The action $(Sp(4)xSp(4)xU(2)xT):M_{8,2}(C)$

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This Maple worksheet provides details concerning an example presented in section 5.6 of our paper *Spaces of Bounded Spherical Functions on Heisenberg Groups: Part II*. At issue is the (multiplicity free) action of the compact group Sp(4)xSp(4)xU(2)xT on the space $V=M_{8,2}(C)$ of 8x2 complex matrices via **(k1, k2, k3, c). Z = diag(ck1,k2) Z k3^t**. We will show that this action is well-behaved as defined in Section 2 of the paper.

```
> restart:with(linalg):
```

Functions **dot** and **sym** below implement the inner product of 8x2 matrices and the symplectic product of vectors in C^4. In the inner product complex conjugation should be applied to the matrix entries of the second input. But for our purposes it will suffice to restrict attention to matrices all of whose entries are real.

```
> dot:=(z,w)->trace(z&*transpose(w));
```

$$dot := (z, w) \rightarrow linalg\text{:-}trace(z \,\&*\, linalg\text{:-}transpose(w)) \tag{1}$$

```
> sym:=(a,b)->sum(a['i']*b['i'+2]-a['i'+2]*b['i'],'i'=1..2);
```

$$sym := (a, b) \rightarrow \sum_{'i'=1}^{2} \left(a_{'i'} \, b_{'i'+2} - a_{'i'+2} \, b_{'i'} \right) \tag{2}$$

So for example...

```
> z:=matrix(8,2): dot(z,z); sym(col(submatrix(z,5..8,1..2),1),col
  (submatrix(z,5..8,1..2),2));
```

$$z_{1,1}^2 + z_{1,2}^2 + z_{2,1}^2 + z_{2,2}^2 + z_{3,1}^2 + z_{3,2}^2 + z_{4,1}^2 + z_{4,2}^2 + z_{5,1}^2 + z_{5,2}^2 + z_{6,1}^2 + z_{6,2}^2 + z_{7,1}^2$$
$$+ z_{7,2}^2 + z_{8,1}^2 + z_{8,2}^2$$

$$z_{5,1} z_{7,2} - z_{7,1} z_{5,2} + z_{6,1} z_{8,2} - z_{8,1} z_{6,2} \tag{3}$$

This multiplicity free action has rank 7. Fundamental highest weights and highest weight vectors are implement below as A1,...,A7 (highest weights) and h1,...h7 (highest weight vectors). We list the weights as 7-tuples "[sp1, sp1, sp2, sp2, t, u, u]". The first 2 entries give minus the weight on the first Sp(4) factor, entries 3,4 minus the weight on the second Sp(4) factor. Entry 5 is minus the weight from the scalar action and the last two entries give minus the weight on the U(2) factor.

```
> h1:=z->z[1,1]: h1(z); A1:=[1,0,0,0,1,1,0];
```

$$z_{1,1}$$
$$A1 := [1, 0, 0, 0, 1, 1, 0] \tag{4}$$

```
> h2 := z→z[5, 1]: h2(z); A2 := [0, 0, 1, 0, 0, 1, 0];
```

$$z_{5,1}$$
$$A2 := [0, 0, 1, 0, 0, 1, 0] \tag{5}$$

```
> h3:=z->z[1,1]*z[2,2]-z[1,2]*z[2,1]: h3(z); A3:=[1,1,0,0,2,1,1];
```

$$z_{1,1} z_{2,2} - z_{1,2} z_{2,1}$$
$$A3 := [1, 1, 0, 0, 2, 1, 1] \tag{6}$$

```
> h4:=z->z[5,1]*z[6,2]-z[5,2]*z[6,1]: h4(z); A4:=[0,0,1,1,0,1,1];
```

$$z_{5,1}\, z_{6,2} - z_{5,2}\, z_{6,1}$$
$$A4 := [0, 0, 1, 1, 0, 1, 1] \tag{7}$$

```
> h5:=z->z[1,1]*z[5,2]-z[1,2]*z[5,1]: h5(z); A5:=[1,0,1,0,1,1,1];
```

$$z_{1,1}\, z_{5,2} - z_{1,2}\, z_{5,1}$$
$$A5 := [1, 0, 1, 0, 1, 1, 1] \tag{8}$$

```
> h6:=z->sym(col(submatrix(z,1..4,1..2),1),col(submatrix(z,1..4,1.
  .2),2)): h6(z); A6:=[0,0,0,0,2,1,1];
```

$$z_{1,1}\, z_{3,2} - z_{3,1}\, z_{1,2} + z_{2,1}\, z_{4,2} - z_{4,1}\, z_{2,2}$$
$$A6 := [0, 0, 0, 0, 2, 1, 1] \tag{9}$$

```
> h7:=z->sym(col(submatrix(z,5..8,1..2),1),col(submatrix(z,5..8,1.
  .2),2)): h7(z); A7:=[0,0,0,0,0,1,1];
```

$$z_{5,1}\, z_{7,2} - z_{7,1}\, z_{5,2} + z_{6,1}\, z_{8,2} - z_{8,1}\, z_{6,2}$$
$$A7 := [0, 0, 0, 0, 0, 1, 1] \tag{10}$$

Matrix X will be an arbitrary element of the Lie algebra sp(4,C)xsp(4,C)....

```
> X := matrix(8, 8):for m to 4 do for n from 5 to 8 do X[m, n] := 0;
  X[n, m] := 0 end do end do:X[1, 4] := X[2, 3]: X[3, 3] := -X[1, 1]:
  X[4, 3] := -X[1, 2]: X[3, 4] := -X[2, 1]: X[4, 4] := -X[2, 2]: X[4,
  1] := X[3, 2]: X[5, 8] := X[6, 7]: X[7, 7] := -X[5, 5]: X[8, 7] :=
  -X[5, 6]: X[7, 8] := -X[6, 5]: X[8, 8] := -X[6, 6]: X[8, 5] := X[7,
  6]:evalm(X);
```

$$\begin{bmatrix}
X_{1,1} & X_{1,2} & X_{1,3} & X_{2,3} & 0 & 0 & 0 & 0 \\
X_{2,1} & X_{2,2} & X_{2,3} & X_{2,4} & 0 & 0 & 0 & 0 \\
X_{3,1} & X_{3,2} & -X_{1,1} & -X_{2,1} & 0 & 0 & 0 & 0 \\
X_{3,2} & X_{4,2} & -X_{1,2} & -X_{2,2} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & X_{5,5} & X_{5,6} & X_{5,7} & X_{6,7} \\
0 & 0 & 0 & 0 & X_{6,5} & X_{6,6} & X_{6,7} & X_{6,8} \\
0 & 0 & 0 & 0 & X_{7,5} & X_{7,6} & -X_{5,5} & -X_{6,5} \\
0 & 0 & 0 & 0 & X_{7,6} & X_{8,6} & -X_{5,6} & -X_{6,6}
\end{bmatrix} \tag{11}$$

Matrix Y will be an arbitrary element of gl(2,C)....

```
> Y:=matrix(2,2): evalm(Y);
```

$$\begin{bmatrix}
Y_{1,1} & Y_{1,2} \\
Y_{2,1} & Y_{2,2}
\end{bmatrix} \tag{12}$$

Matrix T will be be an arbitrary scalar acting on the first 4 rows....

```
> T := matrix(8, 8, 0) :
  for n from 1 to 4 do:
  T[n, n] := T1 :
  end do:
  evalm(T);
```

$$\begin{bmatrix} T1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & T1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & T1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & T1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

