Butler (1981) and Butler and Wybourne (1976), but to find a  $6j$  in the tables one only needs the following. The  $6j$  symbols are invariant under even permutations of the columns; there is the complex conjugation symmetry

$$\left\{ \begin{matrix} \lambda_1 & \lambda_2 & \lambda_3 \\ \mu_1 & \mu_2 & \mu_3 \end{matrix} \right\}_{r_1 r_2 r_3 r_4} = \left\{ \begin{matrix} \lambda_1^* & \lambda_2^* & \lambda_3^* \\ \mu_1^* & \mu_2^* & \mu_3^* \end{matrix} \right\}_{r_1 r_2 r_3 r_4}^* \tag{3.1}$$

the row flip symmetries, the (23) flip being

$$= \left\{ \begin{matrix} \lambda_1^* & \mu_2 & \mu_3^* \\ \mu_1^* & \lambda_2 & \lambda_3^* \end{matrix} \right\}_{r_4 r_3 r_2 r_1} \tag{3.2}$$

and the column interchange symmetries, the (12) operation being

$$= \pm \left\{ \begin{matrix} \lambda_2 & \lambda_1 & \lambda_3 \\ \mu_2^* & \mu_1^* & \mu_3^* \end{matrix} \right\}_{r_2 r_1 r_3 r_4} \tag{3.3}$$

The sign  $\pm$  is the same for all interchanges and is given in the tables immediately after the multiplicity indices.

The  $6j$  symbols of  $SU_3$  and  $SU_6$  are tabulated in tables 4 and 6. The bold typeface headings denote the top line of the  $6j$  symbol and each subsequent entry denotes a lower line (three irreps, four multiplicity labels), the interchange sign, and the value.

The branching rules are given in tables 7, 9 and 11. No branching multiplicity occurs for the cases considered. The tables include the sign of the corresponding  $2jm$ . This is always +1 for  $SU_3 \supset SO_3$  and for  $SU_6 \supset SU_2 \times SU_3$ , while for  $SU_3 \supset U_1 \times SU_2$  the

**Table 3.** 3j symbols of SU<sub>3</sub>.

0 0 0 0+	21 2 <sup>2</sup> 2 0+	3 <sup>2</sup> 3 21 0+	31 31 1 0-
1 1 1 0-	21 21 0 0+	31 2 <sup>2</sup> 1 0+	31 31 2 <sup>2</sup> 0+
1 <sup>2</sup> 1 0 0+	21 21 21 0+	31 2 <sup>2</sup> 2 <sup>2</sup> 0-	31 31 31 0-
2 1 <sup>2</sup> 1 <sup>2</sup> 0+	21 21 21 1-	31 21 1 <sup>2</sup> 0+	31 31 31 1+
2 2 2 0+	3 2 <sup>2</sup> 1 <sup>2</sup> 0+	31 21 2 0-	32 31 0 0+
2 <sup>2</sup> 2 0 0+	3 21 21 0-	31 3 2 0+	32 31 21 0+
21 1 <sup>2</sup> 1 0+	3 3 3 0-	31 3 <sup>2</sup> 1 <sup>2</sup> 0-	32 31 21 1-
21 2 1 0-	3 <sup>2</sup> 3 0 0+	31 3 <sup>2</sup> 2 0+	32 31 3 0-

**Table 4.** 6j symbols of SU<sub>3</sub>.

<b>0 0 0</b>	<b>21 21 0</b>	<b>3 2<sup>2</sup> 1<sup>2</sup></b>
0 0 0 0000+ +1	1 1 1 0000+ +1/2√2.3	0 1 2 <sup>2</sup> 0000+ +1/3√2
<b>1 1 1</b>	1 1 2 <sup>2</sup> 0000+ -1/2√2.3	1 2 1 <sup>2</sup> 0000+ +1/2.3
1 <sup>2</sup> 1 0 0000+ -1/3	1 <sup>2</sup> 1 <sup>2</sup> 1 <sup>2</sup> 0000+ +1/2√2.3	21 1 2 <sup>2</sup> 0000+ +1/2.3√5
<b>1<sup>2</sup> 1 0</b>	1 <sup>2</sup> 1 <sup>2</sup> 2 0000+ -1/2√2.3	<b>3 21 21</b>
0 0 1 0000+ +1/√3	2 2 1 <sup>2</sup> 0000+ -1/4√3	0 21 21 0000+ -1/8
1 1 1 <sup>2</sup> 0000+ -1/3	2 2 2 0000+ +1/4√3	1 <sup>2</sup> 2 1 <sup>2</sup> 0000+ +1/4√3
1 <sup>2</sup> 1 <sup>2</sup> 0 0000+ +1/3	2 <sup>2</sup> 2 <sup>2</sup> 1 0000+ -1/4√3	2 2 1 <sup>2</sup> 0000+ +1/4√3.5
<b>2 1<sup>2</sup> 1<sup>2</sup></b>	2 <sup>2</sup> 2 <sup>2</sup> 2 0000+ +1/4√3	21 21 21 0000+ +1/4.5
0 1 1 <sup>2</sup> 0000+ +1/3	21 21 0 0000+ +1/8	21 21 21 0100- -i/8√5
<b>2 2 2</b>	<b>21 21 21</b>	21 21 21 0110+ 0
2 <sup>2</sup> 2 0 0000+ +1/2.3	1 1 1 0000+ +√5/8√2.3	3 21 21 0000+ +1/8.5
<b>2<sup>2</sup> 2 0</b>	1 1 1 0001- +i√3/8√2	3 <sup>2</sup> 21 21 0000+ +1/8.5
0 0 2 0000+ +1/√2.3	1 <sup>2</sup> 1 <sup>2</sup> 1 <sup>2</sup> 0000+ +√5/8√2.3	<b>3 3 3</b>
1 <sup>2</sup> 1 <sup>2</sup> 1 0000+ +1/3√2	1 <sup>2</sup> 1 <sup>2</sup> 1 <sup>2</sup> 0001- -i√3/8√2	21 21 21 0000+ -1/2.5√2
2 2 2 <sup>2</sup> 0000+ +1/2.3	2 1 <sup>2</sup> 1 <sup>2</sup> 0000+ +√5/8√2.3	3 <sup>2</sup> 3 0 0000+ -1/2.5
2 <sup>2</sup> 2 <sup>2</sup> 0 0000+ +1/2.3	2 1 <sup>2</sup> 1 <sup>2</sup> 0001- +i/8√2.3	3 <sup>2</sup> 3 21 0000+ +1/4.5
<b>21 1<sup>2</sup> 1</b>	2 2 1 <sup>2</sup> 0000+ -1/8√2.3	<b>3<sup>2</sup> 3 0</b>
0 1 <sup>2</sup> 1 <sup>2</sup> 0000+ +1/3	2 2 1 <sup>2</sup> 0001- -i√5/8√2.3	0 0 3 0000+ +1/√2.5
1 <sup>2</sup> 1 1 0000+ +1/2.3	2 2 2 0000+ +7/8.5√2.3	1 <sup>2</sup> 1 <sup>2</sup> 2 0000+ +1/√2.3.5
2 1 1 0000+ +1/4.3	2 2 2 0001- +i√3/8√2.5	2 <sup>2</sup> 2 <sup>2</sup> 1 0000+ +1/2√3.5
21 1 <sup>2</sup> 1 <sup>2</sup> 0000+ -1/8.3	2 <sup>2</sup> 1 1 0000+ +√5/8√2.3	21 21 21 0000+ -1/4√5
<b>21 2 1</b>	2 <sup>2</sup> 1 1 0001- -i/8√2.3	21 21 3 0000+ +1/4√5
0 1 <sup>2</sup> 2 0000+ -1/3√2	2 <sup>2</sup> 2 <sup>2</sup> 1 0000+ -1/8√2.3	3 3 3 <sup>2</sup> 0000+ -1/4√5
1 <sup>2</sup> 1 1 0000+ +1/2√2.3	2 <sup>2</sup> 2 <sup>2</sup> 1 0001- +i√5/8√2.3	3 <sup>2</sup> 3 <sup>2</sup> 0 0000+ +1/2.5
1 <sup>2</sup> 2 <sup>2</sup> 1 0000+ -1/4.3	2 <sup>2</sup> 2 <sup>2</sup> 2 0000+ +7/8.5√2.3	<b>3<sup>2</sup> 3 21</b>
2 1 2 <sup>2</sup> 0000+ +1/4√3	2 <sup>2</sup> 2 <sup>2</sup> 2 0001- -i√3/8√2.5	1 <sup>2</sup> 1 <sup>2</sup> 2 0000+ +1/2√3.5
21 1 <sup>2</sup> 1 <sup>2</sup> 0000+ -1/8	21 21 0 0000+ +1/8	2 <sup>2</sup> 2 <sup>2</sup> 1 0000+ +1/5√3
21 1 <sup>2</sup> 2 0000+ +√5/8.3	21 21 0 0001- 0	21 0 3 0000+ +1/4√5
21 2 1 <sup>2</sup> 0000+ +1/8	21 21 0 0010- 0	21 21 21 0000+ -1/4.5√2
<b>21 2<sup>2</sup> 2</b>	21 21 0 0011+ -1/8	21 21 21 0010- +i/4√2.5
0 2 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/2.3	21 21 21 0000+ -3/8.2.5	21 21 3 0000+ +3/8.5√2
1 1 <sup>2</sup> 1 <sup>2</sup> 0000+ +√5/4.3	21 21 21 0001- 0	21 21 3 0010- -i/8√2.5
2 <sup>2</sup> 2 2 0000+ -1/4.3	21 21 21 1000- 0	3 3 3 <sup>2</sup> 0000+ +1/4.5
21 1 1 0000+ +√5/8.3	21 21 21 1001+ -1/8.2	3 <sup>2</sup> 21 21 0000+ -1/4.5
21 1 2 <sup>2</sup> 0000+ -1/8	21 21 21 1100+ -1/8.2	3 <sup>2</sup> 3 <sup>2</sup> 0 0000+ +1/2.5
21 2 <sup>2</sup> 1 0000+ -1/8	21 21 21 1101- 0	3 <sup>2</sup> 3 <sup>2</sup> 21 0000+ +3/8.5
21 2 <sup>2</sup> 2 <sup>2</sup> 0000+ +11/8.3.5	21 21 21 1110- 0	<b>31 2<sup>2</sup> 1</b>
<b>21 21 0</b>	21 21 21 1111+ +1/8.2	0 1 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/3√2
0 0 21 0000+ +1/2√2		21 1 <sup>2</sup> 2 <sup>2</sup> 0000+ -1/4.3√5

Table 4—continued

<b>31 2<sup>2</sup> 1</b>	<b>31 3 2</b>	<b>31 31 1</b>
21 2 1 0000+ +1/4.3	32 21 1 <sup>2</sup> 0000+ -1/3.5	31 3 2 0000+ -1/3.5
21 2 2 <sup>2</sup> 0000+ -1/2√2.3.5	32 21 2 0000+ -1/3.5√2	31 3 32 0000+ -1/3.5√2.3
3 2 1 0000+ +1/2.3.5	32 3 1 <sup>2</sup> 0000+ -1/3.5	31 3 32 0100- -1/3.5√2
<b>31 2<sup>2</sup> 2<sup>2</sup></b>	32 3 2 0000+ +1/3.5	32 2 <sup>2</sup> 21 0000+ +1/2.5√2.3
0 2 2 <sup>2</sup> 0000+ -1/2.3	32 3 <sup>2</sup> 2 0000+ -1/2.3.5	32 2 <sup>2</sup> 21 0100- -1/3.5√2
21 2 1 0000+ -1/2√2.3.5	<b>31 3<sup>2</sup> 1<sup>2</sup></b>	32 2 <sup>2</sup> 3 0000+ +1/3.5√2
21 2 2 <sup>2</sup> 0000+ +1/2.3.5	0 1 3 <sup>2</sup> 0000+ -1/√2.3.5	32 2 <sup>2</sup> 3 <sup>2</sup> 0000+ +1/3.5
<b>31 21 1<sup>2</sup></b>	1 1 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/3√5	32 31 0 0000+ -1/3.5
0 1 21 0000+ +1/2√2.3	1 2 2 <sup>2</sup> 0000+ -1/2.3√5	<b>31 31 2<sup>2</sup></b>
1 1 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/2.3√2	2 21 1 <sup>2</sup> 0000+ +1/3√2.5	1 <sup>2</sup> 1 21 0000+ +1/4√5
1 2 1 0000+ -1/4√3	2 3 1 <sup>2</sup> 0000+ -1/2.3.5	2 2 <sup>2</sup> 21 0000+ +1/4.3√3.5
1 2 2 <sup>2</sup> 0000+ +1/2.3√2	21 1 21 0000+ -1/2√2.3.5	2 2 <sup>2</sup> 3 0000+ -1/3√2.3.5
1 <sup>2</sup> 21 1 <sup>2</sup> 0000+ +1/8	21 1 3 <sup>2</sup> 0000+ +1/4√3.5	2 2 <sup>2</sup> 3 <sup>2</sup> 0000+ -1/3√2.3.5
1 <sup>2</sup> 21 2 0000+ +1/8	21 2 <sup>2</sup> 21 0000+ -1/2√2.3.5	2 <sup>2</sup> 0 32 0000+ +1/3√2.5
2 21 1 <sup>2</sup> 0000+ +1/8.3	21 2 <sup>2</sup> 3 <sup>2</sup> 0000+ -1/2√2.3.5	21 1 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/4√3.5
2 21 2 0000+ +1/8√5	3 <sup>2</sup> 2 <sup>2</sup> 3 0000+ +1/5√2.3	21 1 <sup>2</sup> 31 0000+ -1/2.3√2.5
2 <sup>2</sup> 1 <sup>2</sup> 2 <sup>2</sup> 0000+ -1/4√3.5	31 2 1 0000+ -1/3.5	21 1 <sup>2</sup> 31 0100- +1/3√2.3.5
21 1 21 0000+ +1/8√2.3.5	31 2 2 <sup>2</sup> 0000+ +1/2.5√3	21 2 1 0000+ -√3/4.5
21 1 21 0100- +i/8√2.3	32 21 2 0000+ -1/3.5	21 2 2 <sup>2</sup> 0000- -1/2.5√2
21 2 <sup>2</sup> 21 0000+ +√3/8√2.5	<b>31 3<sup>2</sup> 2</b>	21 2 31 0000+ +1/4.5
21 2 <sup>2</sup> 21 0100- -i/8√2.3	0 2 <sup>2</sup> 3 <sup>2</sup> 0000+ +1/2√3.5	21 2 31 0100- -i/2.3.5√3
3 <sup>2</sup> 2 <sup>2</sup> 21 0000+ -1/4.5√3	1 1 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/2√3.5	3 <sup>2</sup> 1 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/2.5√3
31 2 1 0000+ -1/4.3.5	2 21 1 <sup>2</sup> 0000+ -1/2.5	3 <sup>2</sup> 1 <sup>2</sup> 31 0000- +1/3.5√3
31 2 2 <sup>2</sup> 0000+ +1/2.5√2.3	21 1 21 0000+ +1/4√3.5	31 21 1 <sup>2</sup> 0000+ -1/2.3.5√2
32 21 1 <sup>2</sup> 0000+ +1/8.5	21 1 3 <sup>2</sup> 0000+ -1/2√2.3.5	31 21 2 0000+ -7/4.9.5
<b>31 21 2</b>	21 2 <sup>2</sup> 21 0000+ +√3/4.5	31 21 32 0000+ +1/2.9.5
0 2 <sup>2</sup> 21 0000+ -1/4√3	21 2 <sup>2</sup> 3 <sup>2</sup> 0000+ +1/2.5√3	31 21 32 0100- +1/3.5√3
1 1 <sup>2</sup> 2 <sup>2</sup> 0000+ -1/4√3	3 1 21 0000+ -1/2.5√3	31 21 32 1000- -2i/9.5√3
1 <sup>2</sup> 21 1 <sup>2</sup> 0000+ +1/8	31 1 <sup>2</sup> 2 <sup>2</sup> 0000+ -1/2.3.5	31 21 32 1100+ -i/9.5
1 <sup>2</sup> 21 2 0000+ -1/8.3	31 2 1 0000+ +1/2.5√3	31 3 1 <sup>2</sup> 0000+ -1/3.5
2 21 1 <sup>2</sup> 0000+ +1/8√5	31 2 2 <sup>2</sup> 0000+ -1/3.5	31 3 2 0000+ +1/2.9
2 21 2 0000+ -1/8.5	32 21 2 0000+ -1/3.5√2	31 3 32 0000+ +2√2/9.5√3
2 <sup>2</sup> 2 1 0000+ -1/4.3	32 3 2 0000+ -1/2.3.5	31 3 32 0100- +√2/9.5
2 <sup>2</sup> 2 2 <sup>2</sup> 0000+ +1/2√2.3.5	32 3 <sup>2</sup> 2 0000+ +1/3.5	31 3 <sup>2</sup> 2 0000+ -1/9.5
21 1 21 0000+ +√3/8√2.5	<b>31 31 1</b>	31 3 <sup>2</sup> 32 0000+ -1/2.9√3
21 1 21 0100- -i/8√2.3	1 0 32 0000+ -1/3√5	31 3 <sup>2</sup> 32 0100- -1/2.9.5
21 2 <sup>2</sup> 21 0000+ +7/8.5√2.3	1 <sup>2</sup> 1 21 0000+ +1/2√3.5	32 1 21 0000+ -1/4.5√3
21 2 <sup>2</sup> 21 0100- -i/8√2.3.5	2 1 21 0000+ +1/2.3√2.5	32 1 21 0100- -i/2.3.5
3 1 21 0000+ -1/4.5√3	2 1 3 <sup>2</sup> 0000+ +1/3√2.5	32 1 3 <sup>2</sup> 0000+ +1/3.5
31 1 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/4.3.5	21 1 <sup>2</sup> 2 <sup>2</sup> 0000+ -1/2√2.3.5	32 2 <sup>2</sup> 21 0000+ -1/2.3.5√2
31 2 1 0000+ +1/2.5√2.3	21 1 <sup>2</sup> 31 0000+ +1/2.3√5	32 2 <sup>2</sup> 21 0100- +i√2/3.5√3
31 2 2 <sup>2</sup> 0000+ +1/2.3.5	21 1 <sup>2</sup> 31 0100- 0	32 2 <sup>2</sup> 3 0000+ -√2/3.5√3
32 21 1 <sup>2</sup> 0000+ +1/8.3.5	21 2 1 0000+ +1/2√2.3.5	32 2 <sup>2</sup> 3 <sup>2</sup> 0000+ -1/2.3.5√3
32 21 2 0000+ +7/8.3.5	21 2 2 <sup>2</sup> 0000+ +1/2.3√5	32 31 0 0000+ +1/3.5
<b>31 3 2</b>	21 2 31 0000+ -1/2.3√2.5	<b>31 31 31</b>
0 2 <sup>2</sup> 3 0000+ +1/2√3.5	21 2 31 0100- +i/3√2.3.5	21 2 1 0000+ +1/2.5√3
1 <sup>2</sup> 21 2 0000+ +1/3√2.5	3 2 2 <sup>2</sup> 0000+ +1/3.5√2	21 2 1 0001- +1/3.5
1 <sup>2</sup> 3 <sup>2</sup> 2 0000+ +1/2.3.5	3 2 31 0000+ +1/3.5√3	21 2 2 <sup>2</sup> 0000+ -1/3.5√2
2 <sup>2</sup> 2 1 0000+ +1/3√2.5	31 21 1 <sup>2</sup> 0000+ -1/2.3.5	21 2 2 <sup>2</sup> 0001- 0
21 1 21 0000+ +1/2√2.3.5	31 21 2 0000+ -1/2.3.5√2	3 2 2 <sup>2</sup> 0000+ +1/2.3.5
21 2 <sup>2</sup> 21 0000+ -1/2.5√2.3	31 21 32 0000+ +1/3.5√2	3 2 2 <sup>2</sup> 0001- +1/2.5√3
21 2 <sup>2</sup> 3 0000+ -1/2.5√3	31 21 32 0100- 0	3 <sup>2</sup> 2 1 0000+ -1/2.5√3
3 1 3 <sup>2</sup> 0000+ +1/5√2.3	31 21 32 1000- -i/3.5√2.3	3 <sup>2</sup> 2 1 0001- +1/2.3.5
31 1 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/3.5	31 21 32 1100+ -i/3.5√2	3 <sup>2</sup> 2 2 <sup>2</sup> 0000+ +1/2.3.5
31 2 2 <sup>2</sup> 0000+ -1/3.5	31 3 1 <sup>2</sup> 0000+ +1/3.5	3 <sup>2</sup> 2 2 <sup>2</sup> 0001- -1/2.5√3

Table 4—continued

<b>31 31 31</b>	<b>32 31 0</b>	<b>32 31 21</b>
31 21 1 <sup>2</sup> 0000+ +1/3.5√2	21 21 2 <sup>2</sup> 0000+ -1/2√2.3.5	21 21 2 <sup>2</sup> 0001- +i/4.5√2
31 21 1 <sup>2</sup> 0001- 0	21 21 31 0000+ +1/2√2.3.5	21 21 2 <sup>2</sup> 0010- +i√3/8√2.5
31 21 1 <sup>2</sup> 0010- +i/3.5√2.3	21 21 31 0100- 0	21 21 2 <sup>2</sup> 0011+ +1/4.3√2.5
31 21 1 <sup>2</sup> 0011+ +i/3.5√2	21 21 31 1000- 0	21 21 31 0000+ -1/8.5√2.3
31 21 2 0000+ +1/2.9.5	21 21 31 1100+ -1/2√2.3.5	21 21 31 0001- -i/4.5√2
31 21 2 0001- +1/3.5√3	3 3 2 <sup>2</sup> 0000+ +1/5√2.3	21 21 31 0100- -i/8√2.3.5
31 21 2 0010- +2i/9.5√3	3 3 31 0000+ -1/5√2.3	21 21 31 0011+ -1/4.3√2.5
31 21 2 0011+ +i/9.5	3 <sup>2</sup> 3 <sup>2</sup> 1 0000+ -1/5√2.3	21 21 31 0100- -i/4.5√2
31 3 1 <sup>2</sup> 0000+ -1/3.5√2.3	3 <sup>2</sup> 3 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/5√2.3	21 21 31 0101+ -1/4.5√2.3
31 3 1 <sup>2</sup> 0001- -1/3.5√2	3 <sup>2</sup> 3 <sup>2</sup> 31 0000+ -1/5√2.3	21 21 31 0110+ -1/4.3√2.5
31 3 2 0000+ +2√2/9.5√3	31 31 1 <sup>2</sup> 0000+ -1/3.5	21 21 31 0111- -i/4.3√2.3.5
31 3 2 0001- +√2/9.5	31 31 2 0000+ +1/3.5	21 21 31 1000- -i/4.5√2
31 3 <sup>2</sup> 2 0000+ -1/2.9√3	31 31 32 0000+ -1/3.5	21 21 31 1001+ -1/4.5√2.3
31 3 <sup>2</sup> 2 0001- -1/2.9.5	31 31 32 0100- 0	21 21 31 1010+ -1/4.3√2.5
32 31 0 0000+ -1/3.5	31 31 32 1000- 0	21 21 31 1011- -i/4.3√2.3.5
32 31 0 0001- 0	31 31 32 1100+ +1/3.5	21 21 31 1100+ -1/4.5√2.3
32 31 0 0010- 0	32 32 0 0000+ +1/3.5	21 21 31 1101- -7i/8.3.5√2
32 31 0 0011+ +1/3.5	<b>32 31 21</b>	21 21 31 1110- -i/4.3√2.3.5
32 31 21 0000+ +1/9.5	1 1 2 0000+ +1/4.3√5	21 21 31 1111+ +11/8.9√2.5
32 31 21 0001- 0	1 1 2 0001- +i/2√3.5	3 21 2 <sup>2</sup> 0000+ +1/2.5√2.3
32 31 21 0010- 0	1 1 32 0000+ +1/2.3√5	3 21 2 <sup>2</sup> 0001- +i/3.5√2
32 31 21 0011+ 0	1 1 32 0001- 0	3 21 31 0000+ +1/2.3.5√2
32 31 21 0100- +i/2.9.5√3	1 <sup>2</sup> 1 <sup>2</sup> 21 0000+ +√5/8.3	3 21 31 0001- +i√2/3.5√3
32 31 21 0101+ -i/2.3.5	1 <sup>2</sup> 1 <sup>2</sup> 21 0001- -i/4√3.5	3 21 31 1000- -i/3.5√2.3
32 31 21 0110+ +i/2.3.5	1 <sup>2</sup> 1 <sup>2</sup> 3 0000+ +1/2.3√5	3 21 31 1001+ -1/2.9.5√2
32 31 21 0111- -i/2.3.5√3	1 <sup>2</sup> 1 <sup>2</sup> 3 0001- +i/4√3.5	3 3 2 <sup>2</sup> 0000+ 0
32 31 21 1000- -i/2.9.5√3	2 1 <sup>2</sup> 21 0000+ -1/8√5	3 3 2 <sup>2</sup> 0001- +i/3.5
32 31 21 1001+ -i/2.3.5	2 1 <sup>2</sup> 21 0001- -i/4√3.5	3 3 31 0000+ -1/4.3.5√3
32 31 21 1010+ +i/2.3.5	2 1 <sup>2</sup> 3 0000+ 0	3 3 31 0001- -i/2.9
32 31 21 1011- +i/2.3.5√3	2 1 <sup>2</sup> 3 0001- -i/2√2.3.5	3 <sup>2</sup> 21 1 0000+ +1/2.5√2.3
32 31 21 1100+ +4/9.3.5	2 2 21 0000+ -1/8.3.5	3 <sup>2</sup> 21 1 0001- 0
32 31 21 1101- 0	2 2 21 0001- -i√3/4.5	3 <sup>2</sup> 21 2 <sup>2</sup> 0000+ +1/4.5√3
32 31 21 1110- 0	2 2 3 0000+ +1/2.3.5	3 <sup>2</sup> 21 2 <sup>2</sup> 0001- -i/2.3.5
32 31 21 1111+ -1/9.5	2 2 3 0001- +i/2.5√3	3 <sup>2</sup> 21 31 0000+ +1/2.3.5√2
32 31 3 0000+ -7/2.9.3.5	2 2 3 <sup>2</sup> 0000+ -1/3.5	3 <sup>2</sup> 21 31 0001- -i/3.5√2.3
32 31 3 0001- -1/2.3.5√3	2 2 3 <sup>2</sup> 0001- 0	3 <sup>2</sup> 21 31 1000- +i√2/3.5√3
32 31 3 0010- -1/2.3.5√3	2 <sup>2</sup> 1 2 0000+ +1/2√2.3.5	3 <sup>2</sup> 21 31 1001+ -1/2.9.5√2
32 31 3 0011+ +1/2.9.5	2 <sup>2</sup> 1 2 0001- 0	3 <sup>2</sup> 3 <sup>2</sup> 1 0000+ -1/2.5√3
32 31 3 <sup>2</sup> 0000+ -7/2.9.3.5	2 <sup>2</sup> 1 32 0000+ -1/2.3√2.5	3 <sup>2</sup> 3 <sup>2</sup> 1 0001- +i/4.5
32 31 3 <sup>2</sup> 0001- +1/2.3.5√3	2 <sup>2</sup> 1 32 0001- +i/3√2.3.5	3 <sup>2</sup> 3 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/2.5√3
32 31 3 <sup>2</sup> 0010- +1/2.3.5√3	2 <sup>2</sup> 2 <sup>2</sup> 1 <sup>2</sup> 0000+ +1/4.3	3 <sup>2</sup> 3 <sup>2</sup> 2 <sup>2</sup> 0001- -i/2.3.5
32 31 3 <sup>2</sup> 0011+ +1/2.9.5	2 <sup>2</sup> 2 <sup>2</sup> 1 <sup>2</sup> 0001- -i/2.5√3	3 <sup>2</sup> 3 <sup>2</sup> 31 0000+ -1/2.3.5√3
<b>32 31 0</b>	2 <sup>2</sup> 2 <sup>2</sup> 2 0000+ -1/2.3.5	3 <sup>2</sup> 3 <sup>2</sup> 31 0001- +7i/4.9.5
0 0 31 0000+ +1/√3.5	2 <sup>2</sup> 2 <sup>2</sup> 2 0001- +i/2.5√3	31 1 2 0000+ -1/4.5√3
1 1 2 0000+ +1/3√5	2 <sup>2</sup> 2 <sup>2</sup> 32 0000+ +1/4.5	31 1 2 0001- +i/2.3.5
1 1 32 0000+ -1/3√5	2 <sup>2</sup> 2 <sup>2</sup> 32 0001- -i/2.3.5√3	31 1 32 0000+ +1/3.5√2
1 <sup>2</sup> 1 <sup>2</sup> 21 0000+ +1/3√5	21 0 31 0000+ +1/2√2.3.5	31 1 32 0001- +i/3.5√2.3
1 <sup>2</sup> 1 <sup>2</sup> 3 0000+ -1/3√5	21 0 31 0001- 0	31 1 32 0100- 0
2 2 21 0000+ -1/3√2.5	21 0 31 0100- 0	31 1 32 0101+ -i/3.5√2
2 2 3 0000+ +1/3√2.5	21 0 31 0101+ -1/2√2.3.5	31 2 <sup>2</sup> 1 <sup>2</sup> 0000+ +1/2.5√2.3
2 2 3 <sup>2</sup> 0000+ +1/3√2.5	21 21 1 0000+ +7/8.5√2.3	31 2 <sup>2</sup> 1 <sup>2</sup> 0001- +i/3.5√2
2 <sup>2</sup> 2 <sup>2</sup> 1 <sup>2</sup> 0000+ +1/3√2.5	21 21 1 0001- +i/4.5√2	31 2 <sup>2</sup> 2 0000+ -1/2.3.5√2
2 <sup>2</sup> 2 <sup>2</sup> 2 0000+ -1/3√2.5	21 21 1 0010- -i/8√2.3.5	31 2 <sup>2</sup> 2 0001- -i√2/3.5√3
2 <sup>2</sup> 2 <sup>2</sup> 32 0000+ +1/3√2.5	21 21 1 0011+ -1/4√2.5	31 2 <sup>2</sup> 32 0000+ +1/2.9.5
21 21 1 0000+ +1/2√2.3.5	21 21 2 <sup>2</sup> 0000+ -1/8.5√2.3	31 2 <sup>2</sup> 32 0001- +2i/9.5√3