(13)

The moment map takes V to the dual of sp(4)xsp(4)xu(2)x(iR). We implement this below as function **mom**.

```
> mom := z->simplify(expand( dot(evalm(X&*z),z)+dot(evalm(T&*z),z)+
  dot(evalm(z&*transpose(Y)),z))) ;
```

$mom := z \rightarrow simplify\,(expand\,(dot\,(evalm\,(X \&* z), z) + dot\,(evalm\,(T \&* z), z)$ (14)
$+ dot\,(evalm\,(z \&* linalg\text{-}transpose\,(Y\,)\,), z)))$

We claim that the following is a generic spherical point for the weight

```
> evalm(a·A1 + b·A2 + c·A3 + d·A4 + e·A5 + f·A6 + g·A7 );
```

$[a + c + e, c, b + d + e, d, a + 2\,c + e + 2\,f, a + b + c + d + e + f + g, c + d + e + f$ (15)
$+ g]$

namely ......

$$> spt := \left[\left[\left[-\sqrt{\frac{a\,(a + 2\,c + e + f)\,(a + c + e)\,(a + e + b)}{(a + b)\,(a + e)\,(a + 2\,c + e)}}\,,\right.\right.\right.$$

$$\sqrt{\frac{b\,e\,(a + 2\,c + e + f)\,(a + c + e)}{(a + b)\,(a + e)\,(a + 2\,c + e)}}\,\right],$$

$$\left[-\sqrt{\frac{b\,c\,e\,(a + 2\,c + e + f)}{(a + b)\,(a + e)\,(a + 2\,c + e)}}\,,\, -\sqrt{\frac{a\,(a + 2\,c + e + f)\,c\,(a + e + b)}{(a + b)\,(a + e)\,(a + 2\,c + e)}}\,\right],$$

$$\left[\sqrt{\frac{b\,e\,f\,(a + c + e)}{(a + b)\,(a + e)\,(a + 2\,c + e)}}\,,\, \sqrt{\frac{a\,f\,(a + c + e)\,(a + e + b)}{(a + b)\,(a + e)\,(a + 2\,c + e)}}\,\right],$$

$$\left[-\sqrt{\frac{a\,c\,f\,(a + e + b)}{(a + b)\,(a + e)\,(a + 2\,c + e)}}\,,\, \sqrt{\frac{b\,c\,e\,f}{(a + b)\,(a + e)\,(a + 2\,c + e)}}\,\right],$$

$$\left[-\sqrt{\frac{(b + 2\,d + e + g)\,(a + e + b)\,(b + d + e)\,b}{(b + 2\,d + e)\,(a + b)\,(e + b)}}\,,\right.$$

$$-\sqrt{\frac{(b + 2\,d + e + g)\,(b + d + e)\,a\,e}{(b + 2\,d + e)\,(a + b)\,(e + b)}}\,\right],$$

$$\left[-\sqrt{\frac{(b + 2\,d + e + g)\,a\,d\,e}{(b + 2\,d + e)\,(a + b)\,(e + b)}}\,,\, \sqrt{\frac{(b + 2\,d + e + g)\,(a + e + b)\,b\,d}{(b + 2\,d + e)\,(a + b)\,(e + b)}}\,\right],$$

$$\left[-\sqrt{\frac{(b + d + e)\,a\,e\,g}{(b + 2\,d + e)\,(a + b)\,(e + b)}}\,,\, \sqrt{\frac{(a + e + b)\,(b + d + e)\,b\,g}{(b + 2\,d + e)\,(a + b)\,(e + b)}}\,\right],$$

$$\left.\left.\left[\sqrt{\frac{(a + e + b)\,b\,d\,g}{(b + 2\,d + e)\,(a + b)\,(e + b)}}\,,\, \sqrt{\frac{a\,d\,e\,g}{(b + 2\,d + e)\,(a + b)\,(e + b)}}\,\right]\right]\right] :$$

For example......

> $evalm\,(\,A1\,+\,2\cdot A2\,+\,3\cdot A3\,+\,4\cdot A4\,+\,5\cdot A5\,+\,6\cdot A6\,+\,7\cdot A7\,)$; $subs\,(\,\{a=1,\,b=2,\,c=3,\,d=4,\,e=5,f=6,\,g=7\},\,spt\,)$; $mom\,(\%)$;

$$\begin{bmatrix} 9 & 3 & 11 & 4 & 24 & 28 & 25 \end{bmatrix}$$

$$\begin{bmatrix}
-\sqrt{6} & \dfrac{1}{2}\sqrt{30} \\[2mm]
-\dfrac{1}{2}\sqrt{10} & -\sqrt{2} \\[2mm]
\dfrac{1}{2}\sqrt{10} & \sqrt{2} \\[2mm]
-\dfrac{1}{3}\sqrt{6} & \dfrac{1}{6}\sqrt{30} \\[2mm]
-\dfrac{44}{105}\sqrt{70} & -\dfrac{11}{21}\sqrt{14} \\[2mm]
-\dfrac{2}{21}\sqrt{154} & \dfrac{8}{105}\sqrt{770} \\[2mm]
-\dfrac{1}{3}\sqrt{11} & \dfrac{4}{15}\sqrt{55} \\[2mm]
\dfrac{8}{15}\sqrt{5} & \dfrac{2}{3}
\end{bmatrix}$$

$$9\,X_{1,\,1} + 3\,X_{2,\,2} + 11\,X_{5,\,5} + 4\,X_{6,\,6} + 24\,T1 + 28\,Y_{1,\,1} + 25\,Y_{2,\,2} \tag{16}$$

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

We discovered the formula given for spt above by generalizing from numerical examples. It is not too hard to check by hand that this is indeed a generic generalized spherical point. But we prove this below by using Maple to apply the moment map (mom) to spt to verify that it maps to the weight aA1+bA2+cA3+dA4+eA5+fA6+gA7. First we will rewrite spt in a form that enables Maple to simplify the result produced by mom.

```
> getallterms:=proc(sp)
  local ntermsarray, dtermsarray, Trms, i, j;
  ntermsarray:=map(x->{op(convert(numer(x^2), list))}, sp);
  dtermsarray:=map(x->{op(convert(denom(x^2), list))}, sp);
  Trms:={};
  for i from 1 to 8 do
  for j from 1 to 2 do
  Trms:=Trms union ntermsarray[i,j] union dtermsarray[i,j]
  od od;
  convert(Trms, list)
  end:
> Terms:=getallterms(spt); nops(Terms);
```

$Terms := [\,a,\,b,\,c,\,d,\,e,f,\,g,\,a+b,\,a+e,\,e+b,\,a+c+e,\,a+2\,c+e,\,a+e+b,\,b+d+e,\,b$
$\quad + 2\,d+e,\,a+2\,c+e+f,\,b+2\,d+e+g\,]$

$$17 \tag{17}$$

```
> rewrite := proc(q)
      local num, den, numr, denr, j:
      global Terms;
      num:={op(convert(numer(q), list))};
```

```
        den:={op(convert(denom(q), list))};
        numr:=1; denr:=1;
        for j from 1 to nops(Terms) do
            if Terms[j] in num then numr:=numr*t[j] fi;
            if Terms[j] in den then denr:=denr*t[j] fi
        od;
        numr/denr
    end:
```

The matrix zt is the spherical point expressed in terms of the t's.

```
> zt:=zip((x,y)->sign(x)*(rewrite(y^2)), spt, spt);
```

$$zt := \begin{bmatrix} -\dfrac{t_1\, t_{11}\, t_{13}\, t_{16}}{t_8\, t_9\, t_{12}} & \dfrac{t_2\, t_5\, t_{11}\, t_{16}}{t_8\, t_9\, t_{12}} \\[2mm] -\dfrac{t_2\, t_3\, t_5\, t_{16}}{t_8\, t_9\, t_{12}} & -\dfrac{t_1\, t_3\, t_{13}\, t_{16}}{t_8\, t_9\, t_{12}} \\[2mm] \dfrac{t_2\, t_5\, t_6\, t_{11}}{t_8\, t_9\, t_{12}} & \dfrac{t_1\, t_6\, t_{11}\, t_{13}}{t_8\, t_9\, t_{12}} \\[2mm] -\dfrac{t_1\, t_3\, t_6\, t_{13}}{t_8\, t_9\, t_{12}} & \dfrac{t_2\, t_3\, t_5\, t_6}{t_8\, t_9\, t_{12}} \\[2mm] -\dfrac{t_2\, t_{13}\, t_{14}\, t_{17}}{t_8\, t_{10}\, t_{15}} & -\dfrac{t_1\, t_5\, t_{14}\, t_{17}}{t_8\, t_{10}\, t_{15}} \\[2mm] -\dfrac{t_1\, t_4\, t_5\, t_{17}}{t_8\, t_{10}\, t_{15}} & \dfrac{t_2\, t_4\, t_{13}\, t_{17}}{t_8\, t_{10}\, t_{15}} \\[2mm] -\dfrac{t_1\, t_5\, t_7\, t_{14}}{t_8\, t_{10}\, t_{15}} & \dfrac{t_2\, t_7\, t_{13}\, t_{14}}{t_8\, t_{10}\, t_{15}} \\[2mm] \dfrac{t_2\, t_4\, t_7\, t_{13}}{t_8\, t_{10}\, t_{15}} & \dfrac{t_1\, t_4\, t_5\, t_7}{t_8\, t_{10}\, t_{15}} \end{bmatrix}$$

(18)

To convert back from "t-variables" to parameters (a,b,...) use this substitution......

```
> Sub:={seq(t[j]=sqrt(Terms[j]), j=1..nops(Terms))};
```

$$Sub := \Big\{ t_1 = \sqrt{a}, \, t_2 = \sqrt{b}, \, t_3 = \sqrt{c}, \, t_4 = \sqrt{d}, \, t_5 = \sqrt{e}, \, t_6 = \sqrt{f}, \, t_7 = \sqrt{g}, \, t_8 = \sqrt{a+b}, \, t_9$$

$$= \sqrt{a+e}, \, t_{10} = \sqrt{e+b}, \, t_{11} = \sqrt{a+c+e}, \, t_{12} = \sqrt{a+2c+e}, \, t_{13} = \sqrt{a+e+b}, \, t_{14}$$

$$= \sqrt{b+d+e}, \, t_{15} = \sqrt{b+2d+e}, \, t_{16} = \sqrt{a+2c+e+f}, \, t_{17} = \sqrt{b+2d+e+g} \Big\}$$

(19)

We apply the moment map to zt, convert back to parameters (a,...,g) , simplify and collect terms...

```
> mom(zt):
  subs(Sub,%):
  simplify(%):
  collect(%,[X[1,1],X[2,2],X[5,5],X[6,6],T1,Y[1,1],Y[2,2]]);
```

$$(a+c+e)\, X_{1,1} + c\, X_{2,2} + (b+d+e)\, X_{5,5} + d\, X_{6,6} + (a+2c+e+2f)\, T1 + (a+b$$

$$+ c+d+e+f+g)\, Y_{1,1} + (c+d+e+f+g)\, Y_{2,2}$$

(20)

So this is a "diagonal functional" and the weight for aA1+bA2+cA3+dA4+eA5+fA6+gA7 is:

```
> evalm(a*A1+b*A2+c*A3+d*A4+e*A5+f*A6+g*A7);
```

$$[a+c+e, c, b+d+e, d, a+2c+e+2f, a+b+c+d+e+f+g, c+d+e+f \qquad (21)$$
$$+g]$$

which agrees with the moment map output above. This completes the justification that z:=spt(a,b,c,d,e,f,g) is indeed a (generalized) spherical point for the weight aA1+bA2+cA3+dA4+eA5+fA6+gA7.

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

To show that this multilicity free action is well-behaved we will apply Lemma 2.5 from the paper. Next we evaluate the highest weight vectors h1,...,h7 at our general spherical point spt. For this we work in terms of the t's and simplify.

```
> h1(zt):h1n:=subs(Sub,%);
```

$$h1n := -\frac{\sqrt{a}\,\sqrt{a+c+e}\,\sqrt{a+e+b}\,\sqrt{a+2c+e+f}}{\sqrt{a+b}\,\sqrt{a+e}\,\sqrt{a+2c+e}} \qquad (22)$$

```
> h2(zt):subs(Sub,%):h2n:=factor(%);
```

$$h2n := -\frac{\sqrt{b}\,\sqrt{a+e+b}\,\sqrt{b+d+e}\,\sqrt{b+2d+e+g}}{\sqrt{a+b}\,\sqrt{e+b}\,\sqrt{b+2d+e}} \qquad (23)$$

```
> h3(zt):subs(Sub,%):h3n:=factor(%);
```

$$h3n := \frac{\sqrt{a+c+e}\,(a+2c+e+f)\,\sqrt{c}}{a+2c+e} \qquad (24)$$

```
> h4(zt):subs(Sub,%):h4n:=factor(%);
```

$$h4n := -\frac{\sqrt{b+d+e}\,(b+2d+e+g)\,\sqrt{d}}{b+2d+e} \qquad (25)$$

```
> h5(zt):subs(Sub,%):h5n:=factor(%);
```

$$h5n := \frac{\sqrt{a+c+e}\,\sqrt{a+e+b}\,\sqrt{a+2c+e+f}\,\sqrt{e}\,\sqrt{b+d+e}\,\sqrt{b+2d+e+g}}{\sqrt{b+2d+e}\,\sqrt{e+b}\,\sqrt{a+2c+e}\,\sqrt{a+e}} \qquad (26)$$

```
> h6(zt):subs(Sub,%):h6n:=factor(%);
```

$$h6n := -\sqrt{a+2c+e+f}\,\sqrt{f} \qquad (27)$$

```
> h7(zt):subs(Sub,%):h7n:=factor(%);
```

$$h7n := -\sqrt{b+2d+e+g}\,\sqrt{g} \qquad (28)$$

These are the formulas given in section 5.6 of our paper. They show that for positive real parameters (a,b, c,d,e,f,g) each fundamental highest weight vector hj(z) takes a non-zero value at z=spt(a,b,c,d,e,f,g). This shows that condition (2) in Lemma 2.5 holds.

It remains to check conditions (3) and (4) in Lemma 2.5. Condition (3) requires that limits of (generalized) spherical points exist if we take some variables to zero.