Table 4—continued

32 31 21	32 31 21	32 31 3
31 2 <sup>2</sup> 32 0100- -1/3.5√3	32 2 3 <sup>2</sup> 0001- +2i/9.5	21 21 2 <sup>2</sup> 0000+ -1/2.3.5√2
31 2 <sup>2</sup> 32 0101+ -i/9.5	32 32 0 0000+ +1/3.5	21 21 31 0000+ +1/2.3.5√2
31 31 1 <sup>2</sup> 0000+ -1/2.3.5	32 32 0 0001- 0	21 21 31 0100- +i√2/3.5√3
31 31 1 <sup>2</sup> 0001- -i/3.5√3	32 32 0 0010- 0	21 21 31 1000- -i/3.5√2.3
31 31 1 <sup>2</sup> 0010- +i/3.5√3	32 32 0 0011+ -1/3.5	21 21 31 1100+ -1/2.9.5√2
31 31 1 <sup>2</sup> 0011+ +2/9.5	32 32 21 0000+ +1/8.5	21 3 <sup>2</sup> 1 0000+ -1/4.5
31 31 2 0000+ +7/4.9.5	32 32 21 0001- -i/4.3.5√3	21 3 <sup>2</sup> 2 <sup>2</sup> 0000+ +1/2.3.5√2
31 31 2 0001- +i/2.9√3	32 32 21 0010- -i/4.3.5√3	21 3 <sup>2</sup> 31 0000+ -1/4.3.5√3
31 31 2 0010- -i/2.9√3	32 32 21 0011+ -2/9.5	21 3 <sup>2</sup> 31 0100- -i/2.9
31 31 2 0011+ -1/9.3	32 32 21 0100- +i/4.3.5√3	3 0 31 0000+ -1/5√2.3
31 31 32 0000+ +1/9.5	32 32 21 0101+ -1/9.5	3 21 2 <sup>2</sup> 0000+ -1/3.5
31 31 32 0001- -i/2.9.5√3	32 32 21 0110+ -1/9.5	3 21 31 0000+ -1/2.3.5√3
31 31 32 0010- +i/2.9.5√3	32 32 21 0111- -7i/4.9.5√3	3 21 31 1000- +7i/4.9.5
31 31 32 0011+ +4/9.3.5	32 32 21 1000- +i/4.3.5√3	3 <sup>2</sup> 3 2 <sup>2</sup> 0000+ +1/3.5√2
31 31 32 0100- 0	32 32 21 1001+ -1/9.5	3 <sup>2</sup> 3 31 0000+ -2/9.5
31 31 32 0101+ +i/2.3.5	32 32 21 1010+ -1/9.5	31 1 2 0000+ +1/3.5
31 31 32 0110+ +i/2.3.5	32 32 21 1011- -7i/4.9.5√3	31 1 32 0000+ -1/3.5√2.3
31 31 32 0111- 0	32 32 21 1100+ -2/9.5	31 1 32 0100- +1/3.5√2
31 31 32 1000- 0	32 32 21 1101- +7i/4.9.5√3	31 2 <sup>2</sup> 1 <sup>2</sup> 0000+ +1/3.5
31 31 32 1001+ -i/2.3.5	32 32 21 1110- +7i/4.9.5√3	31 2 <sup>2</sup> 2 0000+ -1/2.3.5√3
31 31 32 1010+ -i/2.3.5	32 32 21 1111+ +5/8.9.3	31 2 <sup>2</sup> 32 0000+ +2√2/9.5√3
31 31 32 1011- 0	<b>32 31 3</b>	31 2 <sup>2</sup> 32 0100- -√2/9.5
31 31 32 1100+ 0	0 3 <sup>2</sup> 31 0000+ -1/5√2.3	31 31 1 <sup>2</sup> 0000+ +2/9.5
31 31 32 1101- +i/2.3.5√3	1 2 <sup>2</sup> 2 0000+ +1/2.5	31 31 2 0000+ -1/9.3
31 31 32 1110- -i/2.3.5√3	1 2 <sup>2</sup> 32 0000+ +1/3.5√3	31 31 32 0000+ -7/2.9.3.5
31 31 32 1111+ -1/9.5	1 <sup>2</sup> 32 21 0000+ -1/2.5√3	31 31 32 0100- +1/2.3.5√3
32 1 <sup>2</sup> 21 0000+ +1/8.5	1 <sup>2</sup> 32 21 1000- -i/4.3.5	31 31 32 1000- +1/2.3.5√3
32 1 <sup>2</sup> 21 0001- +i/4.5√3	1 <sup>2</sup> 32 3 0000+ +1/3.5	31 31 32 1100+ +1/2.9.5
32 1 <sup>2</sup> 21 0100- -i/4.5√3	2 1 <sup>2</sup> 21 0000+ -1/5√2.3	32 2 21 0000+ -1/3.5√3
32 1 <sup>2</sup> 21 0101+ -1/2.3.5	2 1 <sup>2</sup> 3 0000+ +1/2.5√3	32 2 21 0100- -2i/9.5
32 1 <sup>2</sup> 3 0000+ -1/2.5√3	2 32 21 0000+ -√2/3.5√3	32 2 3 0000+ +√2/9.5
32 1 <sup>2</sup> 3 0001- +i/4.3.5	2 32 21 1000- +i/2.9.5√2	32 2 3 <sup>2</sup> 0000+ +1/9.5
32 2 21 0000+ -7/8.3.5	2 32 3 0000+ -1/2.9	32 32 0 0000+ -1/3.5
32 2 21 0001- +i/4.3.5√3	2 32 3 <sup>2</sup> 0000+ +√2/9.5	32 32 21 0000+ -1/2.9.5
32 2 21 0100- -i/4.3.5√3	2 <sup>2</sup> 31 1 <sup>2</sup> 0000+ +1/3.5√2	32 32 21 0100- -i/9.5√3
32 2 21 0101+ -1/2.9.5	2 <sup>2</sup> 31 2 0000+ -√2/3.5√3	32 32 21 1000- -13i/4.9.5√3
32 2 3 0000+ -√2/3.5√3	2 <sup>2</sup> 31 32 0000+ -1/2.9√3	32 32 21 1100+ +1/2.9.3.5
32 2 3 0001- -i/2.9.5√2	2 <sup>2</sup> 31 32 1000- -1/2.9.5	32 32 3 0000+ -1/9.3.5
32 2 3 <sup>2</sup> 0000+ -1/3.5√3	21 21 1 0000+ -1/2.5√2	32 32 3 <sup>2</sup> 0000+ -1/9.3.5

**Table 5.** 3j symbols of SU<sub>6</sub>.

0	0	0	0+	1 <sup>3</sup>	1 <sup>2</sup>	1	0+	21 <sup>3</sup>	21	2 <sup>5</sup>	0+	31 <sup>4</sup>	2 <sup>4</sup> 1	2	0+
1 <sup>5</sup>	1	0	0-	1 <sup>3</sup>	1 <sup>3</sup>	0	0-	21 <sup>3</sup>	2 <sup>4</sup> 1	1 <sup>4</sup>	0-	31 <sup>4</sup>	21 <sup>3</sup>	21 <sup>4</sup>	0+
1 <sup>2</sup>	1 <sup>5</sup>	1 <sup>5</sup>	0-	1 <sup>3</sup>	1 <sup>3</sup>	21 <sup>4</sup>	0+	21 <sup>3</sup>	21 <sup>3</sup>	1 <sup>2</sup>	0-	31 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>4</sup>	0-
1 <sup>2</sup>	1 <sup>2</sup>	1 <sup>2</sup>	0+	21	1 <sup>4</sup>	1 <sup>5</sup>	0+	21 <sup>3</sup>	21 <sup>3</sup>	2	0+	31 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>5</sup>	0+
1 <sup>4</sup>	1 <sup>2</sup>	0	0+	21	2 <sup>5</sup>	1 <sup>5</sup>	0-	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>3</sup>	0	0-	31 <sup>4</sup>	3 <sup>5</sup>	1 <sup>2</sup>	0-
2	1 <sup>5</sup>	1 <sup>5</sup>	0+	21	1 <sup>3</sup>	21 <sup>4</sup>	0+	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>3</sup>	21 <sup>4</sup>	0+	31 <sup>4</sup>	3 <sup>5</sup>	2	0+
2 <sup>5</sup>	2	0	0+	2 <sup>4</sup> 1	21	0	0-	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>3</sup>	21 <sup>4</sup>	1-	31 <sup>4</sup>	31 <sup>4</sup>	1 <sup>4</sup>	0-
21 <sup>4</sup>	1 <sup>5</sup>	1	0+	2 <sup>4</sup> 1	21	21 <sup>4</sup>	0+	3	2 <sup>5</sup>	1 <sup>5</sup>	0-	31 <sup>4</sup>	31 <sup>4</sup>	2 <sup>5</sup>	0+
21 <sup>4</sup>	1 <sup>4</sup>	1 <sup>2</sup>	0-	2 <sup>4</sup> 1	21	21 <sup>4</sup>	1-	3	2 <sup>4</sup> 1	21 <sup>4</sup>	0+	32 <sup>4</sup>	31 <sup>4</sup>	0	0-
21 <sup>4</sup>	2	1 <sup>4</sup>	0+	21 <sup>3</sup>	1 <sup>2</sup>	1 <sup>5</sup>	0+	3 <sup>5</sup>	3	0	0-	32 <sup>4</sup>	31 <sup>4</sup>	21 <sup>4</sup>	0+
21 <sup>4</sup>	2 <sup>5</sup>	2	0-	21 <sup>3</sup>	21 <sup>4</sup>	1	0-	3 <sup>5</sup>	3	21 <sup>4</sup>	0+	32 <sup>4</sup>	31 <sup>4</sup>	21 <sup>4</sup>	1-
21 <sup>4</sup>	21 <sup>4</sup>	0	0+	21 <sup>3</sup>	1 <sup>3</sup>	1 <sup>4</sup>	0-	31 <sup>4</sup>	2 <sup>5</sup>	1	0-				
21 <sup>4</sup>	21 <sup>4</sup>	21 <sup>4</sup>	0-	21 <sup>3</sup>	1 <sup>3</sup>	2 <sup>5</sup>	0+	31 <sup>4</sup>	21 <sup>4</sup>	1 <sup>5</sup>	0-				
21 <sup>4</sup>	21 <sup>4</sup>	21 <sup>4</sup>	1+	21 <sup>3</sup>	21	1 <sup>4</sup>	0-	31 <sup>4</sup>	2 <sup>4</sup> 1	1 <sup>2</sup>	0-				

**Table 6.** 6j symbols of SU<sub>6</sub>.

<b>0</b>	<b>0</b>	<b>0</b>						<b>21<sup>4</sup></b>	<b>2</b>	<b>1<sup>4</sup></b>					
0	0	0	0000+	+1				0	1 <sup>2</sup>	2	0000+	+1/3√5.7			
1 <sup>5</sup>	1	0						1 <sup>5</sup>	1	1	0000+	+1/√2.3.5.7			
0	0	1	0000+	-1/√2.3				21 <sup>4</sup>	1 <sup>2</sup>	1 <sup>2</sup>	0000+	-1/5.7			
1 <sup>5</sup>	1 <sup>5</sup>	0	0000+	-1/2.3				21 <sup>4</sup>	1 <sup>2</sup>	2	0000+	+2√2/3.5.7			
1 <sup>2</sup>	1 <sup>5</sup>	1 <sup>5</sup>						21 <sup>4</sup>	2	1 <sup>2</sup>	0000+	+1/5.7			
0	1	1 <sup>5</sup>	0000+	-1/2.3				<b>21<sup>4</sup></b>	<b>2<sup>5</sup></b>	<b>2</b>					
1 <sup>2</sup>	1 <sup>2</sup>	1 <sup>2</sup>						0	2 <sup>5</sup>	2 <sup>5</sup>	0000+	-1/3.7			
1 <sup>4</sup>	1 <sup>2</sup>	0	0000+	+1/3.5				1	1 <sup>5</sup>	1 <sup>5</sup>	0000+	+√2/3.7			
1 <sup>4</sup>	1 <sup>2</sup>	0						21 <sup>4</sup>	1 <sup>4</sup>	1 <sup>4</sup>	0000+	+2√2/3.5.7			
0	0	1 <sup>2</sup>	0000+	+1/√3.5				21 <sup>4</sup>	1 <sup>4</sup>	2 <sup>5</sup>	0000+	-1/5.7			
1 <sup>5</sup>	1 <sup>5</sup>	1	0000+	-1/3√2.5				21 <sup>4</sup>	2 <sup>5</sup>	1 <sup>4</sup>	0000+	-1/5.7			
1 <sup>2</sup>	1 <sup>2</sup>	1 <sup>4</sup>	0000+	+1/3.5				21 <sup>4</sup>	2 <sup>5</sup>	2 <sup>5</sup>	0000+	+11/4.3.5.7			
1 <sup>4</sup>	1 <sup>4</sup>	0	0000+	+1/3.5				<b>21<sup>4</sup></b>	<b>21<sup>4</sup></b>	<b>0</b>					
<b>2</b>	<b>1<sup>5</sup></b>	<b>1<sup>5</sup></b>						0	0	21 <sup>4</sup>	0000+	+1/√5.7			
0	1	1 <sup>5</sup>	0000+	+1/2.3				1	1	1	0000+	+1/√2.3.5.7			
<b>2<sup>5</sup></b>	<b>2</b>	<b>0</b>						1 <sup>5</sup>	1 <sup>5</sup>	1 <sup>5</sup>	0000+	+1/√2.3.5.7			
0	0	2	0000+	+1/√3.7				1 <sup>2</sup>	1 <sup>2</sup>	1 <sup>2</sup>	0000+	-1/5√3.7			
1 <sup>5</sup>	1 <sup>5</sup>	1	0000+	+1/3√2.7				1 <sup>2</sup>	1 <sup>2</sup>	2	0000+	+1/5√3.7			
2 <sup>5</sup>	2 <sup>5</sup>	0	0000+	+1/3.7				1 <sup>4</sup>	1 <sup>4</sup>	1 <sup>4</sup>	0000+	-1/5√3.7			
<b>21<sup>4</sup></b>	<b>1<sup>5</sup></b>	<b>1</b>						1 <sup>4</sup>	1 <sup>4</sup>	2 <sup>5</sup>	0000+	+1/5√3.7			
0	1 <sup>5</sup>	1 <sup>5</sup>	0000+	+1/2.3				2	2	1 <sup>2</sup>	0000+	+1/7√3.5			
1 <sup>2</sup>	1	1	0000+	+1/2.3.5				2	2	2	0000+	-1/7√3.5			
2	1	1	0000+	+1/2.3.7				2 <sup>5</sup>	2 <sup>5</sup>	1 <sup>4</sup>	0000+	+1/7√3.5			
21 <sup>4</sup>	1 <sup>5</sup>	1 <sup>5</sup>	0000+	+1/2.3.5.7				2 <sup>5</sup>	2 <sup>5</sup>	2 <sup>5</sup>	0000+	-1/7√3.5			
<b>21<sup>4</sup></b>	<b>1<sup>4</sup></b>	<b>1<sup>2</sup></b>						21 <sup>4</sup>	21 <sup>4</sup>	0	0000+	+1/5.7			
0	1 <sup>4</sup>	1 <sup>4</sup>	0000+	-1/3.5				<b>21<sup>4</sup></b>	<b>21<sup>4</sup></b>	<b>21<sup>4</sup></b>					
1	1 <sup>5</sup>	1 <sup>5</sup>	0000+	+1/3.5				1	1	1	0000+	+√3/5.7			
1 <sup>4</sup>	1 <sup>2</sup>	1 <sup>2</sup>	0000+	-1/2.3.5				1	1	1	0001-	+2i√2/5.7√3			
21 <sup>4</sup>	1 <sup>4</sup>	1 <sup>4</sup>	0000+	+1/2.3.7				1 <sup>5</sup>	1 <sup>5</sup>	1 <sup>5</sup>	0000+	+√3/5.7			



Table 6—continued

<b>2<sup>4</sup>1</b>	<b>21</b>	<b>21<sup>4</sup></b>				<b>21<sup>3</sup></b>	<b>1<sup>3</sup></b>	<b>1<sup>4</sup></b>			
21 <sup>4</sup>	21 <sup>4</sup>	21	0101+	+13/2.9.9.5.7√3		1 <sup>5</sup>	1	1 <sup>2</sup>	0000+	+1/2.5√2.3	
21 <sup>4</sup>	21 <sup>4</sup>	21	0110+	+2/9.3.5.7√3		1 <sup>2</sup>	1 <sup>4</sup>	1 <sup>5</sup>	0000+	+1/2.3.5√2	
21 <sup>4</sup>	21 <sup>4</sup>	21	0111-	+11i/2.9.3.5.7√2.3		1 <sup>4</sup>	21 <sup>4</sup>	1	0000+	+1/2.5√2.7	
21 <sup>4</sup>	21 <sup>4</sup>	21	1000-	-4i√2/9.9.5.7√3		21 <sup>4</sup>	1 <sup>2</sup>	1 <sup>3</sup>	0000+	-1/5.7√2.3	
21 <sup>4</sup>	21 <sup>4</sup>	21	1001+	+13/2.9.9.5.7√3		21 <sup>4</sup>	2	1 <sup>3</sup>	0000+	+1/2.7√3.5	
21 <sup>4</sup>	21 <sup>4</sup>	21	1010+	+2/9.3.5.7√3		1 <sup>3</sup>	1 <sup>5</sup>	21 <sup>4</sup>	0000+	-1/2.5√3.7	
21 <sup>4</sup>	21 <sup>4</sup>	21	1011-	+11i/2.9.3.5.7√2.3		2 <sup>4</sup> 1	1 <sup>5</sup>	21 <sup>4</sup>	0000+	+1/2.5.7√2.3	
21 <sup>4</sup>	21 <sup>4</sup>	21	1100+	+13/2.9.9.5.7√3		21 <sup>3</sup>	1	1 <sup>2</sup>	0000+	-1/2.3.5.7	
21 <sup>4</sup>	21 <sup>4</sup>	21	1101-	-1289i/8.2.9.9.5.7√2.3		2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>3</sup>	1 <sup>4</sup>	0000+	-1/4.3.5.7	
21 <sup>4</sup>	21 <sup>4</sup>	21	1110-	+11i/2.9.3.5.7√2.3		<b>21<sup>3</sup></b>	<b>1<sup>3</sup></b>	<b>2<sup>5</sup></b>			
21 <sup>4</sup>	21 <sup>4</sup>	21	1111+	-127/8.8.9.3.5√3		0	2	1 <sup>3</sup>	0000+	+1/2√3.5.7	
1 <sup>3</sup>	1 <sup>3</sup>	21 <sup>4</sup>	0000+	-1/2.5.7√2.3		1 <sup>5</sup>	1	1 <sup>2</sup>	0000+	+1/2.3√2.7	
1 <sup>3</sup>	1 <sup>3</sup>	21 <sup>4</sup>	0001-	+i/5.7√3		1 <sup>4</sup>	21 <sup>4</sup>	1	0000+	-1/2.3√5.7	
2 <sup>4</sup> 1	1 <sup>3</sup>	21 <sup>4</sup>	0000+	+1/9.5.7		21 <sup>4</sup>	1 <sup>2</sup>	1 <sup>3</sup>	0000+	+1/2.7√3.5	
2 <sup>4</sup> 1	1 <sup>3</sup>	21 <sup>4</sup>	0001-	-2i√2/9.5.7		21 <sup>4</sup>	2	1 <sup>3</sup>	0000+	-1/5.7√3	
2 <sup>4</sup> 1	1 <sup>3</sup>	21 <sup>4</sup>	0100-	+2i√2/9.5.7		2 <sup>4</sup> 1	1 <sup>5</sup>	21 <sup>4</sup>	0000+	-1/2.7√2.3.5	
2 <sup>4</sup> 1	1 <sup>3</sup>	21 <sup>4</sup>	0101+	-17/8.9.5.7		2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>3</sup>	1 <sup>4</sup>	0000+	+1/4.3.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	0	0000+	+1/2.5.7		2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>3</sup>	2 <sup>5</sup>	0000+	+1/4.5.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	0	0001-	0		<b>21<sup>3</sup></b>	<b>21</b>	<b>1<sup>4</sup></b>			
2 <sup>4</sup> 1	2 <sup>4</sup> 1	0	0010-	0		0	1 <sup>2</sup>	21	0000+	-1/5√2.3.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	0	0011+	-1/2.5.7		1 <sup>5</sup>	1	1 <sup>2</sup>	0000+	-1/5√3.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	0000+	-1/2.9.9.7		1 <sup>4</sup>	21 <sup>4</sup>	1	0000+	+1/2.5.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	0001-	+8i√2/9.9.5.7		2 <sup>5</sup>	21 <sup>4</sup>	1	0000+	+1/5.7√2	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	0010-	+8i√2/9.9.5.7		21 <sup>4</sup>	1 <sup>2</sup>	1 <sup>3</sup>	0000+	+√3/2.5.7√2	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	0011+	+61/2.9.9.5.7		21 <sup>4</sup>	1 <sup>2</sup>	21	0000+	-11/2.9.5.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	0100-	-8i√2/9.9.5.7		21 <sup>4</sup>	1 <sup>2</sup>	21	0100-	-i/2.9.5.7√2	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	0101+	+2/9.9.7		21 <sup>4</sup>	2	1 <sup>3</sup>	0000+	-1/2.7√3.5	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	0110+	+2/9.9.7		21 <sup>4</sup>	2	21	0000+	-4√2/9.5.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	0111-	+13i/8.9.9.5√2		21 <sup>4</sup>	2	21	0100-	+i/4.9.5.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	1000-	-8i√2/9.9.5.7		1 <sup>3</sup>	1 <sup>5</sup>	21 <sup>4</sup>	0000+	-1/4.5√3.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	1001+	+2/9.9.7		2 <sup>4</sup> 1	1 <sup>5</sup>	21 <sup>4</sup>	0000+	+1/9.5.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	1010+	+2/9.9.7		2 <sup>4</sup> 1	1 <sup>5</sup>	21 <sup>4</sup>	0100-	-i/9.7√2	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	1011-	+13i/8.9.9.5√2		21 <sup>3</sup>	1	1 <sup>2</sup>	0000+	+1/4.3.5.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	1100+	+61/2.9.9.5.7		2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>3</sup>	1 <sup>4</sup>	0000+	-1/2.3.7√5	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	1101-	-13i/8.9.9.5√2		2 <sup>2</sup> 1 <sup>3</sup>	21	1 <sup>4</sup>	0000+	-1/4.3.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	1110-	-13i/8.9.9.5√2		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>4</sup> 1	1 <sup>4</sup>	0000+	+1/4.3.5.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	21 <sup>4</sup>	1111+	-67/8.8.9.9.5.7		<b>21<sup>3</sup></b>	<b>21</b>	<b>2<sup>5</sup></b>			
0	1	1 <sup>2</sup>	0000+	+1/3√2.5		0	2	21	0000+	+1/7√2.3.5	
21 <sup>4</sup>	1	1 <sup>2</sup>	0000+	+1/2.3.5.7		1 <sup>5</sup>	1	1 <sup>2</sup>	0000+	+2/3.7√5	
1 <sup>3</sup>	1 <sup>4</sup>	1 <sup>5</sup>	0000+	-1/4.3.5		1 <sup>4</sup>	21 <sup>4</sup>	1	0000+	+√2/3.5.7	
2 <sup>4</sup> 1	1 <sup>4</sup>	1 <sup>5</sup>	0000+	-1/3.5.7		2 <sup>5</sup>	21 <sup>4</sup>	1	0000+	+1/5.7√2	
<b>21<sup>3</sup></b>	<b>21<sup>4</sup></b>	<b>1</b>				21 <sup>4</sup>	1 <sup>2</sup>	1 <sup>3</sup>	0000+	+1/5.7√3	
0	1 <sup>5</sup>	21 <sup>4</sup>	0000+	-1/√2.3.5.7		21 <sup>4</sup>	1 <sup>2</sup>	21	0000+	-4√2/9.5.7	
1	21 <sup>4</sup>	1	0000+	+1/5.7		21 <sup>4</sup>	1 <sup>2</sup>	21	0100-	+i/4.9.5.7	
1 <sup>5</sup>	1 <sup>4</sup>	1 <sup>5</sup>	0000+	+1/5√3.7		21 <sup>4</sup>	2	1 <sup>3</sup>	0000+	-1/2.7√3.5	
1 <sup>2</sup>	1	1 <sup>2</sup>	0000+	+1/2.5√3.7		21 <sup>4</sup>	2	21	0000+	-1/2.3.7√2	
2	1	1 <sup>2</sup>	0000+	-1/3.7√2.5		21 <sup>4</sup>	2	21	0100-	-i/8.2.3.5.7	
21 <sup>4</sup>	1 <sup>5</sup>	21 <sup>4</sup>	0000+	-1/2.5.7√3		2 <sup>4</sup> 1	1 <sup>5</sup>	21 <sup>4</sup>	0000+	+2/9.5.7	
21 <sup>4</sup>	1 <sup>5</sup>	21 <sup>4</sup>	0100-	+i/5.7√2.3		2 <sup>4</sup> 1	1 <sup>5</sup>	21 <sup>4</sup>	0100-	+i/2.9.5√2	
21 <sup>3</sup>	1 <sup>4</sup>	1 <sup>5</sup>	0000+	-1/4.3.5.7		2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>3</sup>	1 <sup>4</sup>	0000+	-1/3.5.7	
2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>4</sup>	1	0000+	-1/4.5.7		2 <sup>2</sup> 1 <sup>3</sup>	21	1 <sup>4</sup>	0000+	+1/4.3.7	
<b>21<sup>3</sup></b>	<b>1<sup>3</sup></b>	<b>1<sup>4</sup></b>				<b>21<sup>3</sup></b>	<b>2<sup>4</sup>1</b>	<b>1<sup>4</sup></b>			
0	1 <sup>2</sup>	1 <sup>3</sup>	0000+	-1/2.5√3		0	1 <sup>2</sup>	2 <sup>4</sup> 1	0000+	-1/5√2.3.7	
1	1 <sup>3</sup>	1 <sup>4</sup>	0000+	+1/2.3.5		1	1 <sup>3</sup>	1 <sup>4</sup>	0000+	+1/2.3√2.5.7	
						1	1 <sup>3</sup>	2 <sup>5</sup>	0000+	+1/2.5√2.7	

Table 6—continued

<b>21<sup>3</sup> 2<sup>4</sup> 1<sup>4</sup></b>					<b>2<sup>2</sup>1<sup>3</sup> 21<sup>3</sup> 0</b>		
1 21 1 <sup>4</sup>	0000+	-1/3.5.7			1 <sup>4</sup> 1 <sup>4</sup> 2 <sup>4</sup> 0000+	-1/2.3√5.7	
1 <sup>2</sup> 1 <sup>4</sup> 1 <sup>5</sup>	0000+	-1/2.3√5.7			2 2 2 <sup>2</sup> 1 <sup>3</sup> 0000+	+1/2.3.7	
21 <sup>4</sup> 1 <sup>2</sup> 1 <sup>3</sup>	0000+	-1/2.7√2.3.5			2 <sup>5</sup> 2 <sup>5</sup> 1 <sup>3</sup> 0000+	+1/2.3.7	
21 <sup>4</sup> 1 <sup>2</sup> 2 <sup>4</sup> 1	0000+	-1/2.3.5.7			2 <sup>5</sup> 2 <sup>5</sup> 2 <sup>4</sup> 1 0000+	+1/2.3.7	
21 <sup>4</sup> 1 <sup>2</sup> 2 <sup>4</sup> 1	0100-	-i√2/3.5.7			21 <sup>4</sup> 21 <sup>4</sup> 1 <sup>5</sup> 0000+	-1/2.7√3.5	
21 <sup>4</sup> 2 1 <sup>3</sup>	0000+	-1/2.5.7√3			21 <sup>4</sup> 21 <sup>4</sup> 21 <sup>3</sup> 0000+	+1/2.7√3.5	
1 <sup>3</sup> 1 <sup>5</sup> 21 <sup>4</sup>	0000+	+1/4√3.5.7			21 <sup>4</sup> 21 <sup>4</sup> 21 <sup>3</sup> 0100-	0	
21 <sup>3</sup> 1 1 <sup>2</sup>	0000+	-1/4.3.7			21 <sup>4</sup> 21 <sup>4</sup> 21 <sup>3</sup> 1000-	0	
2 <sup>2</sup> 1 <sup>3</sup> 1 <sup>3</sup> 1 <sup>4</sup>	0000+	-1/2.3.7√5			21 <sup>4</sup> 21 <sup>4</sup> 21 <sup>3</sup> 1100+	-1/2.7√3.5	
2 <sup>2</sup> 1 <sup>3</sup> 1 <sup>3</sup> 2 <sup>5</sup>	0000+	-1/3.5.7			1 <sup>3</sup> 1 <sup>3</sup> 1 <sup>2</sup> 0000+	-1/4√3.5.7	
2 <sup>2</sup> 1 <sup>3</sup> 21 1 <sup>4</sup>	0000+	+1/4.3.5.7			1 <sup>3</sup> 1 <sup>3</sup> 2 0000+	+1/4√3.5.7	
2 <sup>2</sup> 1 <sup>3</sup> 2 <sup>4</sup> 1 1 <sup>4</sup>	0000+	-1/4.3.7			21 21 1 <sup>2</sup> 0000+	-1/2.7√2.3.5	
<b>21<sup>3</sup> 21<sup>3</sup> 1<sup>2</sup></b>					21 21 2 0000+	+1/2.7√2.3.5	
1 1 <sup>5</sup> 21 <sup>4</sup>	0000+	-1/2.5√2.7			2 <sup>4</sup> 1 2 <sup>4</sup> 1 1 <sup>2</sup> 0000+	-1/2.7√2.3.5	
1 <sup>2</sup> 0 2 <sup>2</sup> 1 <sup>3</sup>	0000+	-1/2.3√5.7			21 <sup>3</sup> 21 <sup>3</sup> 1 <sup>4</sup> 0000+	-1/4.3.7	
1 <sup>4</sup> 1 <sup>2</sup> 1 <sup>3</sup>	0000+	-√2/3.5√3.7			21 <sup>3</sup> 21 <sup>3</sup> 2 <sup>5</sup> 0000+	+1/4.3.7	
1 <sup>4</sup> 1 <sup>2</sup> 21	0000+	+1/2.3√2.3.5.7			2 <sup>2</sup> 1 <sup>3</sup> 2 <sup>2</sup> 1 <sup>3</sup> 0 0000+	-1/4.3.7	
1 <sup>4</sup> 1 <sup>2</sup> 2 <sup>4</sup> 1	0000+	+1/2.3√2.3.5.7			<b>2<sup>2</sup>1<sup>3</sup> 21<sup>3</sup> 21<sup>4</sup></b>		
21 <sup>4</sup> 1 <sup>4</sup> 1 <sup>5</sup>	0000+	+√3/2.5.7√2			1 1 21 <sup>4</sup>	0000+	+3√3/4.5.7√2
21 <sup>4</sup> 1 <sup>4</sup> 21 <sup>3</sup>	0000+	+1/4.3.5√2.3			1 1 21 <sup>4</sup>	0001-	-i/4.3.7√2
21 <sup>4</sup> 1 <sup>4</sup> 21 <sup>3</sup>	0100-	-i/4.3.7√2			1 <sup>5</sup> 1 <sup>5</sup> 1 <sup>4</sup>	0000+	+√3/4.5.7√2
21 <sup>4</sup> 2 <sup>5</sup> 21 <sup>3</sup>	0000+	+1/3.7√3.5			1 <sup>5</sup> 1 <sup>5</sup> 1 <sup>4</sup>	0001-	+5i/4.3.7√2
21 <sup>4</sup> 2 <sup>5</sup> 21 <sup>3</sup>	0100-	0			1 <sup>2</sup> 1 <sup>2</sup> 1	0000+	-3√3/4.5.7√2
1 <sup>3</sup> 1 1 <sup>2</sup>	0000+	+1/2.5√3.7			1 <sup>2</sup> 1 <sup>2</sup> 1	0001-	+i/4.3.7√2
21 1 1 <sup>2</sup>	0000+	+1/2.5.7√2.3			1 <sup>2</sup> 1 <sup>2</sup> 2 <sup>2</sup> 1 <sup>3</sup>	0000+	+1/4.3.5√2.3
21 <sup>3</sup> 1 <sup>3</sup> 1 <sup>4</sup>	0000+	-11/4.9.5.7			1 <sup>2</sup> 1 <sup>2</sup> 2 <sup>2</sup> 1 <sup>3</sup>	0001-	-i/4.3.7√2
21 <sup>3</sup> 1 <sup>3</sup> 2 <sup>5</sup>	0000+	-1/4.3.7			1 <sup>4</sup> 1 <sup>4</sup> 1 <sup>3</sup>	0000+	+1/2.5.7√2.3
21 <sup>3</sup> 21 1 <sup>4</sup>	0000+	+1/2.9.7			1 <sup>4</sup> 1 <sup>4</sup> 1 <sup>3</sup>	0001-	-i/2.3.7√2
21 <sup>3</sup> 2 <sup>4</sup> 1 1 <sup>4</sup>	0000+	+2/9.5.7			1 <sup>4</sup> 1 <sup>4</sup> 21	0000+	+1/4.7√2.3
21 <sup>3</sup> 2 <sup>4</sup> 1 2 <sup>5</sup>	0000+	-1/4.3.7√5			1 <sup>4</sup> 1 <sup>4</sup> 21	0001-	-i/4.3.5.7√2
2 <sup>2</sup> 1 <sup>3</sup> 1 <sup>5</sup> 21 <sup>4</sup>	0000+	+1/3.5.7			1 <sup>4</sup> 1 <sup>4</sup> 2 <sup>4</sup> 1	0000+	-1/2.5.7√2.3
2 <sup>2</sup> 1 <sup>3</sup> 1 <sup>5</sup> 21 <sup>4</sup>	0100-	0			1 <sup>4</sup> 1 <sup>4</sup> 2 <sup>4</sup> 1	0001-	-i/2.3.7√2
2 <sup>2</sup> 1 <sup>3</sup> 21 <sup>3</sup> 0	0000+	-1/4.3.7			2 1 <sup>2</sup> 2 <sup>2</sup> 1 <sup>3</sup>	0000+	+1/3.7√3.5
<b>21<sup>3</sup> 21<sup>3</sup> 2</b>					2 1 <sup>2</sup> 2 <sup>2</sup> 1 <sup>3</sup>	0001-	0
1 1 <sup>5</sup> 21 <sup>4</sup>	0000+	+1/2.7√2.3			2 2 2 <sup>2</sup> 1 <sup>3</sup>	0000+	+1/8.7√3
2 0 2 <sup>2</sup> 1 <sup>3</sup>	0000+	+1/2.3.7			2 2 2 <sup>2</sup> 1 <sup>3</sup>	0001-	-i/8.3.7
21 <sup>4</sup> 1 <sup>4</sup> 1 <sup>5</sup>	0000+	+1/2.7√3.5			2 <sup>5</sup> 1 <sup>4</sup> 1 <sup>3</sup>	0000+	+1/4.7√3.5
21 <sup>4</sup> 1 <sup>4</sup> 21 <sup>3</sup>	0000+	+1/3.7√3.5			2 <sup>5</sup> 1 <sup>4</sup> 1 <sup>3</sup>	0001-	+i/4.7√5
21 <sup>4</sup> 1 <sup>4</sup> 21 <sup>3</sup>	0100-	0			2 <sup>5</sup> 1 <sup>4</sup> 2 <sup>4</sup> 1	0000+	-1/8.5.7√3
21 <sup>4</sup> 2 <sup>5</sup> 21 <sup>3</sup>	0000+	+1/8.7√3			2 <sup>5</sup> 1 <sup>4</sup> 2 <sup>4</sup> 1	0001-	-i/8.7
21 <sup>4</sup> 2 <sup>5</sup> 21 <sup>3</sup>	0100-	-i/8.3.7			2 <sup>5</sup> 2 <sup>5</sup> 1 <sup>3</sup>	0000+	0
21 1 1 <sup>2</sup>	0000+	+1/2.7√2.3.5			2 <sup>5</sup> 2 <sup>5</sup> 1 <sup>3</sup>	0001-	-2i/3.5.7
21 <sup>3</sup> 1 <sup>3</sup> 1 <sup>4</sup>	0000+	-1/4.3.7			2 <sup>5</sup> 2 <sup>5</sup> 2 <sup>4</sup> 1	0000+	-3√3/8.4.5.7
21 <sup>3</sup> 1 <sup>3</sup> 2 <sup>5</sup>	0000+	-1/4.3.7			2 <sup>5</sup> 2 <sup>5</sup> 2 <sup>4</sup> 1	0001-	-11i/8.4.3.7
21 <sup>3</sup> 2 <sup>4</sup> 1 1 <sup>4</sup>	0000+	-1/4.3.7√5			21 <sup>4</sup> 0 21 <sup>3</sup>	0000+	+1/2.7√3.5
21 <sup>3</sup> 2 <sup>4</sup> 1 2 <sup>5</sup>	0000+	+1/8.3.7			21 <sup>4</sup> 0 21 <sup>3</sup>	0001-	0
2 <sup>2</sup> 1 <sup>3</sup> 21 <sup>3</sup> 0	0000+	+1/4.3.7			21 <sup>4</sup> 0 21 <sup>3</sup>	0100-	0
<b>2<sup>2</sup>1<sup>3</sup> 21<sup>3</sup> 0</b>					21 <sup>4</sup> 0 21 <sup>3</sup>	0101+	-1/2.7√3.5
0 0 21 <sup>3</sup>	0000+	-1/2√3.7			21 <sup>4</sup> 21 <sup>4</sup> 1 <sup>5</sup>	0000+	-1/4.5.7√2
1 1 21 <sup>4</sup>	0000+	-1/2.3√2.7			21 <sup>4</sup> 21 <sup>4</sup> 1 <sup>5</sup>	0001-	+i/4.7√2.3
1 <sup>5</sup> 1 <sup>5</sup> 1 <sup>4</sup>	0000+	+1/2.3√2.7			21 <sup>4</sup> 21 <sup>4</sup> 1 <sup>5</sup>	0010-	-3i/8.5.7
1 <sup>2</sup> 1 <sup>2</sup> 1	0000+	+1/2.3√5.7			21 <sup>4</sup> 21 <sup>4</sup> 1 <sup>5</sup>	0011+	+1/8.7√3
1 <sup>2</sup> 1 <sup>2</sup> 2 <sup>2</sup> 1 <sup>3</sup>	0000+	-1/2.3√5.7			21 <sup>4</sup> 21 <sup>4</sup> 21 <sup>3</sup>	0000+	+523/8.8.2.9.5.7√2
1 <sup>4</sup> 1 <sup>4</sup> 1 <sup>3</sup>	0000+	-1/2.3√5.7			21 <sup>4</sup> 21 <sup>4</sup> 21 <sup>3</sup>	0001-	-i/8.8.2√2.3
1 <sup>4</sup> 1 <sup>4</sup> 21	0000+	-1/2.3√5.7			21 <sup>4</sup> 21 <sup>4</sup> 21 <sup>3</sup>	0010-	+181i/8.8.8.3.5.7

Table 6—continued

<b>2<sup>2</sup>1<sup>3</sup></b>	<b>2<sup>1</sup>3</b>	<b>2<sup>1</sup>4</b>				<b>2<sup>2</sup>1<sup>3</sup></b>	<b>2<sup>1</sup>3</b>	<b>2<sup>1</sup>4</b>			
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	0011+	+11/8.8.8.7√3		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	0010-	-i/8.8.4.3√3	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	0100-	-i/8.8.2√2.3		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	0011+	+5.11/8.8.4.3.7	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	0101+	+3/8.8.2.7√2		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	0100-	+i/8.8.4.3√3	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	0110+	+11/8.8.8.7√3		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	0101+	+3/8.8.4.7	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	0111-	-9i/8.8.8.7		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	0110+	+3/8.8.4.7	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	1000-	-i/8.8.2√2.3		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	0111-	+3i√3/8.8.4.7	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	1001+	+3/8.8.2.7√2		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	1000-	+i/8.8.4.3√3	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	1010+	+11/8.8.8.7√3		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	1001+	+3/8.8.4.7	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	1011-	-9i/8.8.8.7		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	1010+	+3/8.8.4.7	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	1100+	+3/8.8.2.7√2		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	1011-	+3i√3/8.8.4.7	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	1101-	+43i√3/8.8.2.5.7√2		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	1100+	+5.11/8.8.4.3.7	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	1110-	-9i/8.8.8.7		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	1101-	-3i√3/8.8.4.7	
2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>1</sup> 3	1111+	+71/8.8.8.7√3		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	1110-	-3i√3/8.8.4.7	
1 <sup>3</sup>	1 <sup>3</sup>	1 <sup>2</sup>	0000+	-11/8.3.5.7		2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	1111+	-41/8.8.4.3.5.7	
1 <sup>3</sup>	1 <sup>3</sup>	1 <sup>2</sup>	0001-	+i/8.7√3		<b>3</b>	<b>2<sup>5</sup></b>	<b>1<sup>5</sup></b>			
1 <sup>3</sup>	1 <sup>3</sup>	2	0000+	+1/8.7		0	1	2 <sup>5</sup>	0000+	-1/3√2.7	
1 <sup>3</sup>	1 <sup>3</sup>	2	0001-	-i/8.5.7√3		1	2	1 <sup>5</sup>	0000+	-1/3.7	
21	1 <sup>3</sup>	1 <sup>2</sup>	0000+	-1/3.5.7		2 <sup>1</sup> 4	1	2 <sup>5</sup>	0000+	+1/2.3.7√2	
21	1 <sup>3</sup>	1 <sup>2</sup>	0001-	0		<b>3</b>	<b>2<sup>4</sup>1</b>	<b>2<sup>1</sup>4</b>			
21	1 <sup>3</sup>	2	0000+	-1/8.7√5		0	2 <sup>1</sup> 4	2 <sup>4</sup> 1	0000+	+1/5.7√2	
21	1 <sup>3</sup>	2	0001-	+i/8.7√3.5		1	1	2 <sup>5</sup>	0000+	+1/7√3.5	
21	21	1 <sup>2</sup>	0000+	-11/4.9.5.7√2.3		1 <sup>2</sup>	2	1 <sup>5</sup>	0000+	-1/7√2.3.5	
21	21	1 <sup>2</sup>	0001-	+i/4.9.7√2		2	2	1 <sup>5</sup>	0000+	+1/2.7√2.3.5	
21	21	1 <sup>2</sup>	0010-	-37i/8.4.9.7√3		2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>4</sup> 1	0000+	+1/2.3.5.7√3	
21	21	1 <sup>2</sup>	0011+	-1/8.4.9		2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>4</sup> 1	0010-	-i/2.3.5.7√2.3	
21	21	2	0000+	+1/3.5.7√2.3		2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>4</sup> 1	0100-	-i/2.3.7√2.3	
21	21	2	0001-	0		2 <sup>1</sup> 4	2 <sup>1</sup> 4	2 <sup>4</sup> 1	0110+	+17/8.3.5.7√3	
21	21	2	0010-	+13.19i/8.8.2.3.5.7√3		1 <sup>3</sup>	21	2 <sup>1</sup> 4	0000+	+1/2.5.7	
21	21	2	0011+	+3/8.8.2.7		21	21	2 <sup>1</sup> 4	0000+	-1/9.3.5	
2 <sup>4</sup> 1	1 <sup>3</sup>	1 <sup>2</sup>	0000+	-1/4.3.7√5		21	21	2 <sup>1</sup> 4	0010-	+4i√2/9.3.5.7	
2 <sup>4</sup> 1	1 <sup>3</sup>	1 <sup>2</sup>	0001-	-i/4.7√3.5		21	21	2 <sup>1</sup> 4	0100-	-4i√2/9.3.5.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	1 <sup>2</sup>	0000+	+1/4.9.7√2.3		21	21	2 <sup>1</sup> 4	0110+	+31/8.2.9.3.5.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	1 <sup>2</sup>	0001-	+i/4.3.5√2		2 <sup>2</sup> 1 <sup>3</sup>	1	2 <sup>5</sup>	0000+	+1/4.7√3.5	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	1 <sup>2</sup>	0010-	+5i/8.9.7√3		3	21	2 <sup>1</sup> 4	0000+	-1/8.5.7	
2 <sup>4</sup> 1	2 <sup>4</sup> 1	1 <sup>2</sup>	0011+	+1/8.3.5.7		<b>3<sup>5</sup></b>	<b>3</b>	<b>0</b>			
2 <sup>1</sup> 3	1 <sup>5</sup>	1 <sup>4</sup>	0000+	+1/3.5.7		0	0	3	0000+	-1/2√2.7	
2 <sup>1</sup> 3	1 <sup>5</sup>	1 <sup>4</sup>	0001-	0		1 <sup>5</sup>	1 <sup>5</sup>	2	0000+	-1/4√3.7	
2 <sup>1</sup> 3	2 <sup>1</sup> 3	1 <sup>4</sup>	0000+	-29/8.8.9.3.5.7		2 <sup>5</sup>	2 <sup>5</sup>	1	0000+	-1/2.7√2.3	
2 <sup>1</sup> 3	2 <sup>1</sup> 3	1 <sup>4</sup>	0001-	-5i/8.8.7√3		2 <sup>1</sup> 4	2 <sup>1</sup> 4	21	0000+	+1/2.7√2.5	
2 <sup>1</sup> 3	2 <sup>1</sup> 3	1 <sup>4</sup>	0010-	+5i/8.8.7√3		2 <sup>1</sup> 4	2 <sup>1</sup> 4	3	0000+	+1/2.7√2.5	
2 <sup>1</sup> 3	2 <sup>1</sup> 3	1 <sup>4</sup>	0011+	+5/8.8.3.7		2 <sup>4</sup> 1	2 <sup>4</sup> 1	2 <sup>1</sup> 4	0000+	+1/4.7√5	
2 <sup>1</sup> 3	2 <sup>1</sup> 3	2 <sup>5</sup>	0000+	+19/8.8.9.7		3 <sup>5</sup>	3 <sup>5</sup>	0	0000+	-1/8.7	
2 <sup>1</sup> 3	2 <sup>1</sup> 3	2 <sup>5</sup>	0001-	+5i/8.8.7√3		<b>3<sup>5</sup></b>	<b>3</b>	<b>2<sup>1</sup>4</b>			
2 <sup>1</sup> 3	2 <sup>1</sup> 3	2 <sup>5</sup>	0010-	-5i/8.8.7√3		1 <sup>5</sup>	1 <sup>5</sup>	2	0000+	+1/4.7	
2 <sup>1</sup> 3	2 <sup>1</sup> 3	2 <sup>5</sup>	0011+	-5/8.8.3.7		2 <sup>5</sup>	2 <sup>5</sup>	1	0000+	-1/4.7√2	
2 <sup>2</sup> 1 <sup>3</sup>	1	2 <sup>1</sup> 4	0000+	-19/8.4.3.5.7		2 <sup>1</sup> 4	0	3	0000+	+1/2.7√2.5	
2 <sup>2</sup> 1 <sup>3</sup>	1	2 <sup>1</sup> 4	0001-	-i√3/8.4.7		2 <sup>1</sup> 4	2 <sup>1</sup> 4	21	0000+	+√3/4.5.7	
2 <sup>2</sup> 1 <sup>3</sup>	1	2 <sup>1</sup> 4	0100-	+i√3/8.4.7		2 <sup>1</sup> 4	2 <sup>1</sup> 4	21	0010-	-i√3/4.5.7√2	
2 <sup>2</sup> 1 <sup>3</sup>	1	2 <sup>1</sup> 4	0101+	+1/8.4.7		2 <sup>1</sup> 4	2 <sup>1</sup> 4	3	0000+	+1/2.5.7√3	
2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0	0000+	+1/4.3.7		2 <sup>1</sup> 4	2 <sup>1</sup> 4	3	0010-	-i/5.7√2.3	
2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0	0001-	0		2 <sup>4</sup> 1	2 <sup>4</sup> 1	2 <sup>1</sup> 4	0000+	+1/4.3.7	
2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0	0010-	0		2 <sup>4</sup> 1	2 <sup>4</sup> 1	2 <sup>1</sup> 4	0010-	-i/2.3.5.7√2	
2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0	0011+	-1/4.3.7		3 <sup>5</sup>	2 <sup>4</sup> 1	2 <sup>1</sup> 4	0000+	+1/4.5.7	
2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	0000+	-1033/8.8.4.9.3.5.7		3 <sup>5</sup>	3 <sup>5</sup>	0	0000+	+1/8.7	
2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>1</sup> 4	0001-	-i/8.8.4.3√3		3 <sup>5</sup>	3 <sup>5</sup>	2 <sup>1</sup> 4	0000+	-11/8.3.5.7	

**Table 6—continued**

<b>31<sup>4</sup></b>	<b>2<sup>5</sup></b>	<b>1</b>				<b>31<sup>4</sup></b>	<b>21<sup>3</sup></b>	<b>21<sup>4</sup></b>		
0	1 <sup>5</sup>	2 <sup>5</sup>	0000+	-1/3√2.7		2 <sup>5</sup>	2 <sup>5</sup>	2 <sup>41</sup>	0000+	-1/8.5.7√2
21 <sup>4</sup>	1 <sup>5</sup>	2 <sup>5</sup>	0000+	+1/2.3.5.7√2		21 <sup>4</sup>	21 <sup>4</sup>	1 <sup>5</sup>	0000+	+1/2.5.7√3
21	2	1	0000+	-1/3.5.7		21 <sup>4</sup>	21 <sup>4</sup>	1 <sup>5</sup>	0010-	+i√3/4.5.7√2
3	2	1	0000+	-1/8.3.7		21 <sup>4</sup>	21 <sup>4</sup>	21 <sup>3</sup>	0000+	+31/8.4.3.5.7√2
<b>31<sup>4</sup></b>	<b>21<sup>4</sup></b>	<b>1<sup>5</sup></b>				21 <sup>4</sup>	21 <sup>4</sup>	21 <sup>3</sup>	0010-	+41 <i>i</i> /8.8.2.5.7
0	1	21 <sup>4</sup>	0000+	-1/√2.3.5.7		21 <sup>4</sup>	21 <sup>4</sup>	21 <sup>3</sup>	0100-	-i/8.4.7√2.3
1	2	1	0000+	+1/7√3.5		21 <sup>4</sup>	21 <sup>4</sup>	21 <sup>3</sup>	0110+	+5/8.8.2.7√3
1 <sup>5</sup>	21 <sup>4</sup>	1 <sup>5</sup>	0000+	-1/5.7		1 <sup>5</sup>	21	1 <sup>2</sup>	0000+	+√3/4.5.7
1 <sup>4</sup>	1 <sup>5</sup>	2 <sup>5</sup>	0000+	+1/3.5√2.7		1 <sup>5</sup>	21	2	0000+	-1/2.7√2.3.5
2 <sup>5</sup>	1 <sup>5</sup>	2 <sup>5</sup>	0000+	-1/2.7√2.3.5		21	21	1 <sup>2</sup>	0000+	+1/3.5.7√2
21 <sup>4</sup>	1	21 <sup>4</sup>	0000+	+1/2.5.7√3		21	21	1 <sup>2</sup>	0010-	-17 <i>i</i> /8.4.3.5.7
21 <sup>4</sup>	1	21 <sup>4</sup>	0100-	+i/2.5.7√2.3		21	21	2	0000+	+2/9.5.7
21 <sup>3</sup>	21 <sup>4</sup>	1 <sup>5</sup>	0000+	-1/2.3.5.7		21	21	2	0010-	-11 <i>i</i> /8.4.9.5√2
31 <sup>4</sup>	2	1	0000+	-1/8.3.5.7		21 <sup>3</sup>	1 <sup>5</sup>	2 <sup>5</sup>	0000+	-1/2.3.7√2.5
32 <sup>4</sup>	21 <sup>4</sup>	1 <sup>5</sup>	0000+	-1/8.5.7		21 <sup>3</sup>	21 <sup>3</sup>	1 <sup>4</sup>	0000+	+17/8.8.3.7√3.5
<b>31<sup>4</sup></b>	<b>2<sup>41</sup></b>	<b>1<sup>2</sup></b>				21 <sup>3</sup>	21 <sup>3</sup>	1 <sup>4</sup>	0010-	-i/8.8√5
0	1 <sup>4</sup>	2 <sup>41</sup>	0000+	-1/5√2.3.7		21 <sup>3</sup>	21 <sup>3</sup>	2 <sup>5</sup>	0000+	-1/8.8.3√5.7
1	1 <sup>5</sup>	2 <sup>5</sup>	0000+	+√2/3.5√7		21 <sup>3</sup>	21 <sup>3</sup>	2 <sup>5</sup>	0010-	+i√5/8.8√3.7
1 <sup>2</sup>	21 <sup>4</sup>	1 <sup>5</sup>	0000+	-1/5.7√2		2 <sup>51</sup>	1	21 <sup>4</sup>	0000+	+1/8.2.5.7√2.3
2	21 <sup>4</sup>	1 <sup>5</sup>	0000+	+1/3.5.7		2 <sup>51</sup>	1	21 <sup>4</sup>	0100-	-i/8.2.7√2
21 <sup>4</sup>	1 <sup>4</sup>	2 <sup>41</sup>	0000+	+1/2.9.5.7		2 <sup>51</sup>	2 <sup>51</sup>	21 <sup>4</sup>	0000+	+17.23/8.8.4.9.5.7
21 <sup>4</sup>	1 <sup>4</sup>	2 <sup>41</sup>	0100-	-47 <i>i</i> /8.9.5.7√2		2 <sup>51</sup>	2 <sup>51</sup>	21 <sup>4</sup>	0010-	-i√3/8.8.4.7
21 <sup>4</sup>	2 <sup>5</sup>	2 <sup>41</sup>	0000+	0		2 <sup>51</sup>	2 <sup>51</sup>	21 <sup>4</sup>	0100-	+i√3/8.8.4.7
21 <sup>4</sup>	2 <sup>5</sup>	2 <sup>41</sup>	0100-	+3 <i>i</i> /4.5.7√2		2 <sup>51</sup>	2 <sup>51</sup>	21 <sup>4</sup>	0110+	+1/8.8.4.7
1 <sup>5</sup>	1	21 <sup>4</sup>	0000+	-1/2.5√2.3.7		31 <sup>4</sup>	1	21 <sup>4</sup>	0000+	-1/8.2.3.5.7
21	1	21 <sup>4</sup>	0000+	+√2/9.5.7		31 <sup>4</sup>	2 <sup>51</sup>	21 <sup>4</sup>	0000+	+17/8.4.3.5.7
21	1	21 <sup>4</sup>	0100-	-i/4.9.5		32 <sup>4</sup>	1 <sup>5</sup>	2 <sup>5</sup>	0000+	+1/8.5√3.7
21 <sup>3</sup>	21	1 <sup>2</sup>	0000+	+1/4.5.7		32 <sup>4</sup>	21 <sup>3</sup>	1 <sup>4</sup>	0000+	+1/8.8.3.7
2 <sup>21</sup>	1 <sup>5</sup>	2 <sup>5</sup>	0000+	-1/4.5.7√2.3		32 <sup>4</sup>	21 <sup>3</sup>	2 <sup>5</sup>	0000+	+1/8.8.3.5
<b>31<sup>4</sup></b>	<b>2<sup>41</sup></b>	<b>2</b>				<b>31<sup>4</sup></b>	<b>2<sup>21</sup></b>	<b>1<sup>4</sup></b>		
0	2 <sup>5</sup>	2 <sup>41</sup>	0000+	+1/7√2.3.5		0	1 <sup>5</sup>	2 <sup>21</sup>	0000+	-1/2.3√5.7
1	1 <sup>5</sup>	2 <sup>5</sup>	0000+	+1/7√3.5		1	21	1 <sup>2</sup>	0000+	+1/2.7√2.3.5
1 <sup>2</sup>	21 <sup>4</sup>	1 <sup>5</sup>	0000+	+1/5.7√2		1 <sup>5</sup>	1	21 <sup>4</sup>	0000+	-1/2.3√5.7
2	21 <sup>4</sup>	1 <sup>5</sup>	0000+	-1/2.5.7√2		1 <sup>5</sup>	2 <sup>21</sup>	21 <sup>4</sup>	0000+	-1/4.7√3.5
21 <sup>4</sup>	1 <sup>4</sup>	2 <sup>41</sup>	0000+	0		1 <sup>5</sup>	1 <sup>4</sup>	2 <sup>41</sup>	0000+	+1/2.5√2.3.7
21 <sup>4</sup>	1 <sup>4</sup>	2 <sup>41</sup>	0100-	+3 <i>i</i> /4.5.7√2		1 <sup>4</sup>	21 <sup>4</sup>	1 <sup>5</sup>	0000+	-1/2.7√3.5
21 <sup>4</sup>	2 <sup>5</sup>	2 <sup>41</sup>	0000+	+1/2.9.5.7√2		1 <sup>4</sup>	21 <sup>4</sup>	21 <sup>3</sup>	0000+	+1/4.7√2.5
21 <sup>4</sup>	2 <sup>5</sup>	2 <sup>41</sup>	0100-	-37 <i>i</i> /8.9.5.7		2 <sup>5</sup>	21 <sup>4</sup>	21 <sup>3</sup>	0000+	+1/4.3.7
21	1	21 <sup>4</sup>	0000+	-1/3.5.7		21 <sup>4</sup>	1 <sup>5</sup>	2 <sup>21</sup>	0000+	+√3/8.2.7√2
21	1	21 <sup>4</sup>	0100-	-i/2.3.5.7√2		21 <sup>4</sup>	1 <sup>5</sup>	2 <sup>21</sup>	0100-	-i/8.2.3.5.7√2
3	1	21 <sup>4</sup>	0000+	+1/8.7√3.5		21 <sup>4</sup>	2	1	0000+	-1/3.7√2.5
31 <sup>4</sup>	1 <sup>5</sup>	2 <sup>5</sup>	0000+	-1/8.3.5.7		21 <sup>4</sup>	2	2 <sup>21</sup>	0000+	+1/8.2√5.7
<b>31<sup>4</sup></b>	<b>21<sup>3</sup></b>	<b>21<sup>4</sup></b>				21 <sup>4</sup>	2	2 <sup>21</sup>	0100-	+i/8.2√3.5.7
0	21 <sup>4</sup>	21 <sup>3</sup>	0000+	+1/2.7√3.5		1 <sup>5</sup>	1 <sup>5</sup>	2 <sup>5</sup>	0000+	+1/3.5√2.7
1	1	21 <sup>4</sup>	0000+	+1/5.7		1 <sup>5</sup>	21 <sup>3</sup>	1 <sup>4</sup>	0000+	+1/4.3.7
1	2 <sup>21</sup>	21 <sup>4</sup>	0000+	+1/8.3.5.7		1 <sup>5</sup>	21 <sup>3</sup>	2 <sup>5</sup>	0000+	+1/4.5√3.7
1 <sup>5</sup>	21 <sup>3</sup>	1 <sup>4</sup>	0000+	-1/4.7√3.5		21	21 <sup>3</sup>	1 <sup>4</sup>	0000+	+1/2.3.5.7
1 <sup>2</sup>	1 <sup>2</sup>	2 <sup>21</sup>	0000+	+1/4.7√2.5		2 <sup>41</sup>	1 <sup>5</sup>	2 <sup>5</sup>	0000+	-1/4.3.7√5
1 <sup>2</sup>	2	1	0000+	+√2/5.7√3		2 <sup>41</sup>	21 <sup>3</sup>	1 <sup>4</sup>	0000+	-1/8.3.7
1 <sup>2</sup>	2	2 <sup>21</sup>	0000+	+1/4.5√3.7		2 <sup>41</sup>	21 <sup>3</sup>	2 <sup>5</sup>	0000+	+1/8.2√3.5.7
1 <sup>4</sup>	1 <sup>4</sup>	2 <sup>41</sup>	0000+	+1/4.5.7√2		21 <sup>3</sup>	1	21 <sup>4</sup>	0000+	-1/8.7√2.5
1 <sup>4</sup>	2 <sup>5</sup>	2 <sup>41</sup>	0000+	+1/2.3.5.7√2		21 <sup>3</sup>	1	21 <sup>4</sup>	0100-	+i/8.7√2.3.5
2	1 <sup>2</sup>	2 <sup>21</sup>	0000+	+1/4.3.7		21 <sup>3</sup>	2 <sup>21</sup>	21 <sup>4</sup>	0000+	+17/8.8.3.7√3.5
2	2	2 <sup>21</sup>	0000+	+1/8√3.5.7		21 <sup>3</sup>	2 <sup>21</sup>	21 <sup>4</sup>	0100-	-i/8.8√5
2 <sup>5</sup>	1 <sup>4</sup>	2 <sup>41</sup>	0000+	-1/8.5.7		2 <sup>21</sup>	21	1 <sup>2</sup>	0000+	-1/8.7√5