First, we generate all possible ways the variables can go to zero. There are 126 proper non-empty subsets of {a=0, b=0, c=0, d=0, e=0, f=0, g=0}.

```
> with(combinat):
> zs:=[a=0,b=0,c=0,d=0,e=0,f=0,g=0];
  ch:=[seq(choose(%)[i],i=2..127)]:
  :nops(%);
```

$$zs := [a=0, b=0, c=0, d=0, e=0, f=0, g=0]$$
$$126 \qquad (29)$$

The following code lists each possible setting of parameters a...g to zero and prints the limiting

(generalized) spherical point. This verifies condition (3) in Lemma 3.5. In particular no singularities arise as we perfom these limits via setting parameters to zero in succession.

```
> for i from 1 to nops(ch) do:
      print(ch[i]);
      zf:=evalm(spt):
      for j from 1 to nops(ch[i]) do:
          zf:=subs(ch[i][j],evalm(zf)):
      end do:
      print(zf);
  end do:
```

$$[a = 0]$$

$$
\begin{bmatrix}
0 & \sqrt{\dfrac{(2\,c + e + f)\,(c + e)}{2\,c + e}} \\[2ex]
-\sqrt{\dfrac{c\,(2\,c + e + f)}{2\,c + e}} & 0 \\[2ex]
\sqrt{\dfrac{f\,(c + e)}{2\,c + e}} & 0 \\[2ex]
0 & \sqrt{\dfrac{c\,f}{2\,c + e}} \\[2ex]
-\sqrt{\dfrac{(b + 2\,d + e + g)\,(b + d + e)}{b + 2\,d + e}} & 0 \\[2ex]
0 & \sqrt{\dfrac{(b + 2\,d + e + g)\,d}{b + 2\,d + e}} \\[2ex]
0 & \sqrt{\dfrac{(b + d + e)\,g}{b + 2\,d + e}} \\[2ex]
\sqrt{\dfrac{d\,g}{b + 2\,d + e}} & 0
\end{bmatrix}
$$

$$[b = 0]$$

$$\left[\begin{array}{cc} -\sqrt{\dfrac{(a+2c+e+f)(a+c+e)}{a+2c+e}} & 0 \\[2em] 0 & -\sqrt{\dfrac{(a+2c+e+f)\,c}{a+2c+e}} \\[2em] 0 & \sqrt{\dfrac{f(a+c+e)}{a+2c+e}} \\[2em] -\sqrt{\dfrac{cf}{a+2c+e}} & 0 \\[2em] 0 & -\sqrt{\dfrac{(2d+e+g)(d+e)}{2d+e}} \\[2em] -\sqrt{\dfrac{(2d+e+g)\,d}{2d+e}} & 0 \\[2em] -\sqrt{\dfrac{(d+e)\,g}{2d+e}} & 0 \\[2em] 0 & \sqrt{\dfrac{d\,g}{2d+e}} \end{array}\right]$$

$$[c = 0]$$

$$\left[\left[\left[-\sqrt{\frac{a(a+e+f)(a+e+b)}{(a+e)(a+b)}},\ \sqrt{\frac{be(a+e+f)}{(a+e)(a+b)}}\right],\right.\right.$$

$$\left[0, 0\right],$$

$$\left[\sqrt{\frac{bef}{(a+e)(a+b)}},\ \sqrt{\frac{af(a+e+b)}{(a+e)(a+b)}}\right],$$

$$\left[0, 0\right],$$

$$\left[-\sqrt{\frac{(b+2d+e+g)(a+e+b)(b+d+e)\,b}{(b+2d+e)(a+b)(e+b)}},\right.$$

$$\left.-\sqrt{\frac{(b+2d+e+g)(b+d+e)\,ae}{(b+2d+e)(a+b)(e+b)}}\right],$$

$$\left[-\sqrt{\frac{(b+2d+e+g)\,ade}{(b+2d+e)(a+b)(e+b)}},\ \sqrt{\frac{(b+2d+e+g)(a+e+b)\,bd}{(b+2d+e)(a+b)(e+b)}}\right],$$

$$\left[-\sqrt{\frac{(b+d+e)\,aeg}{(b+2d+e)(a+b)(e+b)}},\ \sqrt{\frac{(a+e+b)(b+d+e)\,bg}{(b+2d+e)(a+b)(e+b)}}\right],$$

$$\left.\left[\sqrt{\frac{(a+e+b)\,bdg}{(b+2d+e)(a+b)(e+b)}},\ \sqrt{\frac{adeg}{(b+2d+e)(a+b)(e+b)}}\right]\right]\right]$$

$$[d = 0]$$

$$\left[\left[\left[-\sqrt{\frac{a\,(a+2\,c+e+f)\,(a+c+e)\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,,\right.\right.\right.$$

$$\left.\sqrt{\frac{b\,e\,(a+2\,c+e+f)\,(a+c+e)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,\right],$$

$$\left[-\sqrt{\frac{b\,c\,e\,(a+2\,c+e+f)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,,\,-\sqrt{\frac{a\,(a+2\,c+e+f)\,c\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,\right],$$

$$\left[\sqrt{\frac{b\,e\,f\,(a+c+e)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,,\,\sqrt{\frac{a\,f\,(a+c+e)\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,\right],$$

$$\left[-\sqrt{\frac{a\,c\,f\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,,\,\sqrt{\frac{b\,c\,e\,f}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,\right],$$

$$\left[-\sqrt{\frac{(b+e+g)\,(a+e+b)\,b}{(e+b)\,(a+b)}}\,,\,-\sqrt{\frac{(b+e+g)\,a\,e}{(e+b)\,(a+b)}}\,\right],$$

$$\left[0,0\right],$$

$$\left[-\sqrt{\frac{a\,e\,g}{(e+b)\,(a+b)}}\,,\,\sqrt{\frac{(a+e+b)\,b\,g}{(e+b)\,(a+b)}}\,\right],$$

$$\left.\left.\left[0,0\right]\right]\right]$$

$$[e=0]$$

$$\begin{bmatrix}
-\sqrt{\dfrac{(a+2\,c+f)\,(a+c)}{a+2\,c}} & 0 \\[2ex]
0 & -\sqrt{\dfrac{(a+2\,c+f)\,c}{a+2\,c}} \\[2ex]
0 & \sqrt{\dfrac{f\,(a+c)}{a+2\,c}} \\[2ex]
-\sqrt{\dfrac{c\,f}{a+2\,c}} & 0 \\[2ex]
-\sqrt{\dfrac{(b+2\,d+g)\,(b+d)}{b+2\,d}} & 0 \\[2ex]
0 & \sqrt{\dfrac{(b+2\,d+g)\,d}{b+2\,d}} \\[2ex]
0 & \sqrt{\dfrac{(b+d)\,g}{b+2\,d}} \\[2ex]
\sqrt{\dfrac{d\,g}{b+2\,d}} & 0
\end{bmatrix}$$

$$[f=0]$$

$$\left[\left[\left[-\sqrt{\frac{a\,(a+c+e)\,(a+e+b)}{(a+b)\,(a+e)}},\sqrt{\frac{b\,e\,(a+c+e)}{(a+b)\,(a+e)}}\right],\right.\right.$$

$$\left[-\sqrt{\frac{b\,c\,e}{(a+b)\,(a+e)}},-\sqrt{\frac{a\,c\,(a+e+b)}{(a+b)\,(a+e)}}\right],$$

$$\left[0,0\right],$$

$$\left[0,0\right],$$

$$\left[-\sqrt{\frac{(b+2\,d+e+g)\,(a+e+b)\,(b+d+e)\,b}{(b+2\,d+e)\,(a+b)\,(e+b)}},\right.$$

$$\left.-\sqrt{\frac{(b+2\,d+e+g)\,(b+d+e)\,a\,e}{(b+2\,d+e)\,(a+b)\,(e+b)}}\right],$$