Table 6—continued

<b>31<sup>4</sup></b>	<b>2<sup>2</sup>1<sup>3</sup></b>	<b>1<sup>4</sup></b>				<b>31<sup>4</sup></b>	<b>31<sup>4</sup></b>	<b>1<sup>4</sup></b>			
2 <sup>2</sup> 1 <sup>3</sup>	21	2	0000+	-1/4.3.7√2		1 <sup>5</sup>	1	21 <sup>4</sup>	0000+	-1/4.5√3	
31 <sup>4</sup>	21	1 <sup>2</sup>	0000+	-11/8.4.3.5.7		1 <sup>4</sup>	0	32 <sup>4</sup>	0000+	-1/2.3.5√2	
31 <sup>4</sup>	21	2	0000+	-1/8.2√2.3.5.7		21 <sup>4</sup>	1 <sup>2</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0000+	+1/8√3.5.7	
<b>31<sup>4</sup></b>	<b>2<sup>2</sup>1<sup>3</sup></b>	<b>2<sup>5</sup></b>				21 <sup>4</sup>	1 <sup>2</sup>	31 <sup>4</sup>	0000+	-1/4.5√2.11	
0	2	2 <sup>2</sup> 1 <sup>3</sup>	0000+	+1/2.3.7		21 <sup>4</sup>	1 <sup>2</sup>	31 <sup>4</sup>	0100-	-i/4.3.5√11	
1	21	1 <sup>2</sup>	0000+	-1/2.3.5√2.7		21 <sup>4</sup>	2	1	0000+	+1/2.5√2.3.7	
1 <sup>5</sup>	1	21 <sup>4</sup>	0000+	+1/2.3√5.7		21 <sup>4</sup>	2	2 <sup>2</sup> 1 <sup>3</sup>	0000+	+1/4.3.5√2	
1 <sup>4</sup>	21 <sup>4</sup>	1 <sup>5</sup>	0000+	-1/3.5√2.7		21 <sup>4</sup>	2	31 <sup>4</sup>	0000+	-√11/4.3.5√3.7	
1 <sup>4</sup>	21 <sup>4</sup>	21 <sup>3</sup>	0000+	+1/4.5√3.7		21 <sup>4</sup>	2	31 <sup>4</sup>	0100-	0	
2 <sup>5</sup>	21 <sup>4</sup>	21 <sup>3</sup>	0000+	+1/8√3.5.7		2 <sup>4</sup> 1	1 <sup>5</sup>	2 <sup>5</sup>	0000+	+1/4.5√3.7	
21 <sup>4</sup>	1 <sup>2</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0000+	+1/8.2√5.7		21 <sup>3</sup>	1	21 <sup>4</sup>	0000+	+1/4.3.5√7	
21 <sup>4</sup>	1 <sup>2</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0100-	+i/8.2√3.5.7		21 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>4</sup>	0000+	+1/8.2.3.5√2.3.7	
21 <sup>4</sup>	2	1	0000+	-1/2.5√2.3.7		2 <sup>2</sup> 1 <sup>3</sup>	21	1 <sup>2</sup>	0000+	+1/8√2.3.5.7	
21 <sup>4</sup>	2	2 <sup>2</sup> 1 <sup>3</sup>	0000+	+√3/8.4.5		2 <sup>2</sup> 1 <sup>3</sup>	21	2	0000+	+1/8.3.5	
21 <sup>4</sup>	2	2 <sup>2</sup> 1 <sup>3</sup>	0100-	+i/8.4.3.7		31 <sup>4</sup>	21	1 <sup>2</sup>	0000+	+1/8.2.3.5	
1 <sup>3</sup>	21 <sup>3</sup>	1 <sup>4</sup>	0000+	+1/4.5√3.7		31 <sup>4</sup>	21	2	0000+	+1/8.5√2.3.7	
1 <sup>3</sup>	21 <sup>3</sup>	2 <sup>5</sup>	0000+	+1/4.3.7		31 <sup>4</sup>	3	1 <sup>2</sup>	0000+	-1/8.3.5	
2 <sup>4</sup> 1	1 <sup>5</sup>	2 <sup>5</sup>	0000+	-1/4.5√3.7		31 <sup>4</sup>	3	2	0000+	-1/8.3.5	
2 <sup>4</sup> 1	21 <sup>3</sup>	1 <sup>4</sup>	0000+	+1/8.2√3.5.7		32 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>4</sup>	0000+	+1/8.4√2.3.5.7.11	
2 <sup>4</sup> 1	21 <sup>3</sup>	2 <sup>5</sup>	0000+	-17/8.4.3.5.7		32 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>4</sup>	0100-	+i√7/8.4√3.5.11	
21 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>4</sup>	0000+	-1/8.8.3√5.7		32 <sup>4</sup>	31 <sup>4</sup>	0	0000+	-1/8.3.5	
21 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>4</sup>	0100-	-i√5/8.8√3.7		<b>31<sup>4</sup></b>	<b>31<sup>4</sup></b>	<b>2<sup>5</sup></b>			
2 <sup>2</sup> 1 <sup>3</sup>	21	1 <sup>2</sup>	0000+	+√3/8.2.5√7		1 <sup>5</sup>	1	21 <sup>4</sup>	0000+	+√3/4.7√5	
2 <sup>2</sup> 1 <sup>3</sup>	21	2	0000+	+1/8√2.3.5.7		2 <sup>5</sup>	0	32 <sup>4</sup>	0000+	+1/2.3√2.5.7	
31 <sup>4</sup>	21	1 <sup>2</sup>	0000+	-1/8.2√2.3.5.7		21 <sup>4</sup>	1 <sup>2</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0000+	+1/4.7√2.5	
31 <sup>4</sup>	21	2	0000+	-1/8.2.3.5		21 <sup>4</sup>	1 <sup>2</sup>	31 <sup>4</sup>	0000+	-√11/4.3.5√3.7	
32 <sup>4</sup>	1	21 <sup>4</sup>	0000+	+1/8.5√3.7		21 <sup>4</sup>	1 <sup>2</sup>	31 <sup>4</sup>	0100-	0	
<b>31<sup>4</sup></b>	<b>3<sup>5</sup></b>	<b>1<sup>2</sup></b>				21 <sup>4</sup>	2	1	0000+	+3/4.5.7√2	
0	1 <sup>4</sup>	3 <sup>5</sup>	0000+	-1/2√2.3.5.7		21 <sup>4</sup>	2	2 <sup>2</sup> 1 <sup>3</sup>	0000+	+√3/8.5√2.7	
1	1 <sup>5</sup>	2 <sup>5</sup>	0000+	+1/4.3√5		21 <sup>4</sup>	2	31 <sup>4</sup>	0000+	-17/8.9.7√11	
1	21 <sup>3</sup>	2 <sup>5</sup>	0000+	+1/2.3.7√5		21 <sup>4</sup>	2	31 <sup>4</sup>	0100-	-i/4.3.5√2.11	
2	21 <sup>4</sup>	1 <sup>5</sup>	0000+	-1/2.3√2.5.7		2 <sup>4</sup> 1	1 <sup>5</sup>	2 <sup>5</sup>	0000+	-1/4.5.7	
21 <sup>4</sup>	1 <sup>4</sup>	2 <sup>4</sup> 1	0000+	+1/2.5√2.3.7		21 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>4</sup>	0000+	+1/8.2.3.7√2.5	
21 <sup>4</sup>	1 <sup>4</sup>	3 <sup>5</sup>	0000+	+1/2.5.7		2 <sup>2</sup> 1 <sup>3</sup>	21	1 <sup>2</sup>	0000+	-3/8.2.7√2.5	
21 <sup>4</sup>	2 <sup>5</sup>	2 <sup>4</sup> 1	0000+	-1/2.5√2.3.7		2 <sup>2</sup> 1 <sup>3</sup>	21	2	0000+	-√3/8.2.5√7	
21 <sup>4</sup>	2 <sup>5</sup>	3 <sup>5</sup>	0000+	-1/2.5√2.3.7		3 <sup>5</sup>	1 <sup>5</sup>	2 <sup>5</sup>	0000+	+1/4.7√3.5	
21	1	21 <sup>4</sup>	0000+	+1/4.5√3.7		31 <sup>4</sup>	21	1 <sup>2</sup>	0000+	+1/8.5√2.3.7	
21	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>4</sup>	0000+	-1/4.5√3.7		31 <sup>4</sup>	21	2	0000+	+11/8.9.5.7	
31 <sup>4</sup>	21 <sup>3</sup>	1 <sup>4</sup>	0000+	+1/8.3.5		31 <sup>4</sup>	3	1 <sup>2</sup>	0000+	-1/8.3.5	
31 <sup>4</sup>	21 <sup>3</sup>	2 <sup>5</sup>	0000+	+1/8.7√5		31 <sup>4</sup>	3	2	0000+	-59/8.9.3.5.7	
<b>31<sup>4</sup></b>	<b>3<sup>5</sup></b>	<b>2</b>				32 <sup>4</sup>	1	21 <sup>4</sup>	0000+	+√11/4.3.5.7√2	
0	2 <sup>5</sup>	3 <sup>5</sup>	0000+	+1/2.7√2.3		32 <sup>4</sup>	1	21 <sup>4</sup>	0100-	0	
1	1 <sup>5</sup>	2 <sup>5</sup>	0000+	+1/4.7		32 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>4</sup>	0000+	-19/8.4.3.5√2.3.7.11	
2	21 <sup>4</sup>	1 <sup>5</sup>	0000+	+√3/4.7√2.5		32 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>4</sup>	0100-	-i√3/8.4√7.11	
21 <sup>4</sup>	1 <sup>4</sup>	2 <sup>4</sup> 1	0000+	-1/2.5.7		32 <sup>4</sup>	31 <sup>4</sup>	0	0000+	+1/8.3.5	
21 <sup>4</sup>	1 <sup>4</sup>	3 <sup>5</sup>	0000+	-1/2.5√2.3.7		<b>32<sup>4</sup></b>	<b>31<sup>4</sup></b>	<b>0</b>			
21 <sup>4</sup>	2 <sup>5</sup>	2 <sup>4</sup> 1	0000+	+3/4.5.7√2		0	0	31 <sup>4</sup>	0000+	-1/2√2.3.5	
21 <sup>4</sup>	2 <sup>5</sup>	3 <sup>5</sup>	0000+	+√2/3.5.7		1	1	2	0000+	-1/4.3√5	
21	1	21 <sup>4</sup>	0000+	+1/4.5.7		1 <sup>5</sup>	1 <sup>5</sup>	21 <sup>4</sup>	0000+	-1/4.3√5	
21	2 <sup>2</sup> 1 <sup>3</sup>	21 <sup>4</sup>	0000+	-3/8.5.7		1 <sup>2</sup>	1 <sup>2</sup>	21	0000+	-1/2.3.5√2	
3	1	21 <sup>4</sup>	0000+	-1/4.7√3.5		1 <sup>2</sup>	1 <sup>2</sup>	3	0000+	-1/2.3.5√2	
31 <sup>4</sup>	1 <sup>5</sup>	2 <sup>5</sup>	0000+	+1/4.3.5.7		1 <sup>4</sup>	1 <sup>4</sup>	21 <sup>3</sup>	0000+	-1/2.3.5√2	
31 <sup>4</sup>	21 <sup>3</sup>	1 <sup>4</sup>	0000+	+1/8.7√5		1 <sup>4</sup>	1 <sup>4</sup>	32 <sup>4</sup>	0000+	-1/2.3.5√2	
31 <sup>4</sup>	21 <sup>3</sup>	2 <sup>5</sup>	0000+	+1/8.3.5		2	2	21	0000+	+1/2.3√2.5.7	
						2	2	3	0000+	+1/2.3√2.5.7	



**Table 6**—*continued*

<b>32<sup>4</sup></b>	<b>31<sup>4</sup></b>	<b>0</b>		<b>32<sup>4</sup></b>	<b>31<sup>4</sup></b>	<b>21<sup>4</sup></b>			
2 <sup>5</sup>	2 <sup>5</sup>	1 <sup>5</sup>	0000+	-1/2.3√2.5.7	21 <sup>4</sup>	21 <sup>4</sup>	1	0001-	-i/4.5√3.11
2 <sup>5</sup>	2 <sup>5</sup>	21 <sup>3</sup>	0000+	+1/2.3√2.5.7	21 <sup>4</sup>	21 <sup>4</sup>	1	0010-	-3i/√3/8.5.7√11
2 <sup>5</sup>	2 <sup>5</sup>	32 <sup>4</sup>	0000+	+1/2.3√2.5.7	21 <sup>4</sup>	21 <sup>4</sup>	1	0011+	+1/2.5√2.3.11
21 <sup>4</sup>	21 <sup>4</sup>	1	0000+	-1/2.5√2.3.7	21 <sup>4</sup>	21 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0000+	-43/8.2.5.7√2.3.11
21 <sup>4</sup>	21 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0000+	+1/2.5√2.3.7	21 <sup>4</sup>	21 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0001-	-i/8.2.5√3.11
21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	0000+	+1/2.5√2.3.7	21 <sup>4</sup>	21 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0010-	+29i/√3/8.8.5.7√11
21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	0100-	0	21 <sup>4</sup>	21 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	0011+	-1/8.4.5√2.3.11
21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	1000-	0	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	0000+	-3079/8.2.9.5.7.11√2.3.11
21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	1100-	-1/2.5√2.3.7	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	0001-	-i/8.2.11√3.11
2 <sup>4</sup> 1	2 <sup>4</sup> 1	1 <sup>4</sup>	0000+	-1/4.5√3.7	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	0010-	+3433i/8.8.3.5.7.11√3.11
2 <sup>4</sup> 1	2 <sup>4</sup> 1	2 <sup>5</sup>	0000+	+1/4.5√3.7	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	0011+	-29/8.4.5.11√2.3.11
21 <sup>3</sup>	21 <sup>3</sup>	21 <sup>4</sup>	0000+	+1/4.3√2.5.7	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	0100-	-i/8.2.11√3.11
2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>2</sup>	0000+	-1/4.3√2.5.7	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	0101-	+3√3/8.5.11√2.11
2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2	0000+	+1/4.3√2.5.7	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	0110+	-29/8.4.5.11√2.3.11
3 <sup>5</sup>	3 <sup>5</sup>	1 <sup>4</sup>	0000+	-1/8√3.5.7	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	0111-	+9i/√3/8.4.5.11√11
3 <sup>5</sup>	3 <sup>5</sup>	2 <sup>5</sup>	0000+	+1/8√3.5.7	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	1000-	-i/8.2.11√3.11
31 <sup>4</sup>	31 <sup>4</sup>	1 <sup>2</sup>	0000+	-1/8.3.5	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	1001+	+3√3/8.5.11√2.11
31 <sup>4</sup>	31 <sup>4</sup>	2	0000+	+1/8.3.5	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	1010+	-29/8.4.5.11√2.3.11
32 <sup>4</sup>	32 <sup>4</sup>	0	0000-	-1/8.3.5	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	1011-	+9i/√3/8.4.5.11√11
<b>32<sup>4</sup></b>	<b>31<sup>4</sup></b>	<b>21<sup>4</sup></b>			21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	1100+	+3√3/8.5.11√2.11
1	1	2	0000+	-3/2.5.7√2.11	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	1101-	-59i/√3/8.5.7.11√11
1	1	2	0001-	+7i/4.3.5√11	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	1110-	+9i/√3/8.4.5.11√11
1 <sup>5</sup>	1 <sup>5</sup>	21 <sup>4</sup>	0000+	-9/2.5.7√2.11	21 <sup>4</sup>	21 <sup>4</sup>	31 <sup>4</sup>	1111+	+443/8.2.5.7.11√2.3.11
1 <sup>5</sup>	1 <sup>5</sup>	21 <sup>4</sup>	0001-	-i/4.3.5√11	2 <sup>4</sup> 1	2 <sup>4</sup> 1	1 <sup>4</sup>	0000+	+3/2.5.7√2.11
1 <sup>2</sup>	1 <sup>2</sup>	21	0000+	-9/8.5.7√2.11	2 <sup>4</sup> 1	2 <sup>4</sup> 1	1 <sup>4</sup>	0001-	-i/4.9.5√11
1 <sup>2</sup>	1 <sup>2</sup>	21	0001-	+i/8.3√11	2 <sup>4</sup> 1	2 <sup>4</sup> 1	1 <sup>4</sup>	0010-	-3i/8.8.5√11
1 <sup>2</sup>	1 <sup>2</sup>	3	0000-	0	2 <sup>4</sup> 1	2 <sup>4</sup> 1	1 <sup>4</sup>	0011-	-13/8.4.9.5√2.11
1 <sup>2</sup>	1 <sup>2</sup>	3	0001-	+i√11/2.3.5.7	2 <sup>4</sup> 1	2 <sup>4</sup> 1	2 <sup>5</sup>	0000+	-3/2.5.7√2.11
1 <sup>4</sup>	1 <sup>4</sup>	21 <sup>3</sup>	0000+	-3/8.7√2.11	2 <sup>4</sup> 1	2 <sup>4</sup> 1	2 <sup>5</sup>	0001-	-i/4.9.5√11
1 <sup>4</sup>	1 <sup>4</sup>	21 <sup>3</sup>	0001-	+i/8.3.5√11	2 <sup>4</sup> 1	2 <sup>4</sup> 1	2 <sup>5</sup>	0010-	+9i/8.4.5.7√11
1 <sup>4</sup>	1 <sup>4</sup>	32 <sup>4</sup>	0000+	-1/4.5√2.11	2 <sup>4</sup> 1	2 <sup>4</sup> 1	2 <sup>5</sup>	0011+	-7/8.2.9.5√2.11
1 <sup>4</sup>	1 <sup>4</sup>	32 <sup>4</sup>	0001-	-i/4.3.5√11	21 <sup>3</sup>	31 <sup>4</sup>	21 <sup>4</sup>	0000+	+1/8.5.7√2.11
2	1 <sup>2</sup>	21	0000+	+1/4.5.7√2.11	21 <sup>3</sup>	31 <sup>4</sup>	21 <sup>4</sup>	0001-	-i/8.5√11
2	1 <sup>2</sup>	21	0001-	-i/4.5√11	21 <sup>3</sup>	21 <sup>3</sup>	21 <sup>4</sup>	0000-	+17√3/8.8.5.7√11
2	1 <sup>2</sup>	3	0000+	+1/2.5√3.7.11	21 <sup>3</sup>	21 <sup>3</sup>	21 <sup>4</sup>	0001+	+i/8.5√2.3.11
2	1 <sup>2</sup>	3	0001-	-i√3/2.5√2.7.11	21 <sup>3</sup>	21 <sup>3</sup>	21 <sup>4</sup>	0010-	+5i/8.8.7√11
2	2	21	0000+	-1/8.7√11	21 <sup>3</sup>	21 <sup>3</sup>	21 <sup>4</sup>	0011+	+1/8.3√2.11
2	2	21	0001-	+i/3.5√2.11	2 <sup>2</sup> 1 <sup>3</sup>	31 <sup>4</sup>	2	0000+	-√3/4.5√2.7.11
2	2	3	0000+	-1/2.3.5.7√11	2 <sup>2</sup> 1 <sup>3</sup>	31 <sup>4</sup>	2	0001-	-i/4.5√3.7.11
2	2	3	0001-	+i/3.5√2.11	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>2</sup>	0000+	-√3/8.8.2.7√11
2 <sup>5</sup>	1 <sup>4</sup>	21 <sup>3</sup>	0000+	-√3/8√5.7.11	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>2</sup>	0001-	+i√3/8.8√2.11
2 <sup>5</sup>	1 <sup>4</sup>	21 <sup>3</sup>	0001-	-i/4√2.3.5.7.11	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>2</sup>	0010-	+9.13i/8.8.2.5.7√11
2 <sup>5</sup>	1 <sup>4</sup>	32 <sup>4</sup>	0000+	-√11/4.3.5√3.7	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>2</sup>	0011+	-1/8.8.3.5√2.11
2 <sup>5</sup>	1 <sup>4</sup>	32 <sup>4</sup>	0001-	0	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2	0000-	-√3/8.8.2.5√11
2 <sup>5</sup>	2 <sup>5</sup>	1 <sup>5</sup>	0000+	+9/4.5.7√11	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2	0001-	-3.13i/√3/8.8.5.7√2.11
2 <sup>5</sup>	2 <sup>5</sup>	1 <sup>5</sup>	0001-	+i/4.3.5√2.11	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2	0010-	-3i/8.8.2√11
2 <sup>5</sup>	2 <sup>5</sup>	21 <sup>3</sup>	0000+	-3/8.2.5√11	2 <sup>2</sup> 1 <sup>3</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2	0011-	-1/8.8.3.7√2.11
2 <sup>5</sup>	2 <sup>5</sup>	21 <sup>3</sup>	0001-	+i/8.3.5.7√2.11	3 <sup>5</sup>	2 <sup>4</sup> 1	1 <sup>4</sup>	0000+	+√3/8.5√7.11
2 <sup>5</sup>	2 <sup>5</sup>	32 <sup>4</sup>	0000+	-17/8.9.7√11	3 <sup>5</sup>	2 <sup>4</sup> 1	1 <sup>4</sup>	0001-	+i/4.5√2.3.7.11
2 <sup>5</sup>	2 <sup>5</sup>	32 <sup>4</sup>	0001-	-i/4.3.5√2.11	3 <sup>5</sup>	2 <sup>4</sup> 1	2 <sup>5</sup>	0000+	-√11/4.3.5.7√2
21 <sup>4</sup>	0	31 <sup>4</sup>	0000+	+1/2.5√2.3.7	3 <sup>5</sup>	2 <sup>4</sup> 1	2 <sup>5</sup>	0001-	0
21 <sup>4</sup>	0	31 <sup>4</sup>	0001-	0	3 <sup>5</sup>	3 <sup>5</sup>	1 <sup>4</sup>	0000+	-1/4.5√2.11
21 <sup>4</sup>	0	31 <sup>4</sup>	0100-	0	3 <sup>5</sup>	3 <sup>5</sup>	1 <sup>4</sup>	0001-	-i/8.5.7√11
21 <sup>4</sup>	0	31 <sup>4</sup>	0101+	-1/2.5√2.3.7	3 <sup>5</sup>	3 <sup>5</sup>	2 <sup>5</sup>	0000+	+59/4.9.5.7√2.11
21 <sup>4</sup>	21 <sup>4</sup>	1	0000+	+√3/5.7√2.11	3 <sup>5</sup>	3 <sup>5</sup>	2 <sup>5</sup>	0001-	+1/8.3.5√11

Table 6—continued

<b>32<sup>4</sup></b>	<b>31<sup>4</sup></b>	<b>21<sup>4</sup></b>		<b>32<sup>4</sup></b>	<b>31<sup>4</sup></b>	<b>21<sup>4</sup></b>	
31 <sup>4</sup>	1	2	0000+ +√11/4.3.5.7√2	32 <sup>4</sup>	21 <sup>3</sup>	21 <sup>4</sup>	0101+ +1/8.4.5.11
31 <sup>4</sup>	1	2	0001- 0	32 <sup>4</sup>	32 <sup>4</sup>	0	0000+ +1/8.3.5
31 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>2</sup>	0000+ +1/8.4√2.3.5.7.11	32 <sup>4</sup>	32 <sup>4</sup>	0	0001- 0
31 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	1 <sup>2</sup>	0001- -i√7/8.4√3.5.11	32 <sup>4</sup>	32 <sup>4</sup>	0	0010- 0
31 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2	0000+ -19/8.4.3.5√2.3.7.11	32 <sup>4</sup>	32 <sup>4</sup>	0	0011+ -1/8.3.5
31 <sup>4</sup>	2 <sup>2</sup> 1 <sup>3</sup>	2	0001- +i√3/8.4√7.11	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	0000+ -6829/4.9.9.5.7.11.11
31 <sup>4</sup>	31 <sup>4</sup>	1 <sup>2</sup>	0000+ +53/8.4.9.5.11	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	0001- +17i/8.2.9.11.11√2
31 <sup>4</sup>	31 <sup>4</sup>	1 <sup>2</sup>	0001- -7i/8.2.5.11√2	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	0010- +17i/8.2.9.11.11√2
31 <sup>4</sup>	31 <sup>4</sup>	1 <sup>2</sup>	0010- +7i/8.2.5.11√2	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	0011+ +2.7/3.5.11.11
31 <sup>4</sup>	31 <sup>4</sup>	1 <sup>2</sup>	0011+ -7/8.2.3.5.11	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	0100- -17i/8.2.9.11.11√2
31 <sup>4</sup>	31 <sup>4</sup>	2	0000+ -2371/8.4.9.9.5.7.11	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	0101+ +3/8.5.11.11
31 <sup>4</sup>	31 <sup>4</sup>	2	0001- +7i/8.2.5.11√2	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	0110+ +3/8.5.11.11
31 <sup>4</sup>	31 <sup>4</sup>	2	0010- -7i/8.2.5.11√2	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	0111- -9i/8.5.11.11√2
31 <sup>4</sup>	31 <sup>4</sup>	2	0011+ +7/8.2.3.5.11	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	1000- -17i/8.2.9.11.11√2
32 <sup>4</sup>	1 <sup>5</sup>	21 <sup>4</sup>	0000+ +53/8.2.3.5.7.11	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	1001+ +3/8.5.11.11
32 <sup>4</sup>	1 <sup>5</sup>	21 <sup>4</sup>	0001- -3i/8.5.11√2	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	1010+ +3/8.5.11.11
32 <sup>4</sup>	1 <sup>5</sup>	21 <sup>4</sup>	0100- +3i/8.5.11√2	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	1011- -9i/8.5.11.11√2
32 <sup>4</sup>	1 <sup>5</sup>	21 <sup>4</sup>	0101+ -1/8.5.11	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	1100+ +2.7/3.5.11.11
32 <sup>4</sup>	21 <sup>3</sup>	21 <sup>4</sup>	0000+ +1051/8.8.9.5.7.11	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	1101- +9i/8.5.11.11√2
32 <sup>4</sup>	21 <sup>3</sup>	21 <sup>4</sup>	0001- +3i/8.4.5.11√2	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	1110- +9i/8.5.11.11√2
32 <sup>4</sup>	21 <sup>3</sup>	21 <sup>4</sup>	0100- -3i/8.4.5.11√2	32 <sup>4</sup>	32 <sup>4</sup>	21 <sup>4</sup>	1111+ -19/8.3.5.7.11.11

Table 7. Branching rules for SU<sub>3</sub> ⊃ SO<sub>3</sub>.

0	⇒	+ 0
1	⇒	+ 1
1 <sup>2</sup>	⇒	+ 1
2	⇒	+ 0 + 2
2 <sup>2</sup>	⇒	+ 0 + 2
21	⇒	+ 1 + 2
3	⇒	+ 1 + 3
3 <sup>2</sup>	⇒	+ 1 + 3
31	⇒	+ 1 + 2 + 3
32	⇒	+ 1 + 2 + 3

Table 8. 3jm factors for SU<sub>3</sub> ⊃ SO<sub>3</sub>.

<b>0 0 0 0</b>	<b>2 2 2 0</b>	<b>21 1<sup>2</sup> 1 0</b>
0 0 0 + +1	0 0 0 + +√2/3√3	2 1 1 + +√5/2√2
<b>1 1 1 0</b>	2 2 0 + -√5/3√2.3	<b>21 2 1 0</b>
1 1 1 + +1	2 2 2 + +√5.7/3√2.3	1 0 1 - -i/√2.3
<b>1<sup>2</sup> 1 0 0</b>	<b>2<sup>2</sup> 2 0 0</b>	1 2 1 - +i√5/2√2.3
1 1 0 + +1	0 0 0 + +1/√2.3	2 2 1 + -√5/2√2
<b>2 1<sup>2</sup> 1<sup>2</sup> 0</b>	2 2 0 + +√5/√2.3	<b>21 2<sup>2</sup> 2 0</b>
0 1 1 + +1/√2.3	<b>21 1<sup>2</sup> 1 0</b>	1 2 2 - +i√3/2√2
2 1 1 + +√5/√2.3	1 1 1 - +i√3/2√2	2 0 2 + +1/√2.3

Table 8—continued

<b>21 2<sup>2</sup> 2 0</b>		<b>31 21 2 0</b>		<b>31 31 31 0</b>	
2 2 2 +	$+\sqrt{7/2}\sqrt{2.3}$	1 1 2 +	$+7i/2.3\sqrt{2.5}$	3 3 3 +	$-2\sqrt{2.7/3.5}$
<b>21 21 0 0</b>		1 2 2 +	$+1/2\sqrt{2.3.5}$	<b>31 31 31 1</b>	
1 1 0 +	$+\sqrt{3/2}\sqrt{2}$	2 1 2 +	$-i/2.3$	1 1 1 -	0
2 2 0 +	$+\sqrt{5/2}\sqrt{2}$	2 2 0 -	$+1/3$	2 1 1 -	$-2.5\sqrt{3}$
<b>21 21 21 0</b>		2 2 2 -	$-\sqrt{7/2.3}$	2 2 1 -	0
1 1 1 -	0	3 1 2 -	$-i\sqrt{7/3}\sqrt{5}$	2 2 2 +	0
2 1 1 +	$-\sqrt{3/4}$	3 2 2 +	$-\sqrt{2.7/3}\sqrt{5}$	3 2 1 -	$-\sqrt{7.5}\sqrt{2.3}$
2 2 1 -	0	<b>31 3 2 0</b>		3 2 2 -	0
2 2 2 +	$+\sqrt{7/4}$	1 1 0 +	$+2/3\sqrt{5}$	3 3 1 -	0
<b>21 21 21 1</b>		1 1 2 +	$-2/3.5$	3 3 2 -	$-\sqrt{2.7.5}\sqrt{3}$
1 1 1 +	$-1/4$	1 3 2 +	$-\sqrt{7/5}\sqrt{3}$	3 3 3 -	0
2 1 1 -	0	2 1 2 -	$-2\sqrt{2/3}\sqrt{5}$	<b>32 31 0 0</b>	
2 2 1 +	$-\sqrt{5/4}$	2 3 2 -	$-\sqrt{7/3}\sqrt{5}$	1 1 0 +	$+1/\sqrt{5}$
2 2 2 -	0	3 1 2 -	$-\sqrt{7.3.5}\sqrt{2}$	2 2 0 -	$+1/\sqrt{3}$
<b>3 2<sup>2</sup> 1<sup>2</sup> 0</b>		3 3 0 +	$-\sqrt{7/3}\sqrt{2.5}$	3 3 0 -	$+\sqrt{7}\sqrt{3.5}$
1 0 1 +	$+1/\sqrt{2.3}$	3 3 2 +	$+2\sqrt{7/5}\sqrt{3}$	<b>32 31 21 0</b>	
1 2 1 +	$+\sqrt{2/\sqrt{3.5}}$	<b>31 3<sup>2</sup> 1<sup>2</sup> 0</b>		1 1 1 -	$-i/2\sqrt{2.3.5}$
3 2 1 +	$+\sqrt{7/\sqrt{2.5}}$	1 1 1 -	$-1/\sqrt{5}$	1 1 2 +	$+1/2.5\sqrt{2}$
<b>3 21 21 0</b>		2 1 1 -	$-1/\sqrt{2.5}$	1 2 1 -	$-i/2\sqrt{3.5}$
1 1 1 +	$-1/2\sqrt{2}$	2 3 1 -	$-\sqrt{7/\sqrt{2.3.5}}$	1 2 2 -	$+\sqrt{5/2.3}$
1 2 1 -	$+i\sqrt{3/2}\sqrt{2.5}$	3 3 1 +	$-\sqrt{7/\sqrt{3.5}}$	1 3 2 -	$+\sqrt{7/3.5}$
1 2 2 +	$+1/2\sqrt{2.5}$	<b>31 3<sup>2</sup> 2 0</b>		2 2 1 -	$+i\sqrt{2.3}\sqrt{3}$
3 2 1 -	$-i\sqrt{7/2}\sqrt{2.5}$	1 1 0 +	$+1/3\sqrt{2.5}$	2 2 2 +	0
3 2 2 -	$+\sqrt{7/2}\sqrt{5}$	1 1 2 +	$+4\sqrt{2/3.5}$	2 3 1 -	$-i\sqrt{2.7.3}\sqrt{3.5}$
<b>3 3 3 0 0</b>		1 3 2 +	$-\sqrt{7/5}\sqrt{2.3}$	2 3 2 -	0
1 1 1 +	$+2/5$	2 1 2 -	$+1/3\sqrt{5}$	3 3 1 -	$-i\sqrt{7/3}\sqrt{3.5}$
3 3 1 +	$-\sqrt{7/5}\sqrt{2}$	2 3 2 -	$+\sqrt{2.7/3}\sqrt{5}$	3 3 2 -	$+\sqrt{7/5}$
3 3 3 +	$+\sqrt{3.7/5}\sqrt{2}$	3 1 2 +	$+2\sqrt{7/3.5}$	<b>32 31 21 1</b>	
<b>3<sup>2</sup> 3 0 0</b>		3 3 0 -	$+\sqrt{7/3}\sqrt{5}$	1 1 1 -	$-\sqrt{2.3}\sqrt{5}$
1 1 0 +	$+\sqrt{3/\sqrt{2.5}}$	3 3 2 +	$+\sqrt{2.7.5}\sqrt{3}$	1 1 2 -	$-2\sqrt{2.5}\sqrt{3}$
3 3 0 +	$+\sqrt{7/\sqrt{2.5}}$	<b>31 31 1 0</b>		1 2 1 -	$-1/2.3\sqrt{5}$
<b>3<sup>2</sup> 3 21 0</b>		1 1 1 +	$+1/\sqrt{3.5}$	1 2 2 -	$+i/2.3\sqrt{3.5}$
1 1 1 -	$+i/2\sqrt{2.5}$	2 1 1 -	$-\sqrt{2/\sqrt{3.5}}$	1 3 2 -	$-2\sqrt{7/3.5}\sqrt{3}$
1 1 2 +	$+3\sqrt{3/2.5}\sqrt{2}$	2 2 1 +	$+2.3\sqrt{3}$	2 2 1 -	$5.2.9\sqrt{2}$
1 3 2 +	$+\sqrt{7/5}\sqrt{2}$	3 2 1 -	$-\sqrt{7/3}\sqrt{3.5}$	2 2 2 -	$+i\sqrt{7.2.3}\sqrt{2}$
3 3 1 -	$+i\sqrt{7/2}\sqrt{5}$	3 3 1 +	$-2\sqrt{2.7.3}\sqrt{3.5}$	2 3 1 -	$-\sqrt{2.7.9}\sqrt{5}$
3 3 2 +	$+\sqrt{3.7/2.5}$	<b>31 31 2<sup>2</sup> 0</b>		2 3 2 +	$-i\sqrt{7/3}\sqrt{5}$
<b>31 2<sup>2</sup> 1 0</b>		1 1 0 +	$-1/3\sqrt{2.3.5}$	3 3 1 +	$-7\sqrt{7.2.9}\sqrt{5}$
1 0 1 +	$+1/\sqrt{2.3}$	1 1 2 +	$+7/3.5\sqrt{2.3}$	3 3 2 -	$-i\sqrt{7.2.5}\sqrt{3}$
1 2 1 +	$-1/\sqrt{2.3.5}$	2 1 2 -	$+1/\sqrt{3.5}$	<b>32 31 3 0</b>	
2 2 1 -	$+1/\sqrt{3}$	2 2 0 +	$-\sqrt{2.9}$	1 1 1 -	$-1/3.5$
3 2 1 +	$+\sqrt{7/\sqrt{3.5}}$	2 2 2 +	$-\sqrt{2.7/9}$	1 2 1 -	$-\sqrt{2.3.5}$
<b>31 2<sup>2</sup> 2<sup>2</sup> 0</b>		3 1 2 +	$+\sqrt{7/5}\sqrt{3}$	1 2 3 -	$-\sqrt{2.7/3.5}\sqrt{3}$
1 2 2 +	$-1/\sqrt{5}$	3 2 2 -	$+2\sqrt{7/9}\sqrt{5}$	1 3 3 +	$+4\sqrt{7.3.5}\sqrt{3}$
2 2 0 -	$-1/\sqrt{2.3}$	3 3 0 +	$+2\sqrt{2.7/9}\sqrt{5}$	2 1 1 -	$-1/3\sqrt{2}$
2 2 2 -	0	3 3 2 +	$+4\sqrt{7/3.5}\sqrt{3}$	2 1 3 -	$-\sqrt{7.3}\sqrt{2.3}$
3 2 2 -	$-\sqrt{7/\sqrt{3.5}}$	<b>31 31 31 0</b>		2 2 1 -	$-\sqrt{5.9}$
<b>31 21 1<sup>2</sup> 0</b>		1 1 1 +	$-\sqrt{2/5}$	2 2 3 -	0
1 1 1 -	$+i/2\sqrt{2}$	2 1 1 -	0	2 3 1 -	$+\sqrt{7.9}$
1 2 1 +	$-\sqrt{3/2}\sqrt{2.5}$	2 2 1 +	$+2\sqrt{2/9}\sqrt{5}$	2 3 3 -	0
2 1 1 +	$+i/2$	2 2 2 -	0	3 1 3 -	$-\sqrt{7.3.5}\sqrt{3}$
2 2 1 -	$+1/2\sqrt{3}$	3 2 1 -	$-\sqrt{7/9}\sqrt{2}$	3 2 1 -	$-4\sqrt{7.9.5}$
3 2 1 +	$-\sqrt{7/\sqrt{3.5}}$	3 2 2 +	$-\sqrt{2.7.3}\sqrt{3.5}$	3 2 3 -	$-\sqrt{2.7.5}\sqrt{3}$
<b>31 21 2 0</b>		3 3 1 +	$+2\sqrt{7/9.5}$	3 3 1 -	$-2\sqrt{2.7.9.5}$
1 1 0 -	$+i/3\sqrt{2}$	3 3 2 -	0	3 3 3 +	$-\sqrt{2.7.5}\sqrt{3}$

**Table 9.** Branching rules for SU<sub>3</sub> ⊃ U<sub>1</sub> × SU<sub>2</sub>.

0	→	+ 0.0
1	→	+ -2.0 + 1.1
1 <sup>2</sup>	→	+ 2.0 - -1.1
2	→	+ -4.0 + -1.1 + 2.2
2 <sup>2</sup>	→	+ 4.0 - 1.1 + -2.2
21	→	+ 0.0 + 3.1 - -3.1 + 0.2
3	→	+ -6.0 + -3.1 + 0.2 + 3.3
3 <sup>2</sup>	→	+ 6.0 - 3.1 + 0.2 - -3.3
31	→	+ -2.0 + 1.1 + -5.1 + -2.2 + 4.2 + 1.3
32	→	+ 2.0 - -1.1 - 5.1 + 2.2 + -4.2 - -1.3

**Table 10.** 3jm factors for SU<sub>3</sub> ⊃ U<sub>1</sub> × SU<sub>2</sub>.

<b>0 0 0 0</b>	<b>21 2<sup>2</sup> 2 0</b>	<b>3 3 3 0</b>
0.0 0.0 0.0 + +1	3.1 -2.2 -1.1 + +√3/2√5	0.2 0.2 0.2 + -1/√2.5
<b>1 1 1 0</b>	0.2 1.1 -1.1 +* +i√3/2√2.5	3.3 0.2 -3.1 + +1/√2.5
1.1 1.1 -2.0 + +1/√3	0.2 -2.2 2.2 - -i√3/√2.5	3.3 3.3 -6.0 + +1/√2.5
<b>1<sup>2</sup> 1 0 0</b>	<b>21 21 0 0</b>	<b>3<sup>2</sup> 3 0 0</b>
2.0 -2.0 0.0 + +1/√3	0.0 0.0 0.0 + +1/2√2	6.0 -6.0 0.0 + +1/√2.5
-1.1 1.1 0.0 -* -√2/√3	-3.1 3.1 0.0 -* -1/2	3.1 -3.1 0.0 -* -1/√5
<b>2 1<sup>2</sup> 1<sup>2</sup> 0</b>	0.2 0.2 0.0 + +√3/2√2	0.2 0.2 0.0 + +√3/√2.5
-4.0 2.0 2.0 + +1/√2.3	<b>21 21 21 0</b>	-3.3 3.3 0.0 -* -√2/√5
-1.1 -1.1 2.0 -* +1/√2.3	0.0 0.0 0.0 + +1/2√2.5	<b>3<sup>2</sup> 3 21 0</b>
2.2 -1.1 -1.1 + +1/√2	-3.1 3.1 0.0 -* -1/4√5	6.0 -6.0 0.0 + +1/2√5
<b>2 2 2 0</b>	0.2 -3.1 3.1 +* +3i/4√5	6.0 -3.1 -3.1 -* -1/2√5
2.2 -1.1 -1.1 + -1/√2.3	0.2 0.2 0.0 + -√3/2√2.5	3.1 -3.1 0.0 -* -1/2√2.5
2.2 2.2 -4.0 + +1/√2.3	0.2 0.2 0.2 - 0	3.1 -3.1 0.2 +* +i/2√2.5
<b>2<sup>2</sup> 2 0 0</b>	<b>21 21 21 1</b>	3.1 0.2 -3.1 + -1/√2.5
4.0 -4.0 0.0 + +1/√2.3	0.0 0.0 0.0 - 0	0.2 0.2 0.0 + 0
1.1 -1.1 0.0 -* -1/√3	-3.1 3.1 0.0 +* +i/4	0.2 0.2 0.2 - -i/√2.5
-2.2 2.2 0.0 + +1/√2	0.2 -3.1 3.1 -* -1/4	0.2 3.3 -3.1 -* -1/√2.5
<b>21 1<sup>2</sup> 1 0</b>	0.2 0.2 0.0 - 0	-3.3 3.3 0.0 -* +1/2√5
0.0 2.0 -2.0 + +1/2√3	0.2 0.2 0.2 + +1/2	-3.3 3.3 0.2 +* +i/2
0.0 -1.1 1.1 -* +1/2√2.3	<b>3 2<sup>2</sup> 1<sup>2</sup> 0</b>	<b>31 2<sup>2</sup> 1 0</b>
3.1 -1.1 -2.0 -* +1/2	-6.0 4.0 2.0 + +1/√2.5	-2.0 4.0 -2.0 + +1/√2.3.5
0.2 -1.1 1.1 +* +i√3/2√2	-3.1 4.0 -1.1 -* +1/√3.5	-2.0 1.1 1.1 -* +1/√2.3.5
<b>21 2 1 0</b>	-3.1 1.1 2.0 -* -√2/√3.5	1.1 1.1 -2.0 -* +1/√2.5
0.0 -1.1 1.1 + -1/2√2	0.2 1.1 -1.1 + +1/√5	1.1 -2.2 1.1 + -1/√2.3.5
3.1 -4.0 1.1 + -1/√2.3	0.2 -2.2 2.0 + +1/√2.5	-5.1 4.0 1.1 - +√2/√3.5
3.1 -1.1 -2.0 + -1/2√3	3.3 -2.2 -1.1 -* +√2/√5	-2.2 1.1 1.1 +* +1/√5
-3.1 2.2 1.1 -* -1/2	<b>3 21 21 0</b>	4.2 -2.2 -2.0 + +1/√5
0.2 -1.1 1.1 - +i/2√2	-6.0 3.1 3.1 + +1/√2.5	1.3 -2.2 1.1 - +2/√3.5
0.2 2.2 -2.0 - -i/2	-3.1 3.1 0.0 + -1/2√5	<b>31 2<sup>2</sup> 2<sup>2</sup> 0</b>
<b>21 2<sup>2</sup> 2 0</b>	-3.1 0.2 3.1 - -i/2√5	-2.0 1.1 1.1 + -1/√3.5
0.0 4.0 -4.0 + +1/√3.5	0.2 -3.1 3.1 -* -1/2√5	1.1 -2.2 1.1 -* +1/√3.5
0.0 1.1 -1.1 -* -1/2√2.3.5	0.2 0.2 0.0 - -i√3/2√2.5	-5.1 1.1 4.0 +* -1/√3.5
0.0 -2.2 2.2 + -1/2√5	0.2 0.2 0.2 + -1/2√5	-2.2 1.1 1.1 - 0
3.1 1.1 -4.0 -* +1/√2.5	3.3 0.2 -3.1 +* -i/√5	-2.2 -2.2 4.0 - +1/√2.5

**Table 10**—*continued*

<b>31 2<sup>2</sup> 2<sup>2</sup> 0</b>	<b>31 3<sup>2</sup> 2 0</b>	<b>32 31 0 0</b>
4.2 -2.2 -2.2 + $-1/\sqrt{5}$	1.1 3.1 -4.0 - * $-1/\sqrt{3.5}$	5.1 -5.1 0.0 - * $\sqrt{2}\sqrt{3.5}$
1.3 -2.2 1.1 + * $+\sqrt{2}/\sqrt{3.5}$	1.1 0.2 -1.1 + $+1/3\sqrt{5}$	2.2 -2.2 0.0 + $+1/\sqrt{5}$
<b>31 21 1<sup>2</sup> 0</b>	1.1 -3.3 2.2 - * $+\sqrt{2}/3\sqrt{5}$	-4.2 4.2 0.0 + $+1/\sqrt{5}$
-2.0 0.0 2.0 + $-1/2\sqrt{5}$	-5.1 6.0 -1.1 - $+1/\sqrt{3.5}$	-1.3 1.3 0.0 + * $-2/\sqrt{3.5}$
-2.0 3.1 -1.1 - * $+1/2\sqrt{3.5}$	-5.1 3.1 2.2 + * $-1/\sqrt{3.5}$	<b>32 31 21 0</b>
1.1 0.0 -1.1 - * $+\sqrt{3}/2\sqrt{2.5}$	-2.2 3.1 -1.1 + * $-1/\sqrt{3.5}$	2.0 -2.0 0.0 + $+1/2\sqrt{3.5}$
1.1 -3.1 2.0 - * $-1/2\sqrt{5}$	-2.2 0.2 2.2 - $-\sqrt{2}/\sqrt{3.5}$	2.0 1.1 -3.1 - * $-1/2\sqrt{3.5}$
1.1 0.2 -1.1 + * $+i/2\sqrt{2.3.5}$	4.2 0.2 -4.0 + $+1/\sqrt{3.5}$	2.0 -5.1 3.1 - 0
-5.1 3.1 2.0 - $+\sqrt{2}/\sqrt{3.5}$	4.2 -3.3 -1.1 - * $+\sqrt{2}/\sqrt{3.5}$	2.0 -2.2 0.2 + $+i/\sqrt{2.3.5}$
-2.2 3.1 -1.1 + * $-1/\sqrt{2.5}$	1.3 0.2 -1.1 - $+\sqrt{2}/3\sqrt{5}$	-1.1 1.1 0.0 - * $-1/2\sqrt{2.3.5}$
-2.2 0.2 2.0 + $+i/\sqrt{2.5}$	1.3 -3.3 2.2 + * $-\sqrt{2}/3$	-1.1 1.1 0.2 + * $+7/2.3\sqrt{2.3.5}$
4.2 -3.1 -1.1 + $-1/\sqrt{5}$	<b>31 31 1 0</b>	-1.1 -2.2 3.1 + * $+1/3\sqrt{2.5}$
1.3 0.2 -1.1 - * $+2i/\sqrt{3.5}$	1.1 -2.0 1.1 + $-1/\sqrt{3.5}$	-1.1 4.2 -3.1 - $+1/3\sqrt{5}$
<b>31 21 2 0</b>	1.1 1.1 -2.0 + $-1/3\sqrt{5}$	-1.1 1.3 0.2 - * $+2/3\sqrt{3.5}$
-2.0 3.1 -1.1 + $-1/2\sqrt{5}$	-2.2 1.1 1.1 - $+\sqrt{2}/3\sqrt{5}$	5.1 -5.1 0.0 - * $-1/\sqrt{2.3.5}$
-2.0 0.2 2.2 - $+i/2\sqrt{3.5}$	4.2 -5.1 1.1 - $+\sqrt{2}/\sqrt{3.5}$	5.1 -5.1 0.2 + * $-i/\sqrt{2.3.5}$
1.1 0.0 -1.1 + $-1/2\sqrt{2.5}$	4.2 -2.2 -2.0 - $+1/\sqrt{3.5}$	5.1 -2.2 -3.1 - $-1/\sqrt{3.5}$
1.1 3.1 -4.0 + $-1/\sqrt{2.3.5}$	1.3 -2.2 1.1 + $-2/3\sqrt{5}$	2.2 -2.2 0.0 - 0
1.1 -3.1 2.2 - * $+1/2.3\sqrt{5}$	1.3 1.3 -2.0 + $+2\sqrt{2}/3\sqrt{5}$	2.2 -2.2 0.2 - 0
1.1 0.2 -1.1 - $-i\sqrt{5}/2.3\sqrt{2}$	<b>31 31 2<sup>2</sup> 0</b>	2.2 1.3 -3.1 - * $-2/3\sqrt{5}$
-5.1 3.1 2.2 - $+\sqrt{2}/\sqrt{3.5}$	-2.0 -2.0 4.0 + $+1/\sqrt{2.3.5}$	-4.2 4.2 0.0 - 0
-2.2 0.0 2.2 - $+1/\sqrt{2.5}$	1.1 -2.0 1.1 - * $-1/3\sqrt{2.5}$	-4.2 4.2 0.2 - $-i\sqrt{2}/\sqrt{3.5}$
-2.2 3.1 -1.1 - $-1/\sqrt{2.3.5}$	1.1 1.1 -2.2 + $+7/9\sqrt{2.5}$	-4.2 1.3 3.1 - $-\sqrt{2}/3\sqrt{5}$
-2.2 0.2 2.2 + $+i/\sqrt{3.5}$	-5.1 1.1 4.0 - $-\sqrt{2}/3\sqrt{5}$	-1.3 1.3 0.0 - * $+1/\sqrt{3.5}$
4.2 -3.1 -1.1 - * $+1/\sqrt{3.5}$	-2.2 1.1 1.1 + * $+1/3\sqrt{3.5}$	-1.3 1.3 0.2 + * $+i/3\sqrt{3}$
4.2 0.2 -4.0 - $+i\sqrt{2}/\sqrt{3.5}$	-2.2 -2.2 4.0 + $-\sqrt{2}/3\sqrt{5}$	<b>32 31 21 1</b>
1.3 -3.1 2.2 + * $-2\sqrt{2}/3\sqrt{5}$	4.2 -2.0 -2.2 + $-1/3\sqrt{5}$	2.0 -2.0 0.0 - 0
1.3 0.2 -1.1 + $+2i/3\sqrt{5}$	4.2 -5.1 1.1 + * $+2/3\sqrt{5}$	2.0 1.1 -3.1 + * $-i/3\sqrt{5}$
<b>31 3 2 0</b>	4.2 -2.2 -2.2 - $-2/3\sqrt{5}$	2.0 -5.1 3.1 - $+i/\sqrt{2.3.5}$
-2.0 0.2 2.2 + $+1/\sqrt{3.5}$	1.3 1.1 -2.2 - $+2/9\sqrt{5}$	2.0 -2.2 0.2 - $+1/3\sqrt{2.5}$
1.1 -3.1 2.2 + $+2/3\sqrt{5}$	1.3 -2.2 1.1 - * $-2\sqrt{2}/3\sqrt{3.5}$	-1.1 1.1 0.0 + * $+i/3\sqrt{2.5}$
1.1 0.2 -1.1 + $-\sqrt{2}/3\sqrt{5}$	1.3 1.3 -2.2 + $-4/9$	-1.1 1.1 0.2 + * $-1/9\sqrt{2.5}$
-5.1 3.3 2.2 - $+\sqrt{2}/\sqrt{3.5}$	<b>31 31 31 0</b>	-1.1 -2.2 3.1 - * $-2i\sqrt{2}/3\sqrt{3.5}$
-2.2 0.2 2.2 - $-1/\sqrt{3.5}$	1.1 1.1 -2.0 + $-\sqrt{2}/3\sqrt{3.5}$	-1.1 4.2 -3.1 - $+2i/3\sqrt{3.5}$
-2.2 3.3 -1.1 - $-\sqrt{2}/\sqrt{3.5}$	-2.2 1.1 1.1 - 0	-1.1 1.3 0.2 - * $+2/9\sqrt{5}$
4.2 -6.0 2.2 + $+1/\sqrt{2.5}$	4.2 -5.1 1.1 - $+1/3\sqrt{3.5}$	5.1 -5.1 0.0 + * $-i/2\sqrt{2.5}$
4.2 -3.1 -1.1 + $+1/\sqrt{3.5}$	4.2 -2.2 -2.0 - $+1/3\sqrt{2.5}$	5.1 -5.1 0.2 - * $-\sqrt{5}/2.3\sqrt{2}$
4.2 0.2 -4.0 + $+1/\sqrt{2.3.5}$	4.2 -2.2 -2.2 + $+\sqrt{2}/3\sqrt{5}$	5.1 -2.2 -3.1 - $-i/2.3\sqrt{5}$
1.3 -3.1 2.2 - $+\sqrt{2}/3\sqrt{5}$	1.3 -2.2 1.1 + $+\sqrt{2}/3\sqrt{5}$	2.2 -2.2 0.0 - $+i/2\sqrt{3.5}$
1.3 0.2 -1.1 - $-2/3\sqrt{5}$	1.3 4.2 -5.1 + $-2\sqrt{2}/3\sqrt{3.5}$	2.2 -2.2 0.2 + $+1/\sqrt{2.5}$
1.3 3.3 -4.0 - $+\sqrt{2}/\sqrt{3.5}$	1.3 1.3 -2.0 + $-2/3\sqrt{3.5}$	2.2 1.3 -3.1 - * $-i/3\sqrt{3.5}$
<b>31 3<sup>2</sup> 1<sup>2</sup> 0</b>	1.3 1.3 -2.2 - 0	-4.2 4.2 0.0 - $-i/\sqrt{3.5}$
-2.0 3.1 -1.1 + $+1/\sqrt{3.5}$	<b>31 31 31 1</b>	-4.2 4.2 0.2 - $+1/3\sqrt{2.5}$
1.1 0.2 -1.1 - * $+\sqrt{2}/\sqrt{3.5}$	1.1 1.1 -2.0 - 0	-4.2 1.3 3.1 + $+i\sqrt{5}/3\sqrt{2.3}$
-5.1 6.0 -1.1 + * $-1/\sqrt{2.5}$	-2.2 1.1 1.1 + $+2/3\sqrt{3.5}$	-1.3 1.3 0.0 + * $-i/2.3\sqrt{5}$
-5.1 3.1 2.0 + * $+1/\sqrt{2.3.5}$	4.2 -5.1 1.1 + $-1/3\sqrt{5}$	-1.3 1.3 0.2 - * $-7/2.9$
-2.2 3.1 -1.1 - $+1/\sqrt{2.5}$	4.2 -2.2 -2.0 + $-1/\sqrt{2.3.5}$	<b>32 31 3 0</b>
-2.2 0.2 2.0 - $+1/\sqrt{2.5}$	4.2 -2.2 -2.2 - 0	2.0 1.1 -3.1 + $-1/3\sqrt{5}$
4.2 -3.3 -1.1 + $+1/\sqrt{5}$	1.3 -2.2 1.1 - $-\sqrt{2}/3\sqrt{3.5}$	2.0 -2.2 0.2 - $+\sqrt{2}/3\sqrt{5}$
1.3 0.2 -1.1 + * $-1/\sqrt{3.5}$	1.3 4.2 -5.1 - $-\sqrt{2}/3\sqrt{5}$	-1.1 1.1 0.2 + * $-\sqrt{2}/9\sqrt{5}$
1.3 -3.3 2.0 + * $+1/\sqrt{5}$	1.3 1.3 -2.0 - 0	-1.1 -2.2 3.3 + * $-2\sqrt{2}/3\sqrt{3.5}$
<b>31 3<sup>2</sup> 2 0</b>	1.3 1.3 -2.2 + $+\sqrt{2}/3\sqrt{3}$	-1.1 4.2 -3.1 - * $-2/3\sqrt{3.5}$
-2.0 6.0 -4.0 + $+1/\sqrt{2.3.5}$	<b>32 31 0 0</b>	-1.1 1.3 0.2 - * $+4/9\sqrt{5}$
-2.0 3.1 -1.1 - * 0	2.0 -2.0 0.0 + $+1/\sqrt{3.5}$	5.1 -2.0 -3.1 - * $-1/\sqrt{2.3.5}$
-2.0 0.2 2.2 + $-1/\sqrt{2.3.5}$	-1.1 1.1 0.0 - * $-\sqrt{2}/\sqrt{3.5}$	5.1 1.1 -6.0 + * $-1/\sqrt{2.3.5}$