$$\left[-\sqrt{\frac{(b+2\,d+e+g)\,a\,d\,e}{(b+2\,d+e)\,(a+b)\,(e+b)}},\sqrt{\frac{(b+2\,d+e+g)\,(a+e+b)\,b\,d}{(b+2\,d+e)\,(a+b)\,(e+b)}}\right],$$

$$\left[-\sqrt{\frac{(b+d+e)\,a\,e\,g}{(b+2\,d+e)\,(a+b)\,(e+b)}},\sqrt{\frac{(a+e+b)\,(b+d+e)\,b\,g}{(b+2\,d+e)\,(a+b)\,(e+b)}}\right],$$

$$\left.\left[\sqrt{\frac{(a+e+b)\,b\,d\,g}{(b+2\,d+e)\,(a+b)\,(e+b)}},\sqrt{\frac{a\,d\,e\,g}{(b+2\,d+e)\,(a+b)\,(e+b)}}\right]\right]$$

$$[g=0]$$

$$\left[\left[\left[-\sqrt{\frac{a\,(a+2\,c+e+f)\,(a+c+e)\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}},\right.\right.\right.$$

$$\left.\sqrt{\frac{b\,e\,(a+2\,c+e+f)\,(a+c+e)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\right],$$

$$\left[-\sqrt{\frac{b\,c\,e\,(a+2\,c+e+f)}{(a+b)\,(a+e)\,(a+2\,c+e)}},-\sqrt{\frac{a\,(a+2\,c+e+f)\,c\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\right],$$

$$\left[\sqrt{\frac{b\,e\,f\,(a+c+e)}{(a+b)\,(a+e)\,(a+2\,c+e)}},\sqrt{\frac{a\,f\,(a+c+e)\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\right],$$

$$\left[-\sqrt{\frac{a\,c\,f\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}},\sqrt{\frac{b\,c\,e\,f}{(a+b)\,(a+e)\,(a+2\,c+e)}}\right],$$

$$\left[-\sqrt{\frac{(a+e+b)\,(b+d+e)\,b}{(a+b)\,(e+b)}},-\sqrt{\frac{(b+d+e)\,a\,e}{(a+b)\,(e+b)}}\right],$$

$$\left[-\sqrt{\frac{a\,d\,e}{(a+b)\,(e+b)}},\sqrt{\frac{(a+e+b)\,b\,d}{(a+b)\,(e+b)}}\right],$$

$$\left[0,0\right],$$

$$\left.\left.\left[0,0\right]\right]\right]$$

$$[a=0,b=0]$$

$$\begin{bmatrix} 0 & \sqrt{\dfrac{(2c+e+f)(c+e)}{2c+e}} \\[2ex] -\sqrt{\dfrac{c(2c+e+f)}{2c+e}} & 0 \\[2ex] \sqrt{\dfrac{f(c+e)}{2c+e}} & 0 \\[2ex] 0 & \sqrt{\dfrac{cf}{2c+e}} \\[2ex] -\sqrt{\dfrac{(2d+e+g)(d+e)}{2d+e}} & 0 \\[2ex] 0 & \sqrt{\dfrac{(2d+e+g)d}{2d+e}} \\[2ex] 0 & \sqrt{\dfrac{(d+e)g}{2d+e}} \\[2ex] \sqrt{\dfrac{dg}{2d+e}} & 0 \end{bmatrix}$$

$$[\,a=0,\ c=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{e+f} \\[1ex] 0 & 0 \\[1ex] \sqrt{f} & 0 \\[1ex] 0 & 0 \\[1ex] -\sqrt{\dfrac{(b+2d+e+g)(b+d+e)}{b+2d+e}} & 0 \\[2ex] 0 & \sqrt{\dfrac{(b+2d+e+g)d}{b+2d+e}} \\[2ex] 0 & \sqrt{\dfrac{(b+d+e)g}{b+2d+e}} \\[2ex] \sqrt{\dfrac{dg}{b+2d+e}} & 0 \end{bmatrix}$$

$$[\,a=0,\ d=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{\dfrac{(2c+e+f)(c+e)}{2c+e}} \\[2ex] -\sqrt{\dfrac{c(2c+e+f)}{2c+e}} & 0 \\[2ex] \sqrt{\dfrac{f(c+e)}{2c+e}} & 0 \\[2ex] 0 & \sqrt{\dfrac{cf}{2c+e}} \\[2ex] -\sqrt{b+e+g} & 0 \\[1ex] 0 & 0 \\[1ex] 0 & \sqrt{g} \\[1ex] 0 & 0 \end{bmatrix}$$

$$[\,a=0,\ e=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{c+\dfrac{1}{2}f} \\[2ex] -\sqrt{c+\dfrac{1}{2}f} & 0 \\[2ex] \dfrac{1}{2}\sqrt{2}\sqrt{f} & 0 \\[2ex] 0 & \dfrac{1}{2}\sqrt{2}\sqrt{f} \\[2ex] -\sqrt{\dfrac{(b+2d+g)(b+d)}{b+2d}} & 0 \\[2ex] 0 & \sqrt{\dfrac{(b+2d+g)d}{b+2d}} \\[2ex] 0 & \sqrt{\dfrac{(b+d)g}{b+2d}} \\[2ex] \sqrt{\dfrac{dg}{b+2d}} & 0 \end{bmatrix}$$

$$[\,a=0,\ f=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{c+e} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{\dfrac{(b+2d+e+g)(b+d+e)}{b+2d+e}} & 0 \\ 0 & \sqrt{\dfrac{(b+2d+e+g)d}{b+2d+e}} \\ 0 & \sqrt{\dfrac{(b+d+e)g}{b+2d+e}} \\ \sqrt{\dfrac{dg}{b+2d+e}} & 0 \end{bmatrix}$$

$$[\,a = 0,\, g = 0\,]$$

$$\begin{bmatrix} 0 & \sqrt{\dfrac{(2c+e+f)(c+e)}{2c+e}} \\ -\sqrt{\dfrac{c(2c+e+f)}{2c+e}} & 0 \\ \sqrt{\dfrac{f(c+e)}{2c+e}} & 0 \\ 0 & \sqrt{\dfrac{cf}{2c+e}} \\ -\sqrt{b+d+e} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,b = 0,\, c = 0\,]$$

$$\begin{bmatrix} -\sqrt{a+e+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ 0 & -\sqrt{\dfrac{(2\,d+e+g)\,(d+e)}{2\,d+e}} \\ -\sqrt{\dfrac{(2\,d+e+g)\,d}{2\,d+e}} & 0 \\ -\sqrt{\dfrac{(d+e)\,g}{2\,d+e}} & 0 \\ 0 & \sqrt{\dfrac{d\,g}{2\,d+e}} \end{bmatrix}$$

$$[b=0,\,d=0]$$

$$\begin{bmatrix} -\sqrt{\dfrac{(a+2\,c+e+f)\,(a+c+e)}{a+2\,c+e}} & 0 \\ 0 & -\sqrt{\dfrac{(a+2\,c+e+f)\,c}{a+2\,c+e}} \\ 0 & \sqrt{\dfrac{f\,(a+c+e)}{a+2\,c+e}} \\ -\sqrt{\dfrac{c\,f}{a+2\,c+e}} & 0 \\ 0 & -\sqrt{e+g} \\ 0 & 0 \\ -\sqrt{g} & 0 \\ 0 & 0 \end{bmatrix}$$