Table 10—continued

32	31	3	0	32	31	3	0	32	31	3	0				
5.1	-5.1	0.2	-*	$-\sqrt{2/3}\sqrt{5}$	2.2	4.2	-6.0	-	$-1/\sqrt{3.5}$	-1.3	1.1	0.2	+	*	$+\sqrt{5/9}$
5.1	-2.2	-3.1	-*	$-1/3\sqrt{5}$	2.2	1.3	-3.1	+	$-2/3\sqrt{3.5}$	-1.3	-2.2	3.3	-*	+	$\sqrt{2/3}\sqrt{3}$
2.2	-2.0	0.2	-	$+1/3\sqrt{2.5}$	-4.2	1.1	3.3	+	$+1/3\sqrt{3.5}$	-1.3	4.2	-3.1	+	*	$-2\sqrt{2/3}\sqrt{3.5}$
2.2	1.1	-3.1	-	$-1/3\sqrt{2.3.5}$	-4.2	4.2	0.2	+	$+\sqrt{2/3}\sqrt{5}$	-1.3	1.3	0.2	-*	+	$+2/9$
2.2	-5.1	3.3	+	$+2/3\sqrt{5}$	-4.2	1.3	3.3	-	$+2/3\sqrt{3}$						
2.2	-2.2	0.2	+	0	-1.3	-2.0	3.3	+	$-1/3\sqrt{5}$						

Table 11. Branching rules for SU<sub>6</sub> = SU<sub>2</sub> × SU<sub>3</sub>.

0	⇒	+	0.0
1	⇒	+	1.1
1 <sup>5</sup>	⇒	+	1.1 <sup>2</sup>
1 <sup>2</sup>	⇒	+	0.2 + 2.1 <sup>2</sup>
1 <sup>4</sup>	⇒	+	0.2 <sup>2</sup> + 2.1
2	⇒	+	0.1 <sup>2</sup> + 2.2
2 <sup>5</sup>	⇒	+	0.1 + 2.2 <sup>2</sup>
21 <sup>4</sup>	⇒	+	0.21 + 2.0 + 2.21
1 <sup>3</sup>	⇒	+	1.21 + 3.0
21	⇒	+	1.0 + 1.21 + 1.3 + 3.21
2 <sup>4</sup> 1	⇒	+	1.0 + 1.21 + 1.3 <sup>2</sup> + 3.21
21 <sup>3</sup>	⇒	+	1.1 <sup>2</sup> + 1.2 + 1.32 + 3.1 <sup>2</sup> + 3.2
2 <sup>2</sup> 1 <sup>3</sup>	⇒	+	1.1 + 1.2 <sup>2</sup> + 1.31 + 3.1 + 3.2 <sup>2</sup>
3	⇒	+	1.21 + 3.3
3 <sup>5</sup>	⇒	+	1.21 + 3.3 <sup>2</sup>
31 <sup>4</sup>	⇒	+	1.1 + 1.2 <sup>2</sup> + 1.31 + 3.1 + 3.31
32 <sup>4</sup>	⇒	+	1.1 <sup>2</sup> + 1.2 + 1.32 + 3.1 <sup>2</sup> + 3.32

Table 12. 3jm factors for SU<sub>6</sub> = SU<sub>2</sub> × SU<sub>3</sub>.

0	0	0	0	2	1 <sup>5</sup>	1 <sup>5</sup>	0
0.0	0.0	0.0	0	+	+	$+1$	$+\sqrt{2.3/\sqrt{7}}$
1 <sup>5</sup>	1	0	0	2 <sup>5</sup>	2	0	0
1.1 <sup>2</sup>	1.1	0.0	0	+	+	$+1/\sqrt{7}$	$+\sqrt{2.3/\sqrt{7}}$
1 <sup>2</sup>	1 <sup>5</sup>	1 <sup>5</sup>	0	2.2 <sup>2</sup>	2.2	0.0	0
0.2	1.1 <sup>2</sup>	1.1 <sup>2</sup>	0	+	+	$+2\sqrt{2.3/\sqrt{5.7}}$	$-2i\sqrt{2/\sqrt{5.7}}$
2.1 <sup>2</sup>	1.1 <sup>2</sup>	1.1 <sup>2</sup>	0	+	+	$+\sqrt{3/\sqrt{5.7}}$	$+\sqrt{3/\sqrt{5.7}}$
1 <sup>2</sup>	1 <sup>2</sup>	1 <sup>2</sup>	0	2.21	1.1 <sup>2</sup>	1.1	0
0.2	0.2	0.2	0	+	+	$-1/\sqrt{5}$	$+2\sqrt{2.3/\sqrt{5.7}}$
2.1 <sup>2</sup>	2.1 <sup>2</sup>	0.2	0	+	+	$+1/\sqrt{5}$	2.1 <sup>4</sup>
2.1 <sup>2</sup>	2.1 <sup>2</sup>	2.1 <sup>2</sup>	0	+	+	$-1/\sqrt{5}$	1 <sup>4</sup>
1 <sup>4</sup>	1 <sup>2</sup>	0	0	0.21	0.2 <sup>2</sup>	0.2	0
0.2 <sup>2</sup>	0.2	0.0	0	+	+	$+\sqrt{2/\sqrt{5}}$	$-i/\sqrt{7}$
2.1	2.1 <sup>2</sup>	0.0	0	+	+	$+\sqrt{3/\sqrt{5.7}}$	$+i\sqrt{3/\sqrt{5.7}}$
2	1 <sup>5</sup>	1 <sup>5</sup>	0	2.0	2.1	2.1 <sup>2</sup>	0
0.1 <sup>2</sup>	1.1 <sup>2</sup>	1.1 <sup>2</sup>	0	+	+	$+3/\sqrt{5.7}$	$+\sqrt{3/\sqrt{5.7}}$
				2.21	2.1	2.1 <sup>2</sup>	0
				+	+	$-1/\sqrt{7}$	$-\sqrt{2.3/\sqrt{5.7}}$

Table 12—continued

<b>21<sup>4</sup> 2 1<sup>4</sup> 0</b>	<b>21 1<sup>4</sup> 1<sup>5</sup> 0</b>
0.21 0.1 <sup>2</sup> 0.2 <sup>2</sup> 0 - + $i\sqrt{2}/\sqrt{5.7}$	1.21 2.1 1.1 <sup>2</sup> 0 - + $2/\sqrt{5.7}$
0.21 2.2 2.1 0 - - $i\sqrt{2.3}/\sqrt{5.7}$	1.3 0.2 <sup>2</sup> 1.1 <sup>2</sup> 0 - - $\sqrt{2}/\sqrt{7}$
2.0 2.0 2.1 0 + - $1/\sqrt{5.7}$	3.21 2.1 1.1 <sup>2</sup> 0 - - $4/\sqrt{5.7}$
2.0 2.2 0.2 <sup>2</sup> 0 + + $\sqrt{2}/\sqrt{5.7}$	<b>21 2<sup>5</sup> 1<sup>5</sup> 0</b>
2.21 0.1 <sup>2</sup> 2.1 0 + + $\sqrt{2}/\sqrt{5.7}$	1.0 0.1 1.1 <sup>2</sup> 0 - - $1/\sqrt{5.7}$
2.21 2.2 0.2 <sup>2</sup> 0 + + $\sqrt{2}/\sqrt{7}$	1.21 0.1 1.1 <sup>2</sup> 0 - - $2/\sqrt{5.7}$
2.21 2.2 2.1 0 + - $2\sqrt{3}/\sqrt{5.7}$	1.21 2.2 <sup>2</sup> 1.1 <sup>2</sup> 0 - + $2/\sqrt{5.7}$
<b>21<sup>4</sup> 2<sup>5</sup> 2 0</b>	1.3 2.2 <sup>2</sup> 1.1 <sup>2</sup> 0 - - $\sqrt{2}/\sqrt{7}$
0.21 0.1 0.1 <sup>2</sup> 0 - - $i/\sqrt{2.5.7}$	3.21 2.2 <sup>2</sup> 1.1 <sup>2</sup> 0 - - $4/\sqrt{5.7}$
0.21 2.2 <sup>2</sup> 2.2 0 - + $i\sqrt{3}/\sqrt{2.7}$	<b>21 1<sup>3</sup> 21<sup>4</sup> 0</b>
2.0 2.2 <sup>2</sup> 2.2 0 + - $\sqrt{3}/\sqrt{5.7}$	1.0 1.21 0.21 0 - - $i/\sqrt{2.5.7}$
2.21 0.1 2.2 0 + + $3/\sqrt{2.5.7}$	1.0 1.21 2.21 0 + + $1/\sqrt{2.3.5.7}$
2.21 2.2 <sup>2</sup> 2.2 0 + - $\sqrt{3}/\sqrt{7}$	1.0 3.0 2.0 0 - + $1/\sqrt{3.5.7}$
<b>21<sup>4</sup> 21<sup>4</sup> 0 0</b>	1.21 1.21 0.21 0 - - $1/\sqrt{2.7}$
0.21 0.21 0.0 0 + + $2\sqrt{2}/\sqrt{5.7}$	1.21 1.21 0.21 1 + + $1/\sqrt{2.5.7}$
2.0 2.0 0.0 0 + + $\sqrt{3}/\sqrt{5.7}$	1.21 1.21 2.0 0 + + $2/\sqrt{3.5.7}$
2.21 2.21 0.0 0 + + $2\sqrt{2.3}/\sqrt{5.7}$	1.21 1.21 2.21 0 + - $1/\sqrt{2.3.7}$
<b>21<sup>4</sup> 21<sup>4</sup> 21<sup>4</sup> 0</b>	1.21 1.21 2.21 1 + + $i\sqrt{3}/\sqrt{2.5.7}$
0.21 0.21 0.21 0 - - 0	1.21 3.0 2.21 0 - + $2/\sqrt{3.5.7}$
0.21 0.21 0.21 1 + + $\sqrt{2}/\sqrt{5.7}$	1.3 1.21 0.21 0 + + $1/\sqrt{2.7}$
2.0 2.0 2.0 0 + - $1/\sqrt{3.5.7}$	1.3 1.21 2.21 0 - + $\sqrt{3}/\sqrt{2.7}$
2.21 2.0 0.21 0 - - 0	3.21 1.21 2.0 0 - - $2/\sqrt{3.5.7}$
2.21 2.21 0.21 0 - - 0	3.21 1.21 2.21 0 - - $\sqrt{2}/\sqrt{3.7}$
2.21 2.21 0.21 1 + + $\sqrt{2.3}/\sqrt{5.7}$	3.21 1.21 2.21 1 + + $i\sqrt{2.3}/\sqrt{5.7}$
2.21 2.21 2.0 0 + - $2\sqrt{2}/\sqrt{3.5.7}$	3.21 3.0 0.21 0 - - $i\sqrt{2}/\sqrt{5.7}$
2.21 2.21 2.21 0 + - $2/\sqrt{3.7}$	3.21 3.0 2.21 0 + - $\sqrt{2}/\sqrt{3.7}$
2.21 2.21 2.21 1 - - 0	<b>2<sup>4</sup> 21 0 0</b>
<b>21<sup>4</sup> 21<sup>4</sup> 21<sup>4</sup> 1</b>	1.0 1.0 0.0 0 + + $1/\sqrt{5.7}$
0.21 0.21 0.21 0 + - $1/2\sqrt{7}$	1.21 1.21 0.0 0 + + $2\sqrt{2}/\sqrt{5.7}$
0.21 0.21 0.21 1 - - 0	1.3 <sup>2</sup> 1.3 0.0 0 + + $\sqrt{2}/\sqrt{7}$
2.0 2.0 2.0 0 - - 0	3.21 3.21 0.0 0 + + $4/\sqrt{5.7}$
2.21 2.0 0.21 0 + - $\sqrt{3}/\sqrt{2.5.7}$	<b>2<sup>4</sup> 21 21<sup>4</sup> 0</b>
2.21 2.21 0.21 0 + - $\sqrt{3}/2\sqrt{7}$	1.0 1.0 2.0 0 + + $1/9\sqrt{5.7}$
2.21 2.21 0.21 1 - - 0	1.0 1.21 0.21 0 - + $2/3\sqrt{3.5.7}$
2.21 2.21 2.0 0 - - 0	1.0 1.21 2.21 0 - + $2/9\sqrt{5.7}$
2.21 2.21 2.21 0 - - 0	1.0 3.21 2.21 0 - + $8/9\sqrt{5.7}$
2.21 2.21 2.21 1 + - $3\sqrt{3}/\sqrt{2.5.7}$	1.21 1.21 0.21 0 - - 0
<b>1<sup>3</sup> 1<sup>2</sup> 1 0</b>	1.21 1.21 0.21 1 + + $4/3\sqrt{3.5.7}$
1.21 0.2 1.1 0 + + $\sqrt{2}/\sqrt{5}$	1.21 1.21 2.0 0 - - $2\sqrt{2}/9\sqrt{5.7}$
1.21 2.1 <sup>2</sup> 1.1 0 + + $\sqrt{2}/\sqrt{5}$	1.21 1.21 2.21 0 - + $4/9\sqrt{7}$
3.0 2.1 <sup>2</sup> 1.1 0 - - $1/\sqrt{5}$	1.21 1.21 2.21 1 - - 0
<b>1<sup>3</sup> 1<sup>3</sup> 0 0</b>	1.21 1.3 0.21 0 + - $2/3\sqrt{3.7}$
1.21 1.21 0.0 0 + + $2/\sqrt{5}$	1.21 1.3 2.21 0 - + $2/3\sqrt{7}$
3.0 3.0 0.0 0 + + $1/\sqrt{5}$	1.21 3.21 2.0 0 - - $4\sqrt{2}/9\sqrt{5.7}$
<b>1<sup>3</sup> 1<sup>3</sup> 21<sup>4</sup> 0</b>	1.21 3.21 2.21 0 - + $4/9\sqrt{7}$
1.21 1.21 0.21 0 - - 0	1.21 3.21 2.21 1 + - $4/3\sqrt{5.7}$
1.21 1.21 0.21 1 + + $2\sqrt{2}/\sqrt{5.7}$	1.3 <sup>2</sup> 1.3 0.21 0 - + $2i\sqrt{2}/3\sqrt{3.7}$
1.21 1.21 2.0 0 + - $2/\sqrt{3.5.7}$	1.3 <sup>2</sup> 1.3 2.0 0 + + $\sqrt{2}/3\sqrt{7}$
1.21 1.21 2.21 0 + + $2\sqrt{2}/\sqrt{3.7}$	1.3 <sup>2</sup> 1.3 2.21 0 - - $2\sqrt{2}/3\sqrt{7}$
1.21 1.21 2.21 1 - - 0	1.3 <sup>2</sup> 3.21 2.21 0 + - 0
3.0 1.21 2.21 0 - - $4/\sqrt{3.5.7}$	3.21 3.21 0.21 0 - - $2/\sqrt{2.3}\sqrt{3.7}$
3.0 3.0 2.0 0 + - $1/\sqrt{3.7}$	3.21 3.21 0.21 1 + + $2\sqrt{2}/\sqrt{3.5.7}$
<b>21 1<sup>4</sup> 1<sup>5</sup> 0</b>	3.21 3.21 2.0 0 - - $4/9\sqrt{7}$
1.0 2.1 1.1 <sup>2</sup> 0 + + $1/\sqrt{5.7}$	3.21 3.21 2.21 0 - - $2\sqrt{2.5}/9\sqrt{7}$
1.21 0.2 <sup>2</sup> 1.1 <sup>2</sup> 0 + - $2/\sqrt{5.7}$	3.21 3.21 2.21 1 - - $2i\sqrt{2}/3\sqrt{7}$

Table 12—continued

<b>2<sup>4</sup>1</b>	<b>21</b>	<b>21<sup>4</sup></b>	<b>1</b>		<b>21<sup>3</sup></b>	<b>1<sup>3</sup></b>	<b>2<sup>5</sup></b>	<b>0</b>	
1.0	1.0	2.0	0 -	$-i\sqrt{5/9}\sqrt{2.7}$	1.1 <sup>2</sup>	1.21	2.2 <sup>2</sup>	0 -	$+1/2\sqrt{7}$
1.0	1.21	0.21	0 +	$+13/4.3\sqrt{2.3.5.7}$	1.2	1.21	0.1	0 +	$+\sqrt{3}/\sqrt{2.5.7}$
1.0	1.21	2.21	0 -	$+41i/4.9\sqrt{2.5.7}$	1.2	1.21	2.2 <sup>2</sup>	0 +	$+1/\sqrt{2.3.7}$
1.0	3.21	2.21	0 +	$+i/2.9\sqrt{2.5.7}$	1.2	3.0	2.2 <sup>2</sup>	0 -	$+2\sqrt{2}/\sqrt{3.5.7}$
1.21	1.21	0.21	0 +	0	1.32	1.21	0.1	0 -	$-1/2\sqrt{7}$
1.21	1.21	0.21	1 -	$+i\sqrt{7/3}\sqrt{2.3.5}$	1.32	1.21	2.2 <sup>2</sup>	0 -	$-3/2\sqrt{7}$
1.21	1.21	2.0	0 -	$-i\sqrt{7/2.9}\sqrt{5}$	3.1 <sup>2</sup>	1.21	2.2 <sup>2</sup>	0 +	$-2/\sqrt{5.7}$
1.21	1.21	2.21	0 -	$-13i/2.9\sqrt{2.7}$	3.1 <sup>2</sup>	3.0	0.1	0 -	$-1/\sqrt{5.7}$
1.21	1.21	2.21	1 +	$-3/2\sqrt{2.5.7}$	3.2	1.21	2.2 <sup>2</sup>	0 -	$-2/\sqrt{3.7}$
1.21	1.3	0.21	0 -	$-13/4.3\sqrt{2.3.7}$	3.2	3.0	2.2 <sup>2</sup>	0 +	$-\sqrt{2}/\sqrt{3.7}$
1.21	1.3	2.21	0 +	$+5i/4.3\sqrt{2.7}$	<b>21<sup>3</sup></b>	<b>21</b>	<b>1<sup>4</sup></b>	<b>0</b>	
1.21	3.21	2.0	0 +	$-13i/2.9\sqrt{5.7}$	1.1 <sup>2</sup>	1.0	2.1	0 -	$+1/2.3\sqrt{5.7}$
1.21	3.21	2.21	0 +	$+i\sqrt{7/9}\sqrt{2}$	1.1 <sup>2</sup>	1.21	0.2 <sup>2</sup>	0 -	$-3/4\sqrt{5.7}$
1.21	3.21	2.21	1 -	$-\sqrt{2/3}\sqrt{5.7}$	1.1 <sup>2</sup>	1.21	2.1	0 -	$-11/4.3\sqrt{5.7}$
1.3 <sup>2</sup>	1.3	0.21	0 +	$-\sqrt{7/2.3}\sqrt{3}$	1.1 <sup>2</sup>	1.3	0.2 <sup>2</sup>	0 +	$+1/2\sqrt{2.7}$
1.3 <sup>2</sup>	1.3	2.0	0 -	$+i/2.3\sqrt{7}$	1.1 <sup>2</sup>	3.21	2.1	0 +	$-2/3\sqrt{5.7}$
1.3 <sup>2</sup>	1.3	2.21	0 -	$+i/3\sqrt{7}$	1.2	1.0	0.2 <sup>2</sup>	0 +	$-1/2\sqrt{3.7}$
1.3 <sup>2</sup>	3.21	2.21	0 -	$+3i/2\sqrt{2.7}$	1.2	1.21	0.2 <sup>2</sup>	0 +	$-\sqrt{5/2}\sqrt{2.3.7}$
3.21	3.21	0.21	0 +	$+13/4.3\sqrt{3.7}$	1.2	1.21	2.1	0 +	$-1/2\sqrt{2.3.7}$
3.21	3.21	0.21	1 -	$+i\sqrt{5/4}\sqrt{3.7}$	1.2	3.21	2.1	0 -	$-\sqrt{2}/\sqrt{3.7}$
3.21	3.21	2.0	0 -	$-i\sqrt{7/9}\sqrt{2}$	1.32	1.21	0.2 <sup>2</sup>	0 -	$+\sqrt{5/4}\sqrt{7}$
3.21	3.21	2.21	0 -	$+13i\sqrt{5/4.9}\sqrt{7}$	1.32	1.21	2.1	0 -	$+\sqrt{5/4}\sqrt{7}$
3.21	3.21	2.21	1 +	$-5/4.3\sqrt{7}$	1.32	1.3	0.2 <sup>2</sup>	0 +	$-\sqrt{5/2}\sqrt{2.7}$
<b>21<sup>3</sup></b>	<b>1<sup>2</sup></b>	<b>1<sup>5</sup></b>	<b>0</b>		1.32	1.3	2.1	0 +	$+\sqrt{5/2}\sqrt{7}$
1.1 <sup>2</sup>	0.2	1.1 <sup>2</sup>	0 -	$+\sqrt{3}/\sqrt{2.5.7}$	1.32	3.21	2.1	0 +	0
1.1 <sup>2</sup>	2.1 <sup>2</sup>	1.1 <sup>2</sup>	0 -	$-1/\sqrt{5.7}$	3.1 <sup>2</sup>	1.0	2.1	0 +	$-1/3\sqrt{7}$
1.2	2.1 <sup>2</sup>	1.1 <sup>2</sup>	0 +	$+1/\sqrt{7}$	3.1 <sup>2</sup>	1.21	2.1	0 +	$+1/3\sqrt{7}$
1.32	0.2	1.1 <sup>2</sup>	0 -	$-\sqrt{5}/\sqrt{2.7}$	3.1 <sup>2</sup>	3.21	0.2 <sup>2</sup>	0 -	$-1/\sqrt{2.7}$
3.1 <sup>2</sup>	2.1 <sup>2</sup>	1.1 <sup>2</sup>	0 +	$+1/\sqrt{7}$	3.1 <sup>2</sup>	3.21	2.1	0 -	$+\sqrt{5/3}\sqrt{2.7}$
3.2	2.1 <sup>2</sup>	1.1 <sup>2</sup>	0 -	$-\sqrt{2}/\sqrt{7}$	3.2	1.21	2.1	0 -	$+1/\sqrt{3.7}$
<b>21<sup>3</sup></b>	<b>21<sup>4</sup></b>	<b>1</b>	<b>0</b>		3.2	3.21	0.2 <sup>2</sup>	0 +	$-\sqrt{5}/\sqrt{2.3.7}$
1.1 <sup>2</sup>	0.21	1.1	0 +	$-3i/2\sqrt{2.5.7}$	3.2	3.21	2.1	0 +	$+\sqrt{5}/\sqrt{2.3.7}$
1.1 <sup>2</sup>	2.0	1.1	0 -	$+2/\sqrt{3.5.7}$	<b>21<sup>3</sup></b>	<b>21</b>	<b>2<sup>5</sup></b>	<b>0</b>	
1.1 <sup>2</sup>	2.21	1.1	0 -	$+1/2\sqrt{2.3.5.7}$	1.1 <sup>2</sup>	1.0	0.1	0 -	$-1/4\sqrt{5.7}$
1.2	0.21	1.1	0 -	$+i\sqrt{3/2}\sqrt{7}$	1.1 <sup>2</sup>	1.21	0.1	0 -	$-1/8\sqrt{5.7}$
1.2	2.21	1.1	0 +	$+1/2\sqrt{7}$	1.1 <sup>2</sup>	1.21	2.2 <sup>2</sup>	0 -	$-1/8\sqrt{5.7}$
1.32	0.21	1.1	0 +	$-i\sqrt{5/2}\sqrt{2.7}$	1.1 <sup>2</sup>	1.3	2.2 <sup>2</sup>	0 +	$+3/4\sqrt{2.7}$
1.32	2.21	1.1	0 -	$+\sqrt{3.5/2}\sqrt{2.7}$	1.1 <sup>2</sup>	3.21	2.2 <sup>2</sup>	0 +	$+1/\sqrt{5.7}$
3.1 <sup>2</sup>	2.0	1.1	0 +	$+1/\sqrt{3.7}$	1.2	1.0	2.2 <sup>2</sup>	0 +	$+1/4\sqrt{3.7}$
3.1 <sup>2</sup>	2.21	1.1	0 +	$-\sqrt{2}/\sqrt{3.7}$	1.2	1.21	0.1	0 +	$+\sqrt{3/4}\sqrt{2.7}$
3.2	2.21	1.1	0 -	$+\sqrt{2}/\sqrt{7}$	1.2	1.21	2.2 <sup>2</sup>	0 +	$+\sqrt{5/4}\sqrt{2.3.7}$
<b>21<sup>3</sup></b>	<b>1<sup>3</sup></b>	<b>1<sup>4</sup></b>	<b>0</b>		1.2	3.21	2.2 <sup>2</sup>	0 -	$+\sqrt{5}/\sqrt{2.3.7}$
1.1 <sup>2</sup>	1.21	0.2 <sup>2</sup>	0 -	$+1/2\sqrt{5.7}$	1.32	1.21	0.1	0 -	$+\sqrt{5/8}\sqrt{7}$
1.1 <sup>2</sup>	1.21	2.1	0 -	$-\sqrt{7/2.3}\sqrt{5}$	1.32	1.21	2.2 <sup>2</sup>	0 -	$+3\sqrt{5/8}\sqrt{7}$
1.1 <sup>2</sup>	3.0	2.1	0 +	$-2\sqrt{2/3}\sqrt{5.7}$	1.32	1.3	0.1	0 +	$+\sqrt{5/4}\sqrt{7}$
1.2	1.21	0.2 <sup>2</sup>	0 +	$+\sqrt{5}/\sqrt{2.3.7}$	1.32	1.3	2.2 <sup>2</sup>	0 +	$-3\sqrt{5/4}\sqrt{2.7}$
1.2	1.21	2.1	0 +	$+1/\sqrt{2.3.7}$	1.32	3.21	2.2 <sup>2</sup>	0 +	0
1.32	1.21	0.2 <sup>2</sup>	0 -	$+\sqrt{5/2}\sqrt{7}$	3.1 <sup>2</sup>	1.21	2.2 <sup>2</sup>	0 +	$-1/2\sqrt{7}$
1.32	1.21	2.1	0 -	$+\sqrt{5/2}\sqrt{7}$	3.1 <sup>2</sup>	1.3	2.2 <sup>2</sup>	0 -	0
3.1 <sup>2</sup>	1.21	2.1	0 +	$-2/3\sqrt{7}$	3.1 <sup>2</sup>	3.21	0.1	0 -	$+1/2\sqrt{2.7}$
3.1 <sup>2</sup>	3.0	2.1	0 -	$+\sqrt{5/3}\sqrt{7}$	3.1 <sup>2</sup>	3.21	2.2 <sup>2</sup>	0 -	$-\sqrt{5/2}\sqrt{2.7}$
3.2	1.21	2.1	0 -	$-2/\sqrt{3.7}$	3.2	1.0	2.2 <sup>2</sup>	0 -	$-1/\sqrt{2.3.7}$
3.2	3.0	0.2 <sup>2</sup>	0 +	$+\sqrt{2}/\sqrt{3.7}$	3.2	1.21	2.2 <sup>2</sup>	0 -	$-\sqrt{5/2}\sqrt{3.7}$
<b>21<sup>3</sup></b>	<b>1<sup>3</sup></b>	<b>2<sup>5</sup></b>	<b>0</b>		3.2	3.21	0.1	0 +	$+\sqrt{3/2}\sqrt{2.7}$
1.1 <sup>2</sup>	1.21	0.1	0 -	$+1/2\sqrt{7}$	3.2	3.21	2.2 <sup>2</sup>	0 +	$-5/2\sqrt{2.3.7}$