$$[b=0,\,e=0]$$

$$\begin{bmatrix} -\sqrt{\dfrac{(a+2c+f)(a+c)}{a+2c}} & 0 \\[2ex] 0 & -\sqrt{\dfrac{(a+2c+f)c}{a+2c}} \\[2ex] 0 & \sqrt{\dfrac{f(a+c)}{a+2c}} \\[2ex] -\sqrt{\dfrac{cf}{a+2c}} & 0 \\[2ex] 0 & -\sqrt{d+\dfrac{1}{2}g} \\[2ex] -\sqrt{d+\dfrac{1}{2}g} & 0 \\[2ex] -\dfrac{1}{2}\sqrt{2}\sqrt{g} & 0 \\[2ex] 0 & \dfrac{1}{2}\sqrt{2}\sqrt{g} \end{bmatrix}$$

$$[b=0, f=0]$$

$$\begin{bmatrix} -\sqrt{a+c+e} & 0 \\[1ex] 0 & -\sqrt{c} \\[1ex] 0 & 0 \\[1ex] 0 & 0 \\[1ex] 0 & -\sqrt{\dfrac{(2d+e+g)(d+e)}{2d+e}} \\[2ex] -\sqrt{\dfrac{(2d+e+g)d}{2d+e}} & 0 \\[2ex] -\sqrt{\dfrac{(d+e)g}{2d+e}} & 0 \\[2ex] 0 & \sqrt{\dfrac{dg}{2d+e}} \end{bmatrix}$$

$$[b=0, g=0]$$

$$\begin{bmatrix} -\sqrt{\dfrac{(a+2c+e+f)(a+c+e)}{a+2c+e}} & 0 \\[2ex] 0 & -\sqrt{\dfrac{(a+2c+e+f)c}{a+2c+e}} \\[2ex] 0 & \sqrt{\dfrac{f(a+c+e)}{a+2c+e}} \\[2ex] -\sqrt{\dfrac{cf}{a+2c+e}} & 0 \\[2ex] 0 & -\sqrt{d+e} \\[2ex] -\sqrt{d} & 0 \\[2ex] 0 & 0 \\[2ex] 0 & 0 \end{bmatrix}$$

$$[c=0,\, d=0]$$

$$\begin{bmatrix} -\sqrt{\dfrac{a(a+e+f)(a+e+b)}{(a+e)(a+b)}} & \sqrt{\dfrac{be(a+e+f)}{(a+e)(a+b)}} \\[2ex] 0 & 0 \\[2ex] \sqrt{\dfrac{bef}{(a+e)(a+b)}} & \sqrt{\dfrac{af(a+e+b)}{(a+e)(a+b)}} \\[2ex] 0 & 0 \\[2ex] -\sqrt{\dfrac{(b+e+g)(a+e+b)b}{(e+b)(a+b)}} & -\sqrt{\dfrac{(b+e+g)ae}{(e+b)(a+b)}} \\[2ex] 0 & 0 \\[2ex] -\sqrt{\dfrac{aeg}{(e+b)(a+b)}} & \sqrt{\dfrac{(a+e+b)bg}{(e+b)(a+b)}} \\[2ex] 0 & 0 \end{bmatrix}$$

$$[c=0,\, e=0]$$

$$\begin{bmatrix} -\sqrt{a+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ -\sqrt{\dfrac{(b+2d+g)(b+d)}{b+2d}} & 0 \\ 0 & \sqrt{\dfrac{(b+2d+g)d}{b+2d}} \\ 0 & \sqrt{\dfrac{(b+d)g}{b+2d}} \\ \sqrt{\dfrac{dg}{b+2d}} & 0 \end{bmatrix}$$

$$[c=0, f=0]$$

$$\left[\left[\left[-\sqrt{\frac{a(a+e+b)}{a+b}}, \sqrt{\frac{be}{a+b}}\right],\right.\right.$$

$$\left[0,0\right],$$

$$\left[0,0\right],$$

$$\left[0,0\right],$$

$$\left[-\sqrt{\frac{(b+2d+e+g)(a+e+b)(b+d+e)b}{(b+2d+e)(a+b)(e+b)}},\right.$$

$$\left.-\sqrt{\frac{(b+2d+e+g)(b+d+e)ae}{(b+2d+e)(a+b)(e+b)}}\right],$$

$$\left[-\sqrt{\frac{(b+2d+e+g)ade}{(b+2d+e)(a+b)(e+b)}}, \sqrt{\frac{(b+2d+e+g)(a+e+b)bd}{(b+2d+e)(a+b)(e+b)}}\right],$$

$$\left[-\sqrt{\frac{(b+d+e)aeg}{(b+2d+e)(a+b)(e+b)}}, \sqrt{\frac{(a+e+b)(b+d+e)bg}{(b+2d+e)(a+b)(e+b)}}\right],$$

$$\left.\left[\sqrt{\frac{(a+e+b)bdg}{(b+2d+e)(a+b)(e+b)}}, \sqrt{\frac{adeg}{(b+2d+e)(a+b)(e+b)}}\right]\right]$$

$$[c=0, g=0]$$

$$
\begin{bmatrix}
-\sqrt{\dfrac{a\,(a+e+f)\,(a+e+b)}{(a+e)\,(a+b)}} & \sqrt{\dfrac{b\,e\,(a+e+f)}{(a+e)\,(a+b)}} \\
0 & 0 \\
\sqrt{\dfrac{b\,e\,f}{(a+e)\,(a+b)}} & \sqrt{\dfrac{a\,f\,(a+e+b)}{(a+e)\,(a+b)}} \\
0 & 0 \\
-\sqrt{\dfrac{(a+e+b)\,(b+d+e)\,b}{(a+b)\,(e+b)}} & -\sqrt{\dfrac{(b+d+e)\,a\,e}{(a+b)\,(e+b)}} \\
-\sqrt{\dfrac{a\,d\,e}{(a+b)\,(e+b)}} & \sqrt{\dfrac{(a+e+b)\,b\,d}{(a+b)\,(e+b)}} \\
0 & 0 \\
0 & 0
\end{bmatrix}
$$

$$[d=0,\,e=0]$$

$$
\begin{bmatrix}
-\sqrt{\dfrac{(a+2\,c+f)\,(a+c)}{a+2\,c}} & 0 \\
0 & -\sqrt{\dfrac{(a+2\,c+f)\,c}{a+2\,c}} \\
0 & \sqrt{\dfrac{f\,(a+c)}{a+2\,c}} \\
-\sqrt{\dfrac{c\,f}{a+2\,c}} & 0 \\
-\sqrt{b+g} & 0 \\
0 & 0 \\
0 & \sqrt{g} \\
0 & 0
\end{bmatrix}
$$

$$[d=0,\,f=0]$$

$$\left[\begin{array}{cc} -\sqrt{\dfrac{a\,(a+c+e)\,(a+e+b)}{(a+b)\,(a+e)}} & \sqrt{\dfrac{b\,e\,(a+c+e)}{(a+b)\,(a+e)}} \\[2em] -\sqrt{\dfrac{b\,c\,e}{(a+b)\,(a+e)}} & -\sqrt{\dfrac{a\,c\,(a+e+b)}{(a+b)\,(a+e)}} \\[2em] 0 & 0 \\[1em] 0 & 0 \\[1em] -\sqrt{\dfrac{(b+e+g)\,(a+e+b)\,b}{(e+b)\,(a+b)}} & -\sqrt{\dfrac{(b+e+g)\,a\,e}{(e+b)\,(a+b)}} \\[2em] 0 & 0 \\[1em] -\sqrt{\dfrac{a\,e\,g}{(e+b)\,(a+b)}} & \sqrt{\dfrac{(a+e+b)\,b\,g}{(e+b)\,(a+b)}} \\[2em] 0 & 0 \end{array}\right]$$