Table 12—continued

<b>21<sup>3</sup></b>	<b>2<sup>4</sup>1</b>	<b>1<sup>4</sup></b>	<b>0</b>		<b>21<sup>3</sup></b>	<b>21<sup>3</sup></b>	<b>2</b>	<b>0</b>	
1.1 <sup>2</sup>	1.0	2.1	0	-	3.2	3.1 <sup>2</sup>	0.1 <sup>2</sup>	0	-
1.1 <sup>2</sup>	1.21	0.2 <sup>2</sup>	0	-	3.2	3.2	2.2	0	+
1.1 <sup>2</sup>	1.21	2.1	0	-	<b>2<sup>2</sup>1<sup>3</sup></b>	<b>21<sup>3</sup></b>	<b>0</b>	<b>0</b>	
1.1 <sup>2</sup>	3.21	2.1	0	+	1.1	1.1 <sup>2</sup>	2.0	0	+
1.2	1.0	0.2 <sup>2</sup>	0	+	1.2 <sup>2</sup>	1.2	0.0	0	+
1.2	1.21	0.2 <sup>2</sup>	0	+	1.31	1.32	0.0	0	+
1.2	1.21	2.1	0	+	3.1	3.1 <sup>2</sup>	0.0	0	+
1.2	1.3 <sup>2</sup>	2.1	0	-	3.2 <sup>2</sup>	3.2	0.0	0	+
1.2	3.21	2.1	0	-	<b>2<sup>2</sup>1<sup>3</sup></b>	<b>21<sup>3</sup></b>	<b>21<sup>4</sup></b>	<b>0</b>	
1.32	1.21	0.2 <sup>2</sup>	0	-	1.1	1.1 <sup>2</sup>	0.21	0	-
1.32	1.21	2.1	0	-	1.1	1.1 <sup>2</sup>	2.0	0	+
1.32	1.3 <sup>2</sup>	0.2 <sup>2</sup>	0	+	1.1	1.1 <sup>2</sup>	2.21	0	+
1.32	3.21	2.1	0	+	1.1	1.2	0.21	0	+
3.1 <sup>2</sup>	1.0	2.1	0	+	1.1	1.2	2.21	0	-
3.1 <sup>2</sup>	1.21	2.1	0	+	1.1	1.32	0.21	0	-
3.1 <sup>2</sup>	3.21	0.2 <sup>2</sup>	0	-	1.1	1.32	2.21	0	+
3.1 <sup>2</sup>	3.21	2.1	0	-	1.1	3.1 <sup>2</sup>	2.0	0	-
3.2	1.21	2.1	0	-	1.1	3.1 <sup>2</sup>	2.21	0	+
3.2	1.3 <sup>2</sup>	2.1	0	+	1.1	3.2	2.21	0	+
3.2	3.21	0.2 <sup>2</sup>	0	+	1.2 <sup>2</sup>	1.2	0.21	0	-
3.2	3.21	2.1	0	+	1.2 <sup>2</sup>	1.2	2.0	0	+
<b>21<sup>3</sup></b>	<b>21<sup>3</sup></b>	<b>1<sup>2</sup></b>	<b>0</b>		1.2 <sup>2</sup>	1.2	2.21	0	+
1.1 <sup>2</sup>	1.1 <sup>2</sup>	0.2	0	+	1.2 <sup>2</sup>	1.32	0.21	0	+
1.1 <sup>2</sup>	1.1 <sup>2</sup>	2.1 <sup>2</sup>	0	+	1.2 <sup>2</sup>	1.32	2.21	0	-
1.2	1.1 <sup>2</sup>	2.1 <sup>2</sup>	0	-	1.2 <sup>2</sup>	3.1 <sup>2</sup>	2.21	0	+
1.2	1.2	0.2	0	+	1.2 <sup>2</sup>	3.2	2.0	0	-
1.32	1.1 <sup>2</sup>	0.2	0	+	1.2 <sup>2</sup>	3.2	2.21	0	-
1.32	1.2	0.2	0	-	1.31	1.32	0.21	0	-
1.32	1.2	2.1 <sup>2</sup>	0	-	1.31	1.32	2.0	0	+
1.32	1.32	0.2	0	+	1.31	1.32	2.21	0	+
1.32	1.32	2.1 <sup>2</sup>	0	+	1.31	1.32	2.21	1	+
3.1 <sup>2</sup>	1.1 <sup>2</sup>	2.1 <sup>2</sup>	0	-	1.31	1.32	2.21	1	-
3.1 <sup>2</sup>	1.2	2.1 <sup>2</sup>	0	-	1.31	3.1 <sup>2</sup>	2.21	0	-
3.1 <sup>2</sup>	3.1 <sup>2</sup>	0.2	0	+	1.31	3.2	2.21	0	+
3.1 <sup>2</sup>	3.1 <sup>2</sup>	2.1 <sup>2</sup>	0	+	3.1	3.1 <sup>2</sup>	0.21	0	-
3.2	1.1 <sup>2</sup>	2.1 <sup>2</sup>	0	+	3.1	3.1 <sup>2</sup>	2.0	0	+
3.2	1.32	2.1 <sup>2</sup>	0	+	3.1	3.1 <sup>2</sup>	2.21	0	+
3.2	3.1 <sup>2</sup>	2.1 <sup>2</sup>	0	-	3.1	3.2	0.21	0	+
3.2	3.2	0.2	0	+	3.1	3.2	2.21	0	+
<b>21<sup>3</sup></b>	<b>21<sup>3</sup></b>	<b>2</b>	<b>0</b>		3.2 <sup>2</sup>	3.2	0.21	0	-
1.1 <sup>2</sup>	1.1 <sup>2</sup>	0.1 <sup>2</sup>	0	+	3.2 <sup>2</sup>	3.2	2.0	0	+
1.1 <sup>2</sup>	1.1 <sup>2</sup>	2.2	0	+	3.2 <sup>2</sup>	3.2	2.21	0	+
1.2	1.1 <sup>2</sup>	0.1 <sup>2</sup>	0	-	<b>2<sup>2</sup>1<sup>3</sup></b>	<b>21<sup>3</sup></b>	<b>21<sup>4</sup></b>	<b>1</b>	
1.2	1.2	2.2	0	+	1.1	1.1 <sup>2</sup>	0.21	0	+
1.32	1.1 <sup>2</sup>	2.2	0	+	1.1	1.1 <sup>2</sup>	2.0	0	-
1.32	1.2	0.1 <sup>2</sup>	0	-	1.1	1.1 <sup>2</sup>	2.21	0	-
1.32	1.2	2.2	0	-	1.1	1.2	0.21	0	+
1.32	1.32	0.1 <sup>2</sup>	0	+	1.1	1.32	0.21	0	+
1.32	1.32	2.2	0	+	1.1	1.32	2.21	0	-
3.1 <sup>2</sup>	1.1 <sup>2</sup>	2.2	0	-	1.1	3.1 <sup>2</sup>	2.0	0	+
3.1 <sup>2</sup>	1.32	2.2	0	-	1.1	3.1 <sup>2</sup>	2.21	0	+
3.1 <sup>2</sup>	3.1 <sup>2</sup>	0.1 <sup>2</sup>	0	+	1.2 <sup>2</sup>	1.2	0.21	0	+
3.1 <sup>2</sup>	3.1 <sup>2</sup>	2.2	0	+	1.2 <sup>2</sup>	1.2	2.0	0	-
3.2	1.2	2.2	0	-					
3.2	1.32	2.2	0	+					

Table 12—continued

<b>21<sup>3</sup> 21<sup>3</sup> 21<sup>4</sup> 1</b>	<b>3<sup>5</sup> 3 21<sup>4</sup> 0</b>
1.2 <sup>2</sup> 1.2 2.21 0 - $-i/2\sqrt{3.7}$	3.3 <sup>2</sup> 3.3 2.21 0 + $+2\sqrt{5/3}\sqrt{7}$
1.2 <sup>2</sup> 1.32 0.21 0 - 0	<b>31<sup>4</sup> 2<sup>5</sup> 1 0</b>
1.2 <sup>2</sup> 1.32 2.21 0 + $+3i/8.2\sqrt{2.7}$	1.1 0.1 1.1 0 - $+ \sqrt{3}/\sqrt{2.5.7}$
1.2 <sup>2</sup> 3.1 <sup>2</sup> 2.21 0 - $+11i/8\sqrt{2.5.7}$	1.1 2.2 <sup>2</sup> 1.1 0 - $-1/2\sqrt{5.7}$
1.2 <sup>2</sup> 3.2 2.0 0 + $-i\sqrt{5/4}\sqrt{2.3.7}$	1.2 <sup>2</sup> 0.1 1.1 0 + $+1/\sqrt{2.5}$
1.2 <sup>2</sup> 3.2 2.21 0 + $-13i/8\sqrt{2.3.7}$	1.31 2.2 <sup>2</sup> 1.1 0 - $-1/2$
1.31 1.32 0.21 0 + $+1/8.4\sqrt{7}$	3.1 2.2 <sup>2</sup> 1.1 0 + $+1/\sqrt{2.5}$
1.31 1.32 0.21 1 - $-i\sqrt{3.7}/8.2$	3.31 2.2 <sup>2</sup> 1.1 0 + $+1/\sqrt{2}$
1.31 1.32 2.0 0 - $+3i\sqrt{3/8}\sqrt{2.7}$	<b>31<sup>4</sup> 21<sup>4</sup> 1<sup>5</sup> 0</b>
1.31 1.32 2.21 0 - $+3i\sqrt{3/8}\sqrt{2.7}$	1.1 0.21 1.1 <sup>2</sup> 0 + $+3i/4\sqrt{5.7}$
1.31 1.32 2.21 1 + $+9/8\sqrt{7}$	1.1 2.0 1.1 <sup>2</sup> 0 - $-\sqrt{2}/\sqrt{3.5.7}$
1.31 3.1 <sup>2</sup> 2.21 0 + $-i\sqrt{3/8.2}\sqrt{7}$	1.1 2.21 1.1 <sup>2</sup> 0 - $+ \sqrt{5/4}\sqrt{3.7}$
1.31 3.2 2.21 0 - $+3i/8.2\sqrt{7}$	1.2 <sup>2</sup> 0.21 1.1 <sup>2</sup> 0 - $+i/2\sqrt{2.5}$
3.1 3.1 <sup>2</sup> 0.21 0 + $-\sqrt{7/8}\sqrt{2.5}$	1.2 <sup>2</sup> 2.21 1.1 <sup>2</sup> 0 + $+ \sqrt{3/2}\sqrt{2.5}$
3.1 3.1 <sup>2</sup> 2.0 0 - $+i/2\sqrt{3.7}$	1.31 0.21 1.1 <sup>2</sup> 0 + $-i\sqrt{3/4}$
3.1 3.1 <sup>2</sup> 2.21 0 - $-5i/8\sqrt{2.3.7}$	1.31 2.21 1.1 <sup>2</sup> 0 - $+1/4$
3.1 3.2 0.21 0 - $+ \sqrt{3.5/8}\sqrt{2.7}$	3.1 2.0 1.1 <sup>2</sup> 0 + $-1/\sqrt{3.5}$
3.1 3.2 2.21 0 + $+i\sqrt{7/8}\sqrt{2}$	3.1 2.21 1.1 <sup>2</sup> 0 + $-1/\sqrt{2.3.5}$
3.2 <sup>2</sup> 3.2 0.21 0 + $+ \sqrt{7/8}\sqrt{2}$	3.31 2.21 1.1 <sup>2</sup> 0 + $+1/\sqrt{2}$
3.2 <sup>2</sup> 3.2 2.0 0 - $+i/\sqrt{2.3.7}$	<b>31<sup>4</sup> 2<sup>4</sup> 1<sup>2</sup> 0</b>
3.2 <sup>2</sup> 3.2 2.21 0 - $+5i\sqrt{5/8}\sqrt{2.3.7}$	1.1 1.0 2.1 <sup>2</sup> 0 - $-3/4\sqrt{5.7}$
<b>3 2<sup>5</sup> 1<sup>5</sup> 0</b>	1.1 1.21 0.2 0 - $+ \sqrt{5/8}\sqrt{7}$
1.21 0.1 1.1 <sup>2</sup> 0 + $+1/\sqrt{7}$	1.1 1.21 2.1 <sup>2</sup> 0 - $-\sqrt{5/8}\sqrt{7}$
1.21 2.2 <sup>2</sup> 1.1 <sup>2</sup> 0 + $-1/\sqrt{7}$	1.1 1.3 <sup>2</sup> 0.2 0 + $-1/4\sqrt{2.7}$
3.3 2.2 <sup>2</sup> 1.1 <sup>2</sup> 0 + $+ \sqrt{5/7}\sqrt{7}$	1.1 3.21 2.1 <sup>2</sup> 0 + $-1/2\sqrt{5.7}$
<b>3 2<sup>4</sup> 1<sup>4</sup> 0</b>	1.2 <sup>2</sup> 1.0 0.2 0 + $+1/4\sqrt{5}$
1.21 1.0 0.21 0 - $-i/2\sqrt{5.7}$	1.2 <sup>2</sup> 1.21 0.2 0 + $-1/4\sqrt{2}$
1.21 1.0 2.21 0 + $-\sqrt{3/2}\sqrt{5.7}$	1.2 <sup>2</sup> 1.21 2.1 <sup>2</sup> 0 + $+3/4\sqrt{2.5}$
1.21 1.21 0.21 0 - $+i/2\sqrt{7}$	1.2 <sup>2</sup> 3.21 2.1 <sup>2</sup> 0 - 0
1.21 1.21 0.21 1 + $-1/2\sqrt{5.7}$	1.31 1.21 0.2 0 - $-\sqrt{3/8}$
1.21 1.21 2.0 0 + $+ \sqrt{2}/\sqrt{3.5.7}$	1.31 1.21 2.1 <sup>2</sup> 0 - $+1/8\sqrt{3}$
1.21 1.21 2.21 0 + $+1/2\sqrt{3.7}$	1.31 1.3 <sup>2</sup> 0.2 0 + $-\sqrt{3/4}\sqrt{2}$
1.21 1.21 2.21 1 + $+i\sqrt{5/2}\sqrt{3.7}$	1.31 1.3 <sup>2</sup> 2.1 <sup>2</sup> 0 + $-1/4\sqrt{3}$
1.21 1.3 <sup>2</sup> 0.21 0 + $-i/2\sqrt{7}$	1.31 3.21 2.1 <sup>2</sup> 0 + $-1/2\sqrt{3}$
1.21 1.3 <sup>2</sup> 2.21 0 - $+1/2\sqrt{3.7}$	3.1 1.0 2.1 <sup>2</sup> 0 + 0
1.21 3.21 2.0 0 - $-\sqrt{2}/\sqrt{3.5.7}$	3.1 1.21 2.1 <sup>2</sup> 0 + $-1/2\sqrt{2.5}$
1.21 3.21 2.21 0 - $+1/\sqrt{3.7}$	3.1 3.21 0.2 0 - $+1/4\sqrt{5}$
1.21 3.21 2.21 1 + $-i/\sqrt{3.5.7}$	3.1 3.21 2.1 <sup>2</sup> 0 - $+1/4$
3.3 1.21 2.21 0 + $-\sqrt{2}/\sqrt{3.7}$	3.31 1.21 2.1 <sup>2</sup> 0 + $-1/2\sqrt{2.3}$
3.3 1.3 <sup>2</sup> 2.0 0 - $+1/\sqrt{3.7}$	3.31 1.3 <sup>2</sup> 2.1 <sup>2</sup> 0 - $+1/\sqrt{2.3}$
3.3 1.3 <sup>2</sup> 2.21 0 - $+2/\sqrt{3.7}$	3.31 3.21 0.2 0 - $+ \sqrt{3/4}$
3.3 3.21 0.21 0 + $+i/\sqrt{7}$	3.31 3.21 2.1 <sup>2</sup> 0 - $+ \sqrt{5/4}\sqrt{3}$
3.3 3.21 2.21 0 - $+ \sqrt{5/7}\sqrt{3.7}$	<b>31<sup>4</sup> 2<sup>4</sup> 1<sup>2</sup> 0</b>
<b>3<sup>5</sup> 3 0 0</b>	1.1 1.0 0.1 <sup>2</sup> 0 - $+1/2\sqrt{2.5.7}$
1.21 1.21 0.0 0 + $+ \sqrt{2}/\sqrt{7}$	1.1 1.21 0.1 <sup>2</sup> 0 - $+3/4\sqrt{2.5.7}$
3.3 <sup>2</sup> 3.3 0.0 0 + $+ \sqrt{5/7}\sqrt{7}$	1.1 1.21 2.2 0 - $-19/4.3\sqrt{2.5.7}$
<b>3<sup>5</sup> 3 21<sup>4</sup> 0</b>	1.1 1.3 <sup>2</sup> 2.2 0 + $-1/4.3\sqrt{7}$
1.21 1.21 0.21 0 - 0	1.1 3.21 2.2 0 + $+1/3\sqrt{2.5.7}$
1.21 1.21 0.21 1 + $-2/\sqrt{3.5.7}$	1.2 <sup>2</sup> 1.0 2.2 0 + $-1/2\sqrt{2.5}$
1.21 1.21 2.0 0 + $+ \sqrt{2/3}\sqrt{5.7}$	1.2 <sup>2</sup> 1.21 0.1 <sup>2</sup> 0 + $-1/4\sqrt{5}$
1.21 1.21 2.21 0 + $+2/3\sqrt{7}$	1.2 <sup>2</sup> 1.21 2.2 0 + $+1/4$
1.21 1.21 2.21 1 - $-4i/3\sqrt{5.7}$	1.2 <sup>2</sup> 3.21 2.2 0 - 0
1.21 3.3 2.21 0 + $+2\sqrt{2/3}\sqrt{7}$	1.31 1.21 0.1 <sup>2</sup> 0 - $+1/4\sqrt{2.3}$
3.3 <sup>2</sup> 3.3 0.21 0 - $-2i/\sqrt{3.7}$	1.31 1.21 2.2 0 - $-1/4\sqrt{2.3}$
3.3 <sup>2</sup> 3.3 2.0 0 + $+ \sqrt{5/3}\sqrt{7}$	1.31 1.3 <sup>2</sup> 0.1 <sup>2</sup> 0 + $-1/2\sqrt{2.3}$

Table 12—continued

<b>31<sup>4</sup> 2<sup>4</sup> 2 0</b>		<b>31<sup>4</sup> 21<sup>3</sup> 21<sup>4</sup> 0</b>	
1.31 1.3 <sup>2</sup> 2.2 0 +	$-1/4\sqrt{3}$	3.31 1.32 2.21 1 +	$-i\sqrt{5/4}\sqrt{2.3}$
1.31 3.21 2.2 0 +	$+1/\sqrt{2.3}$	3.31 3.1 <sup>2</sup> 0.21 0 -	$-i\sqrt{5/8}\sqrt{3}$
3.1 1.21 2.2 0 +	$+1/2.3\sqrt{5}$	3.31 3.1 <sup>2</sup> 2.21 0 +	$-5/8.3$
3.1 1.3 <sup>2</sup> 2.2 0 -	$+1/3\sqrt{2}$	3.31 3.2 0.21 0 +	$+i\sqrt{5/8}$
3.1 3.21 0.1 <sup>2</sup> 0 -	$-1/2\sqrt{2.5}$	3.31 3.2 2.21 0 -	$+5/8\sqrt{3}$
3.1 3.21 2.2 0 -	$-1/2.3\sqrt{2}$	<b>31<sup>4</sup> 2<sup>2</sup>1<sup>3</sup> 1<sup>4</sup> 0</b>	
3.31 1.21 2.2 0 +	$+1/2\sqrt{3}$	1.1 1.1 0.2 <sup>2</sup> 0 +	$-5/8.2\sqrt{7}$
3.31 1.3 <sup>2</sup> 2.2 0 -	$+1/\sqrt{2.3}$	1.1 1.1 2.1 0 +	$+5/8\sqrt{2.3.7}$
3.31 3.21 0.1 <sup>2</sup> 0 -	$-1/2\sqrt{2.3}$	1.1 1.2 <sup>2</sup> 2.1 0 -	$-11/8\sqrt{2.3.5.7}$
3.31 3.21 2.2 0 -	$-\sqrt{5/2}\sqrt{2.3}$	1.1 1.31 0.2 <sup>2</sup> 0 -	$-\sqrt{3/8.2}\sqrt{7}$
<b>31<sup>4</sup> 21<sup>3</sup> 21<sup>4</sup> 0</b>		1.1 3.1 2.1 0 -	$-1/2\sqrt{2.3.5.7}$
1.1 1.1 <sup>2</sup> 0.21 0 -	$-i/2\sqrt{5.7}$	1.1 3.2 <sup>2</sup> 2.1 0 +	$-\sqrt{5/4}\sqrt{3.7}$
1.1 1.1 <sup>2</sup> 2.0 0 +	$+\sqrt{3/4}\sqrt{2.5.7}$	1.2 <sup>2</sup> 1.1 2.1 0 -	$-1/8\sqrt{2}$
1.1 1.1 <sup>2</sup> 2.21 0 +	$+\sqrt{5/8.2}\sqrt{3.7}$	1.2 <sup>2</sup> 1.2 <sup>2</sup> 0.2 <sup>2</sup> 0 +	$-3/8\sqrt{5}$
1.1 1.2 0.21 0 +	$+i/8\sqrt{2.3.7}$	1.2 <sup>2</sup> 1.31 0.2 <sup>2</sup> 0 -	$-1/8$
1.1 1.2 2.21 0 -	$+1/3\sqrt{2.7}$	1.2 <sup>2</sup> 1.31 2.1 0 -	$-\sqrt{3/8}\sqrt{2}$
1.1 1.32 0.21 0 -	$+i\sqrt{5/8}\sqrt{7}$	1.2 <sup>2</sup> 3.1 2.1 0 +	$-1/2\sqrt{2.5}$
1.1 1.32 2.21 0 +	$+\sqrt{5/8.2}\sqrt{3.7}$	1.31 1.1 0.2 <sup>2</sup> 0 +	$-\sqrt{5/8.2}$
1.1 3.1 <sup>2</sup> 2.0 0 -	$-1/2\sqrt{2.3.7}$	1.31 1.2 <sup>2</sup> 0.2 <sup>2</sup> 0 -	$-1/8$
1.1 3.1 <sup>2</sup> 2.21 0 -	$-\sqrt{3/8}\sqrt{7}$	1.31 1.2 <sup>2</sup> 2.1 0 -	$+5/8\sqrt{2.3}$
1.1 3.2 2.21 0 +	$-5/8.3\sqrt{7}$	1.31 1.31 0.2 <sup>2</sup> 0 +	$+3\sqrt{3/8.2}$
1.2 <sup>2</sup> 1.1 <sup>2</sup> 0.21 0 +	$+i/8\sqrt{2.5}$	1.31 1.31 2.1 0 +	$-\sqrt{3/8}\sqrt{2}$
1.2 <sup>2</sup> 1.1 <sup>2</sup> 2.21 0 -	$+1/4\sqrt{2.3.5}$	1.31 3.2 <sup>2</sup> 2.1 0 +	$-1/4\sqrt{3}$
1.2 <sup>2</sup> 1.2 0.21 0 -	0	3.1 1.1 2.1 0 -	$+1/4\sqrt{3}$
1.2 <sup>2</sup> 1.2 2.0 0 +	$-1/4.3$	3.1 1.2 <sup>2</sup> 2.1 0 +	$-1/4\sqrt{3.5}$
1.2 <sup>2</sup> 1.2 2.21 0 +	$+\sqrt{5/8.3}$	3.1 3.1 0.2 <sup>2</sup> 0 +	$-1/4\sqrt{5}$
1.2 <sup>2</sup> 1.32 0.21 0 +	$-i\sqrt{5/8}\sqrt{2}$	3.1 3.1 2.1 0 +	$-1/2\sqrt{2.3}$
1.2 <sup>2</sup> 1.32 2.21 0 -	0	3.1 3.2 <sup>2</sup> 2.1 0 -	$+1/4\sqrt{3}$
1.2 <sup>2</sup> 3.1 <sup>2</sup> 2.21 0 +	$-1/4\sqrt{2.3}$	3.31 1.2 <sup>2</sup> 2.1 0 +	$+1/4\sqrt{3}$
1.2 <sup>2</sup> 3.2 2.0 0 -	$+1/2.3\sqrt{2}$	3.31 1.31 2.1 0 -	$+\sqrt{3/4}$
1.2 <sup>2</sup> 3.2 2.21 0 -	$-\sqrt{5/4.3}\sqrt{2}$	3.31 3.1 0.2 <sup>2</sup> 0 +	$+1/4$
1.31 1.1 <sup>2</sup> 0.21 0 -	$-i/8\sqrt{3}$	3.31 3.2 <sup>2</sup> 0.2 <sup>2</sup> 0 -	$+1/2\sqrt{2}$
1.31 1.1 <sup>2</sup> 2.21 0 +	$-7/8.2.3$	3.31 3.2 <sup>2</sup> 2.1 0 -	$-\sqrt{5/4}\sqrt{3}$
1.31 1.2 0.21 0 +	$+i\sqrt{5/8}\sqrt{2}$	<b>31<sup>4</sup> 2<sup>2</sup>1<sup>3</sup> 2<sup>5</sup> 0</b>	
1.31 1.2 2.21 0 -	$+\sqrt{5/4}\sqrt{2.3}$	1.1 1.1 0.1 0 +	$-1/8\sqrt{2.5}$
1.31 1.32 0.21 0 -	0	1.1 1.1 2.2 <sup>2</sup> 0 +	$+1/8.2\sqrt{3.5}$
1.31 1.32 0.21 1 +	0	1.1 1.2 <sup>2</sup> 0.1 0 -	$-1/8\sqrt{2}$
1.31 1.32 2.0 0 +	$-\sqrt{5/4.3}\sqrt{2}$	1.1 1.31 2.2 <sup>2</sup> 0 +	$+\sqrt{5/8.2}$
1.31 1.32 2.21 0 +	$-5\sqrt{5/8.2.3}$	1.1 3.1 2.2 <sup>2</sup> 0 -	$-1/4\sqrt{3}$
1.31 1.32 2.21 1 -	$-i\sqrt{5/8}\sqrt{3}$	1.2 <sup>2</sup> 1.1 0.1 0 -	$-\sqrt{3/8}\sqrt{2.5.7}$
1.31 3.1 <sup>2</sup> 2.21 0 -	$-\sqrt{5/8.3}$	1.2 <sup>2</sup> 1.2 <sup>2</sup> 2.2 <sup>2</sup> 0 +	$-\sqrt{3/8}\sqrt{7}$
1.31 3.2 2.21 0 +	$+\sqrt{5/8}\sqrt{3}$	1.2 <sup>2</sup> 1.31 0.1 0 -	$+\sqrt{5/8}\sqrt{2.7}$
3.1 1.1 <sup>2</sup> 2.0 0 -	$+1/4\sqrt{3.5}$	1.2 <sup>2</sup> 1.31 2.2 <sup>2</sup> 0 -	$+\sqrt{3.5/8}\sqrt{7}$
3.1 1.1 <sup>2</sup> 2.21 0 -	$+7/8\sqrt{2.3.5}$	1.2 <sup>2</sup> 3.2 <sup>2</sup> 2.2 <sup>2</sup> 0 -	$-\sqrt{3/2}\sqrt{2.7}$
3.1 1.2 2.21 0 +	$-1/8.3$	1.31 1.1 2.2 <sup>2</sup> 0 +	$-13/8.2\sqrt{3.7}$
3.1 1.32 2.21 0 -	$+\sqrt{5/8}\sqrt{2.3}$	1.31 1.2 <sup>2</sup> 0.1 0 -	$+\sqrt{5/8}\sqrt{2.7}$
3.1 3.1 <sup>2</sup> 0.21 0 -	$-i/8$	1.31 1.2 <sup>2</sup> 2.2 <sup>2</sup> 0 -	$-5\sqrt{5/8}\sqrt{3.7}$
3.1 3.1 <sup>2</sup> 2.0 0 +	0	1.31 1.31 0.1 0 +	$-3\sqrt{5/8}\sqrt{2.7}$
3.1 3.1 <sup>2</sup> 2.21 0 +	$-\sqrt{5/8}\sqrt{3}$	1.31 1.31 2.2 <sup>2</sup> 0 +	$+3\sqrt{5/8.2}\sqrt{7}$
3.1 3.2 0.21 0 +	$+i/8\sqrt{3}$	1.31 3.1 2.2 <sup>2</sup> 0 -	$+\sqrt{5/4}\sqrt{3.7}$
3.1 3.2 2.21 0 -	$+\sqrt{5/8.3}$	1.31 3.2 <sup>2</sup> 2.2 <sup>2</sup> 0 +	$+\sqrt{5/2}\sqrt{2.3.7}$
3.31 1.1 <sup>2</sup> 2.21 0 -	$-1/8.3\sqrt{2}$	3.1 1.1 2.2 <sup>2</sup> 0 -	$+11/4\sqrt{2.3.5.7}$
3.31 1.2 2.21 0 +	$-\sqrt{5/8}\sqrt{3}$	3.1 1.31 2.2 <sup>2</sup> 0 -	$-\sqrt{5/4}\sqrt{2.7}$
3.31 1.32 2.0 0 -	$-\sqrt{5/4.3}$	3.1 3.1 0.1 0 +	$-1/2\sqrt{2.7}$
3.31 1.32 2.21 0 -	$-5\sqrt{5/8.3}\sqrt{2}$	3.1 3.1 2.2 <sup>2</sup> 0 +	$-\sqrt{5/4}\sqrt{3.7}$

Table 12—continued

<b>31<sup>4</sup> 2<sup>13</sup> 2<sup>5</sup> 0</b>		<b>31<sup>4</sup> 31<sup>4</sup> 2<sup>5</sup> 0</b>	
3.1 3.2 <sup>2</sup> 0.1 0 -	+1/4√7	1.1 1.1 2.2 <sup>2</sup> 0 +	-13/8.3√2.5.7
3.31 1.1 2.2 <sup>2</sup> 0 -	+1/4√2.3.7	1.2 <sup>2</sup> 1.1 0.1 0 -	+1/8.3√5
3.31 1.2 <sup>2</sup> 2.2 <sup>2</sup> 0 +	-√5/2√2.3.7	1.2 <sup>2</sup> 1.2 <sup>2</sup> 2.2 <sup>2</sup> 0 +	+√7/4√2.3.5
3.31 1.31 2.2 <sup>2</sup> 0 -	-3√5/4√2.7	1.31 1.1 2.2 <sup>2</sup> 0 +	-11/8.9√2
3.31 3.1 2.2 <sup>2</sup> 0 +	+5/4√3.7	1.31 1.2 <sup>2</sup> 0.1 0 -	-√7/8.3
3.31 3.2 <sup>2</sup> 0.1 0 -	-√5/4√7	1.31 1.2 <sup>2</sup> 2.2 <sup>2</sup> 0 -	+√7/4.3√2.3
3.31 3.2 <sup>2</sup> 2.2 <sup>2</sup> 0 -	+5/2√2.3.7	1.31 1.31 0.1 0 +	+√7/8.3
<b>31<sup>4</sup> 3<sup>5</sup> 1<sup>2</sup> 0</b>		1.31 1.31 2.2 <sup>2</sup> 0 +	-5√7/8.3√2
1.1 1.21 0.2 0 -	+1/2√2.5	3.1 1.1 2.2 <sup>2</sup> 0 -	-1/4√5
1.1 1.21 2.1 <sup>2</sup> 0 -	-1/2√2.5	3.1 1.31 2.2 <sup>2</sup> 0 -	-√7/4.9
1.2 <sup>2</sup> 1.21 0.2 0 +	-1/2√7	3.1 3.1 0.1 0 +	+√7/2.3√2.3.5
1.2 <sup>2</sup> 1.21 2.1 <sup>2</sup> 0 +	+3/2√5.7	3.1 3.1 2.2 <sup>2</sup> 0 +	+√7/4.3
1.31 1.21 0.2 0 -	+√3/2√2.7	3.31 1.1 2.2 <sup>2</sup> 0 -	+5/4.9
1.31 1.21 2.1 <sup>2</sup> 0 -	-1/2√2.3.7	3.31 1.2 <sup>2</sup> 2.2 <sup>2</sup> 0 +	-√7/2.3√3
1.31 3.3 <sup>2</sup> 2.1 <sup>2</sup> 0 -	-2/√3.7	3.31 1.31 2.2 <sup>2</sup> 0 -	-√7/4.3
3.1 1.21 2.1 <sup>2</sup> 0 +	+1/√5.7	3.31 3.1 2.2 <sup>2</sup> 0 +	+√5.7/4.9
3.1 3.3 <sup>2</sup> 0.2 0 +	-1/√2.7	3.31 3.31 0.1 0 +	-√7/2.3√2
3.31 1.21 2.1 <sup>2</sup> 0 +	+1/√3.7	3.31 3.31 2.2 <sup>2</sup> 0 +	+√5.7/4.3
3.31 3.3 <sup>2</sup> 0.2 0 +	-√3/√2.7	<b>32<sup>4</sup> 31<sup>4</sup> 0 0</b>	
3.31 3.3 <sup>2</sup> 2.1 <sup>2</sup> 0 +	+√5/√3.7	1.1 <sup>2</sup> 1.1 0.0 0 +	+1/2√5
<b>31<sup>4</sup> 3<sup>5</sup> 2 0</b>		1.2 1.2 <sup>2</sup> 0.0 0 +	+1/√2.5
1.1 1.21 0.1 <sup>2</sup> 0 -	+1/2√2.3.5.7	1.32 1.31 0.0 0 +	+1/2
1.1 1.21 2.2 0 -	-17/2.3√2.3.5.7	3.1 <sup>2</sup> 3.1 0.0 0 +	+1/√2.5
1.1 3.3 <sup>2</sup> 2.2 0 -	-√2/3√3.7	3.32 3.31 0.0 0 +	+1/√2
1.2 <sup>2</sup> 1.21 0.1 <sup>2</sup> 0 -	-1/2√3.5	<b>32<sup>4</sup> 31<sup>4</sup> 21<sup>4</sup> 0</b>	
1.2 <sup>2</sup> 1.21 2.2 0 +	+1/2√3	1.1 <sup>2</sup> 1.1 0.21 0 -	+47 i/8.2.3√5.7.11
1.31 1.21 0.1 <sup>2</sup> 0 -	-1/2.3√2	1.1 <sup>2</sup> 1.1 2.0 0 +	-31/4.9√2.3.5.7.11
1.31 1.21 2.2 0 -	+1/2.3√2	1.1 <sup>2</sup> 1.1 2.21 0 +	+8.2/9√3.5.7.11
1.31 3.3 <sup>2</sup> 2.2 0 -	-√2/3	1.1 <sup>2</sup> 1.2 <sup>2</sup> 0.21 0 +	-i√5/4.3√2.11
3.1 1.21 2.2 0 +	-1/3√3.5	1.1 <sup>2</sup> 1.2 <sup>2</sup> 2.21 0 -	+19/8.3√2.3.5.11
3.1 3.3 <sup>2</sup> 2.2 0 +	+√5/3√2.3	1.1 <sup>2</sup> 1.31 0.21 0 -	-5 i/8.2.3√3.11
3.31 1.21 2.2 0 +	-1/3	1.1 <sup>2</sup> 1.31 2.21 0 +	+3/8√11
3.31 3.3 <sup>2</sup> 0.1 <sup>2</sup> 0 +	-1/3	1.1 <sup>2</sup> 3.1 2.0 0 -	-√5/4.9√3.11
3.31 3.3 <sup>2</sup> 2.2 0 +	+√5/3√2	1.1 <sup>2</sup> 3.1 2.21 0 -	-157/8.9√2.3.5.11
<b>31<sup>4</sup> 31<sup>4</sup> 1<sup>4</sup> 0</b>		1.1 <sup>2</sup> 3.31 2.21 0 -	-13/8.3√2.11
1.1 1.1 0.2 <sup>2</sup> 0 +	+√3/8√2.5	1.2 1.2 <sup>2</sup> 0.21 0 -	-i√7/8√11
1.1 1.1 2.1 0 +	+1/8.3√5	1.2 1.2 <sup>2</sup> 2.0 0 +	-√7/4.3√3.5.11
1.2 <sup>2</sup> 1.1 2.1 0 -	-√7/8√3.5	1.2 1.2 <sup>2</sup> 2.21 0 +	-√7/4.3√3.11
1.2 <sup>2</sup> 1.2 <sup>2</sup> 0.2 <sup>2</sup> 0 +	-1/4√2.5	1.2 1.31 0.21 0 +	0
1.31 1.1 0.2 <sup>2</sup> 0 +	-√7/8√2.3	1.2 1.31 2.21 0 -	-7√7/8.3√2.11
1.31 1.2 <sup>2</sup> 0.2 <sup>2</sup> 0 -	+1/4√2	1.2 3.1 2.21 0 +	+7√7/8.3√3.5.11
1.31 1.2 <sup>2</sup> 2.1 0 -	-1/8√3	1.2 3.31 2.21 0 +	+7√7/8.3√11
1.31 1.31 0.2 <sup>2</sup> 0 +	-√3/8√2	1.32 1.31 0.21 0 -	+i√7.11/8.2.3
1.31 1.31 2.1 0 +	+5/8√3	1.32 1.31 0.21 1 +	+√3.7/8√11
3.1 1.1 2.1 0 -	-√7/2.3√2.5	1.32 1.31 2.0 0 +	-13√7/4.9√2.3.11
3.1 1.2 <sup>2</sup> 2.1 0 +	-1/2√2.3.5	1.32 1.31 2.21 0 +	-17√7/4.9√3.11
3.1 3.1 0.2 <sup>2</sup> 0 +	+√3/4√5	1.32 1.31 2.21 1 -	+2 i/7/9√11
3.1 3.1 2.1 0 +	+1/2.3√2	1.32 3.1 2.21 0 -	+√7/8.3√2.11
3.31 1.2 <sup>2</sup> 2.1 0 +	+1/2√2.3	1.32 3.31 2.0 0 -	-5√7/4.9√3.11
3.31 1.31 2.1 0 -	+1/2√2.3	1.32 3.31 2.21 0 -	-31√7/8.9√2.3.11
3.31 3.1 0.2 <sup>2</sup> 0 +	+1/4√3	1.32 3.31 2.21 1 +	+i√7.11/4.9√2
3.31 3.31 0.2 <sup>2</sup> 0 +	+√3/4	3.1 <sup>2</sup> 3.1 0.21 0 -	+i√7.11/8.3√2.5
3.31 3.31 2.1 0 +	-√5/2√2.3	3.1 <sup>2</sup> 3.1 2.0 0 +	-2√7/9√3.11
<b>31<sup>4</sup> 31<sup>4</sup> 2<sup>5</sup> 0</b>		3.1 <sup>2</sup> 3.1 2.21 0 +	-37√7/8.9√2.3.11
1.1 1.1 0.1 0 +	+11/8.3√3.5.7	3.1 <sup>2</sup> 3.31 0.21 0 -	-5 i/√7/8.3√2.3.11

**Table 12**—*continued*

<b>32<sup>4</sup></b>	<b>31<sup>4</sup></b>	<b>21<sup>4</sup></b>	<b>0</b>		<b>32<sup>4</sup></b>	<b>31<sup>4</sup></b>	<b>21<sup>4</sup></b>	<b>1</b>			
3.1 <sup>2</sup>	3.31	2.21	0	+	$+\sqrt{5.7/8}\sqrt{2.11}$	1.2	3.1	2.21	0	-	$-i\sqrt{3/4}\sqrt{2.5.7.11}$
3.32	3.31	0.21	0	-	$+i\sqrt{7.11/8.3}\sqrt{2}$	1.2	3.31	2.21	0	-	$-3i/4\sqrt{2.7.11}$
3.32	3.31	0.21	1	+	$+\sqrt{3.7/4}\sqrt{2.11}$	1.32	1.31	0.21	0	+	$+\sqrt{11/8}\sqrt{2.7}$
3.32	3.31	2.0	0	+	$-2\sqrt{5.7/9}\sqrt{3.11}$	1.32	1.31	0.21	1	-	$+5i\sqrt{3/4}\sqrt{2.7.11}$
3.32	3.31	2.21	0	+	$-37\sqrt{5.7/8.9}\sqrt{2.3.11}$	1.32	1.31	2.0	0	-	$+5i/4\sqrt{3.7.11}$
3.32	3.31	2.21	1	-	$+5i\sqrt{5.7/4.9}\sqrt{2.11}$	1.32	1.31	2.21	0	-	$+i\sqrt{2/\sqrt{3.7.11}}$
<b>32<sup>4</sup></b>	<b>31<sup>4</sup></b>	<b>21<sup>4</sup></b>	<b>1</b>			1.32	1.31	2.21	1	+	$-1/\sqrt{2.7.11}$
1.1 <sup>2</sup>	1.1	0.21	0	+	$-\sqrt{7/8}\sqrt{2.5.11}$	1.32	3.1	2.21	0	+	$-13i/8\sqrt{7.11}$
1.1 <sup>2</sup>	1.1	2.0	0	-	$-i\sqrt{7/4}\sqrt{3.5.11}$	1.32	3.31	2.0	0	+	$+i\sqrt{7/2}\sqrt{2.3.11}$
1.1 <sup>2</sup>	1.1	2.21	0	-	$+i\sqrt{7/2}\sqrt{2.3.5.11}$	1.32	3.31	2.21	0	+	$+17i/8\sqrt{3.7.11}$
1.1 <sup>2</sup>	1.2 <sup>2</sup>	0.21	0	-	$-3/4\sqrt{5.11}$	1.32	3.31	2.21	1	-	$-\sqrt{11/4}\sqrt{7}$
1.1 <sup>2</sup>	1.2 <sup>2</sup>	2.21	0	+	$+i\sqrt{3.5/8}\sqrt{11}$	3.1 <sup>2</sup>	3.1	0.21	0	+	$+\sqrt{11/8}\sqrt{5.7}$
1.1 <sup>2</sup>	1.31	0.21	0	+	$-\sqrt{3/8}\sqrt{2.11}$	3.1 <sup>2</sup>	3.1	2.0	0	-	$-i/\sqrt{2.3.7.11}$
1.1 <sup>2</sup>	1.31	2.21	0	-	$-i/4\sqrt{2.11}$	3.1 <sup>2</sup>	3.1	2.21	0	-	$-i/8\sqrt{3.7.11}$
1.1 <sup>2</sup>	3.1	2.0	0	+	$+i/2\sqrt{2.3.5.11}$	3.1 <sup>2</sup>	3.31	0.21	0	+	$-\sqrt{3.7/8}\sqrt{11}$
1.1 <sup>2</sup>	3.1	2.21	0	+	$+i\sqrt{5/8}\sqrt{3.11}$	3.1 <sup>2</sup>	3.31	2.21	0	-	$+5i\sqrt{5/8}\sqrt{7.11}$
1.1 <sup>2</sup>	3.31	2.21	0	+	$-i/8\sqrt{11}$	3.32	3.31	0.21	0	+	$+\sqrt{11/8}\sqrt{7}$
1.2	1.2 <sup>2</sup>	0.21	0	+	$+5/4\sqrt{2.7.11}$	3.32	3.31	0.21	1	-	$+5i\sqrt{3/4}\sqrt{7.11}$
1.2	1.2 <sup>2</sup>	2.0	0	-	$-3i\sqrt{3/2}\sqrt{2.5.7.11}$	3.32	3.31	2.0	0	-	$-i\sqrt{5/\sqrt{2.3.7.11}}$
1.2	1.2 <sup>2</sup>	2.21	0	-	$-3i\sqrt{3/2}\sqrt{2.7.11}$	3.32	3.31	2.21	0	-	$-i\sqrt{5/8}\sqrt{3.7.11}$
1.2	1.31	0.21	0	-	0	3.32	3.31	2.21	1	+	$+\sqrt{5.7/4}\sqrt{11}$
1.2	1.31	2.21	0	+	$+3i/8\sqrt{7.11}$						

orthogonal nature of some  $SU_3$  irreps and the symplectic nature of some  $SU_2$  irreps means that many  $2jm$ 's are  $-1$ . From table 9, line 6 we have

$$\begin{pmatrix} 21 \\ 0.0 \end{pmatrix} = \begin{pmatrix} 21 \\ 3.1 \end{pmatrix} = \begin{pmatrix} 21 \\ 0.2 \end{pmatrix} = 1 \quad \text{and} \quad \begin{pmatrix} 21 \\ -3.1 \end{pmatrix} = -1. \tag{3.4}$$

$3jm$  factors are zero unless the top and bottom rows are triads of the group and subgroups respectively, and unless the columns obey the branching rules. The symmetries of the  $3jm$  are: invariance under cyclic permutations of the columns; a possible sign change for a column interchange, the (12) interchange being

$$\begin{pmatrix} \lambda_1 & \lambda_2 & \lambda_3 \\ \rho_1 & \rho_2 & \rho_3 \end{pmatrix}_{r,s} = \pm \begin{pmatrix} \lambda_2 & \lambda_1 & \lambda_3 \\ \rho_2 & \rho_1 & \rho_3 \end{pmatrix}_{r,s}, \tag{3.5}$$

and a possible sign change under the complex conjugation symmetry

$$= \pm \begin{pmatrix} \lambda_1^* & \lambda_2^* & \lambda_3^* \\ \rho_1^* & \rho_2^* & \rho_3^* \end{pmatrix}_{r,s}. \tag{3.6}$$

For  $SU_3 \supset U_1 \times SU_2$  and  $SU_6 \supset SU_2 \times SU_3$  the irrep labels for the direct product subgroup are a product of the labels for each group, and for the second case, the subgroup coupling multiplicity label refers to the multiplicity in  $SU_3$ .

The  $3jm$  tables (tables 8, 10 and 12) use the top row of a  $3jm$  as a bold typeface header, each subsequent entry giving the subgroup irrep label pairs, the label  $s$  (for table 12 only), the column interchange sign (for equation (3.5)), a star if complex conjugation introduces a negative sign (for equation (3.6)), and then the value. The symmetries are used to reduce the size of the tables; the irreps appear in the order of tables 1 and 2.

#### 4. The symmetric group–unitary group duality

The relationship between the structures of the symmetric and unitary groups was recognised by Frobenius and Schur. Weyl (1946) makes much use of this duality, showing that irreps of the unitary groups can be obtained using Young symmetrisers. Both the symmetric and unitary group characters are specified by Schur functions (Littlewood 1950), which were studied by Jacobi, Trudi, Kostka and others long before Schur (1901) showed the connection with the characters of these groups. The use of the purely functional combinatoric properties of Schur functions has recently proved fruitful in obtaining new identities, and thus new computational techniques for character theory (see for example Butler and King (1973a, b), King (1970, 1975), Wybourne (1970)). The algebra of Schur functions makes the dual structures of the characters of S<sub>l</sub> and U<sub>n</sub> apparent.

The duality goes further than character theory, and one can establish many identities between the Racah–Wigner algebra of S<sub>l</sub> and that of U<sub>n</sub>. Nuclear shell model theorists used this duality to compute *jm* and *j* symbols of U<sub>n</sub> (Jahn 1954, Elliott *et al* 1953, Kaplan 1962a, b, Horie 1964, Vanagas 1971). Kramer (1967, 1968) obtained the equality of ‘*f*-symbols’ for symmetric group chains with *j* symbols of all unitary groups and *jm* factors in U<sub>p+q</sub> ⊃ U<sub>p</sub> × U<sub>q</sub> bases. These results yield the Regge symmetries for the 3*jm* symbols of SU<sub>2</sub> ⊃ U<sub>1</sub> (Kramer and Seligman 1969a).

Another approach to duality applies the concept of double coset (DC) generators (Kramer and Seligman 1969b) to relate the matrix elements of double coset generators (DCME) to 9*f* symbols of a certain symmetric group chains and hence to appropriate 9*j* symbols of any unitary group. Sullivan (1976, 1980, and references therein) has formulated the general problem of DC decompositions and arrived at more duality results.

None of these calculations is complete because phase and multiplicity relationships between different unitary and symmetric groups have been left unspecified. In addition, simplifications can be obtained by using the isomorphism between U<sub>n</sub> and U<sub>1</sub> × SU<sub>n</sub>. The coefficients of U<sub>n</sub> calculated by Baird and Biedenharn (1964) and So and Strotzman (1979) are not factorisable into U<sub>1</sub> × SU<sub>n</sub> coefficients. The application of the tilde symmetry for S<sub>l</sub> (see Butler and Ford 1979) provides further symmetries for U<sub>n</sub> coefficients, in analogy to the SU<sub>2</sub> Regge symmetries. A full discussion of these symmetries must include duality phases.

Although the phase questions remain unsolved, our tables provide illustrations of the dualities. The SU<sub>6</sub> 6*j* {<sup>21</sup><sub>1</sub> <sup>25</sup><sub>2</sub> <sup>15</sup><sub>3</sub>} may be found in table 6, as 1/2.3.7. Using the 6*j* symmetries, in particular (13) column interchange and complex conjugation, this becomes

$$\left| \left\{ \begin{matrix} 21 & 2^5 & 1^5 \\ 1 & 2 & 1^5 \end{matrix} \right\}_{\text{SU}_6} \right| = \left| \left\{ \begin{matrix} 1 & 2 & 21^* \\ 1^* & 2 & 1 \end{matrix} \right\}_{\text{SU}_6} \right|.$$

Writing this as a recoupling coefficient (Butler and Wybourne 1976, equation (13)—note that there is an error in the ordering of subscripts in the 6*j* symbol on the right-hand side of this equation) and using Kramer (1967, equation (6.14)) allows us to change unitary groups. From the SU<sub>3</sub> 6*j* table we have

$$= \frac{|2|_{\text{SU}_3}}{|2|_{\text{SU}_6}} \left| \left\{ \begin{matrix} 1 & 2 & 21^* \\ 1^* & 2 & 1 \end{matrix} \right\}_{\text{SU}_3} \right| = \frac{6}{21} \left| \left\{ \begin{matrix} 21 & 2 & 1 \\ 1^2 & 2^* & 1 \end{matrix} \right\}_{\text{SU}_3} \right| = \frac{6}{21} \cdot \frac{1}{2.6}$$

while from the  $SU_2$  table (Rotenberg *et al* 1959) this is also

$$= \frac{|2|_{SU_2}}{|2|_{SU_6}} \left| \begin{pmatrix} 1 & 2 & 21^* \\ 1^* & 2 & 1 \end{pmatrix}_{SU_2} \right| = \frac{3}{21} \left| \begin{pmatrix} 1 & 2 & 1 \\ 1 & 2 & 1 \end{pmatrix}_{SU_2} \right| = \frac{3}{21} \cdot \frac{1}{2.3}.$$

In a similar fashion the coupling (or isoscalar) factors of  $SU_{pq}$  in the  $SU_p \times SU_q$  basis, are  $p$  and  $q$  independent, (see for example Sullivan (1980), Chen (1981)). The  $3jm$

$$\begin{pmatrix} 1^3 & 1^2 & 1 \\ 1.21 & 0.2 & 1.1 \end{pmatrix}_{SU_6} = \sqrt{\frac{2}{5}}$$

as found in table 12, may be successively transformed into a trivial  $3jm$  of  $SU_4 \supset SU_2 \times SU_2$ :

$$\begin{aligned} & \left| \begin{pmatrix} 1^3 & 1^2 & 1 \\ 1.21 & 0.2 & 1.1 \end{pmatrix}_{SU_6} \right| \\ &= \left| \begin{pmatrix} 1 & 1^3 & 1^2 \\ 1.1 & 1.21 & 0.2 \end{pmatrix}_{SU_2 \times SU_3} \right| \\ &= \left( \frac{|0|_{SU_2} |2|_{SU_3}}{|1^2|_{SU_6}} \right)^{1/2} \left| \begin{pmatrix} 1 & 1^3 & 1^4 \\ 1.1 & 21.21 & 2^2.2^2 \end{pmatrix}_{U_p \times U_q} \right| \\ &= \left( \frac{|0|_{SU_2} |2|_{SU_3}}{|1^2|_{SU_6}} \cdot \frac{|0|_{SU_4}}{|0|_{SU_2} |0|_{SU_2}} \right)^{1/2} \left| \begin{pmatrix} 1 & 1^3 & 0 \\ 1.1 & 1.1 & 0.0 \end{pmatrix}_{SU_4} \right|. \end{aligned}$$

Trivial  $3jm$ 's are just a ratio of dimensions, in this case unity.

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