$$[d=0,\,g=0]$$

$$\left[\left[-\sqrt{\dfrac{a\,(a+2\,c+e+f)\,(a+c+e)\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,,\right.\right.$$
$$\left.\sqrt{\dfrac{b\,e\,(a+2\,c+e+f)\,(a+c+e)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\right],$$
$$\left[-\sqrt{\dfrac{b\,c\,e\,(a+2\,c+e+f)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,,\ -\sqrt{\dfrac{a\,(a+2\,c+e+f)\,c\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\right],$$
$$\left[\sqrt{\dfrac{b\,e\,f\,(a+c+e)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,,\ \sqrt{\dfrac{a\,f\,(a+c+e)\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\right],$$
$$\left[-\sqrt{\dfrac{a\,c\,f\,(a+e+b)}{(a+b)\,(a+e)\,(a+2\,c+e)}}\,,\ \sqrt{\dfrac{b\,c\,e\,f}{(a+b)\,(a+e)\,(a+2\,c+e)}}\right],$$
$$\left[-\sqrt{\dfrac{(a+e+b)\,b}{a+b}}\,,\ -\sqrt{\dfrac{a\,e}{a+b}}\right],$$
$$\left[0,0\right],$$
$$\left[0,0\right],$$
$$\left.\left[0,0\right]\right]$$

$$[e=0,\,f=0]$$

$$\begin{bmatrix} -\sqrt{a+c} & 0 \\ 0 & -\sqrt{c} \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{\dfrac{(b+2d+g)(b+d)}{b+2d}} & 0 \\ 0 & \sqrt{\dfrac{(b+2d+g)d}{b+2d}} \\ 0 & \sqrt{\dfrac{(b+d)g}{b+2d}} \\ \sqrt{\dfrac{dg}{b+2d}} & 0 \end{bmatrix}$$

$$[\,e=0,\,g=0\,]$$

$$\begin{bmatrix} -\sqrt{\dfrac{(a+2c+f)(a+c)}{a+2c}} & 0 \\ 0 & -\sqrt{\dfrac{(a+2c+f)c}{a+2c}} \\ 0 & \sqrt{\dfrac{f(a+c)}{a+2c}} \\ -\sqrt{\dfrac{cf}{a+2c}} & 0 \\ -\sqrt{b+d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,f=0,\,g=0\,]$$

$$\begin{bmatrix} -\sqrt{\dfrac{a\,(a+c+e)\,(a+e+b)}{(a+b)\,(a+e)}} & \sqrt{\dfrac{b\,e\,(a+c+e)}{(a+b)\,(a+e)}} \\[4mm] -\sqrt{\dfrac{b\,c\,e}{(a+b)\,(a+e)}} & -\sqrt{\dfrac{a\,c\,(a+e+b)}{(a+b)\,(a+e)}} \\[4mm] 0 & 0 \\[2mm] 0 & 0 \\[2mm] -\sqrt{\dfrac{(a+e+b)\,(b+d+e)\,b}{(a+b)\,(e+b)}} & -\sqrt{\dfrac{(b+d+e)\,a\,e}{(a+b)\,(e+b)}} \\[4mm] -\sqrt{\dfrac{a\,d\,e}{(a+b)\,(e+b)}} & \sqrt{\dfrac{(a+e+b)\,b\,d}{(a+b)\,(e+b)}} \\[4mm] 0 & 0 \\[2mm] 0 & 0 \end{bmatrix}$$

$$[\,a=0,\,b=0,\,c=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{e+f} \\[2mm] 0 & 0 \\[2mm] \sqrt{f} & 0 \\[2mm] 0 & 0 \\[2mm] -\sqrt{\dfrac{(2\,d+e+g)\,(d+e)}{2\,d+e}} & 0 \\[4mm] 0 & \sqrt{\dfrac{(2\,d+e+g)\,d}{2\,d+e}} \\[4mm] 0 & \sqrt{\dfrac{(d+e)\,g}{2\,d+e}} \\[4mm] \sqrt{\dfrac{d\,g}{2\,d+e}} & 0 \end{bmatrix}$$

$$[\,a=0,\,b=0,\,d=0\,]$$

$$\begin{bmatrix}
0 & \sqrt{\dfrac{(2c+e+f)(c+e)}{2c+e}} \\[2ex]
-\sqrt{\dfrac{c(2c+e+f)}{2c+e}} & 0 \\[2ex]
\sqrt{\dfrac{f(c+e)}{2c+e}} & 0 \\[2ex]
0 & \sqrt{\dfrac{cf}{2c+e}} \\[2ex]
-\sqrt{e+g} & 0 \\[1ex]
0 & 0 \\[1ex]
0 & \sqrt{g} \\[1ex]
0 & 0
\end{bmatrix}$$

$$[\,a=0,\ b=0,\ e=0\,]$$

$$\begin{bmatrix}
0 & \sqrt{c+\dfrac{1}{2}f} \\[2ex]
-\sqrt{c+\dfrac{1}{2}f} & 0 \\[2ex]
\dfrac{1}{2}\sqrt{2}\,\sqrt{f} & 0 \\[2ex]
0 & \dfrac{1}{2}\sqrt{2}\,\sqrt{f} \\[2ex]
-\sqrt{d+\dfrac{1}{2}g} & 0 \\[2ex]
0 & \sqrt{d+\dfrac{1}{2}g} \\[2ex]
0 & \dfrac{1}{2}\sqrt{2}\,\sqrt{g} \\[2ex]
\dfrac{1}{2}\sqrt{2}\,\sqrt{g} & 0
\end{bmatrix}$$

$$[\,a=0,\ b=0,\ f=0\,]$$

$$
\begin{bmatrix}
0 & \sqrt{c+e} \\
-\sqrt{c} & 0 \\
0 & 0 \\
0 & 0 \\
-\sqrt{\dfrac{(2\,d+e+g)\,(d+e)}{2\,d+e}} & 0 \\
0 & \sqrt{\dfrac{(2\,d+e+g)\,d}{2\,d+e}} \\
0 & \sqrt{\dfrac{(d+e)\,g}{2\,d+e}} \\
\sqrt{\dfrac{d\,g}{2\,d+e}} & 0
\end{bmatrix}
$$

$$[\,a=0,\,b=0,\,g=0\,]$$

$$
\begin{bmatrix}
0 & \sqrt{\dfrac{(2\,c+e+f)\,(c+e)}{2\,c+e}} \\
-\sqrt{\dfrac{c\,(2\,c+e+f)}{2\,c+e}} & 0 \\
\sqrt{\dfrac{f\,(c+e)}{2\,c+e}} & 0 \\
0 & \sqrt{\dfrac{c\,f}{2\,c+e}} \\
-\sqrt{d+e} & 0 \\
0 & \sqrt{d} \\
0 & 0 \\
0 & 0
\end{bmatrix}
$$

$$[\,a=0,\,c=0,\,d=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{e+f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{b+e+g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$$[a=0,\ c=0,\ e=0]$$

$$\begin{bmatrix} 0 & \sqrt{f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{\dfrac{(b+2d+g)(b+d)}{b+2d}} & 0 \\ 0 & \sqrt{\dfrac{(b+2d+g)d}{b+2d}} \\ 0 & \sqrt{\dfrac{(b+d)g}{b+2d}} \\ \sqrt{\dfrac{dg}{b+2d}} & 0 \end{bmatrix}$$

$$[a=0,\ c=0,\ f=0]$$

$$\begin{bmatrix} 0 & \sqrt{e} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{\dfrac{(b+2d+e+g)(b+d+e)}{b+2d+e}} & 0 \\ 0 & \sqrt{\dfrac{(b+2d+e+g)\,d}{b+2d+e}} \\ 0 & \sqrt{\dfrac{(b+d+e)\,g}{b+2d+e}} \\ \sqrt{\dfrac{d\,g}{b+2d+e}} & 0 \end{bmatrix}$$

$$[\,a=0,\ c=0,\ g=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{e+f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{b+d+e} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,a=0,\ d=0,\ e=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{c + \frac{1}{2}f} \\ -\sqrt{c + \frac{1}{2}f} & 0 \\ \frac{1}{2}\sqrt{2}\,\sqrt{f} & 0 \\ 0 & \frac{1}{2}\sqrt{2}\,\sqrt{f} \\ -\sqrt{b+g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$$[a = 0, d = 0, f = 0]$$

$$\begin{bmatrix} 0 & \sqrt{c + e} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b + e + g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$$[a = 0, d = 0, g = 0]$$

$$
\begin{bmatrix}
0 & \sqrt{\dfrac{(2c+e+f)(c+e)}{2c+e}} \\[4ex]
-\sqrt{\dfrac{c(2c+e+f)}{2c+e}} & 0 \\[4ex]
\sqrt{\dfrac{f(c+e)}{2c+e}} & 0 \\[4ex]
0 & \sqrt{\dfrac{cf}{2c+e}} \\[4ex]
-\sqrt{e+b} & 0 \\[2ex]
0 & 0 \\[1ex]
0 & 0 \\[1ex]
0 & 0
\end{bmatrix}
$$

$$[\,a=0,\ e=0,\ f=0\,]$$

$$
\begin{bmatrix}
0 & \sqrt{c} \\[2ex]
-\sqrt{c} & 0 \\[1ex]
0 & 0 \\[1ex]
0 & 0 \\[2ex]
-\sqrt{\dfrac{(b+2d+g)(b+d)}{b+2d}} & 0 \\[4ex]
0 & \sqrt{\dfrac{(b+2d+g)d}{b+2d}} \\[4ex]
0 & \sqrt{\dfrac{(b+d)g}{b+2d}} \\[4ex]
\sqrt{\dfrac{dg}{b+2d}} & 0
\end{bmatrix}
$$

$$[\,a=0,\ e=0,\ g=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{c + \frac{1}{2}f} \\ -\sqrt{c + \frac{1}{2}f} & 0 \\ \frac{1}{2}\sqrt{2}\sqrt{f} & 0 \\ 0 & \frac{1}{2}\sqrt{2}\sqrt{f} \\ -\sqrt{b+d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, f = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{c+e} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b+d+e} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[b = 0, c = 0, d = 0]$

$$\begin{bmatrix} -\sqrt{a+e+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ 0 & -\sqrt{e+g} \\ 0 & 0 \\ -\sqrt{g} & 0 \\ 0 & 0 \end{bmatrix}$$

$[b = 0, c = 0, e = 0]$

$$\begin{bmatrix} -\sqrt{a+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ 0 & -\sqrt{d+\frac{1}{2}g} \\ -\sqrt{d+\frac{1}{2}g} & 0 \\ -\frac{1}{2}\sqrt{2}\sqrt{g} & 0 \\ 0 & \frac{1}{2}\sqrt{2}\sqrt{g} \end{bmatrix}$$

$$[b=0,\, c=0,\, f=0]$$

$$\begin{bmatrix} -\sqrt{a+e} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{\dfrac{(2d+e+g)(d+e)}{2d+e}} \\ -\sqrt{\dfrac{(2d+e+g)d}{2d+e}} & 0 \\ -\sqrt{\dfrac{(d+e)g}{2d+e}} & 0 \\ 0 & \sqrt{\dfrac{dg}{2d+e}} \end{bmatrix}$$

$$[b=0,\, c=0,\, g=0]$$

$$\begin{bmatrix} -\sqrt{a+e+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ 0 & -\sqrt{d+e} \\ -\sqrt{d} & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,b=0,\, d=0,\, e=0\,]$$

$$\begin{bmatrix} -\sqrt{\dfrac{(a+2c+f)(a+c)}{a+2c}} & 0 \\[2ex] 0 & -\sqrt{\dfrac{(a+2c+f)c}{a+2c}} \\[2ex] 0 & \sqrt{\dfrac{f(a+c)}{a+2c}} \\[2ex] -\sqrt{\dfrac{cf}{a+2c}} & 0 \\[2ex] 0 & -\sqrt{g} \\ 0 & 0 \\ -\sqrt{g} & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,b=0,\, d=0,\, f=0\,]$$

$$\begin{bmatrix} -\sqrt{a+c+e} & 0 \\ 0 & -\sqrt{c} \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{e+g} \\ 0 & 0 \\ -\sqrt{g} & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,b=0,\, d=0,\, g=0\,]$$

$$\begin{bmatrix} -\sqrt{\dfrac{(a+2c+e+f)(a+c+e)}{a+2c+e}} & 0 \\[2em] 0 & -\sqrt{\dfrac{(a+2c+e+f)c}{a+2c+e}} \\[2em] 0 & \sqrt{\dfrac{f(a+c+e)}{a+2c+e}} \\[2em] -\sqrt{\dfrac{cf}{a+2c+e}} & 0 \\[2em] 0 & -\sqrt{e} \\[1em] 0 & 0 \\[1em] 0 & 0 \\[1em] 0 & 0 \end{bmatrix}$$

$$[\,b=0,\ e=0,\ f=0\,]$$

$$\begin{bmatrix} -\sqrt{a+c} & 0 \\[1em] 0 & -\sqrt{c} \\[1em] 0 & 0 \\[1em] 0 & 0 \\[1em] 0 & -\sqrt{d+\dfrac{1}{2}\,g} \\[1.5em] -\sqrt{d+\dfrac{1}{2}\,g} & 0 \\[1.5em] -\dfrac{1}{2}\,\sqrt{2}\,\sqrt{g} & 0 \\[1.5em] 0 & \dfrac{1}{2}\,\sqrt{2}\,\sqrt{g} \end{bmatrix}$$

$$[\,b=0,\ e=0,\ g=0\,]$$

$$\begin{bmatrix} -\sqrt{\dfrac{(a+2c+f)(a+c)}{a+2c}} & 0 \\ 0 & -\sqrt{\dfrac{(a+2c+f)c}{a+2c}} \\ 0 & \sqrt{\dfrac{f(a+c)}{a+2c}} \\ -\sqrt{\dfrac{cf}{a+2c}} & 0 \\ 0 & -\sqrt{d} \\ -\sqrt{d} & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[b=0, f=0, g=0]$$

$$\begin{bmatrix} -\sqrt{a+c+e} & 0 \\ 0 & -\sqrt{c} \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{d+e} \\ -\sqrt{d} & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[c=0, d=0, e=0]$$

$$\begin{bmatrix} -\sqrt{a+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ -\sqrt{b+g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$$[c=0, d=0, f=0]$$

$$
\begin{bmatrix}
-\sqrt{\dfrac{a\,(a+e+b)}{a+b}} & \sqrt{\dfrac{b\,e}{a+b}} \\[4mm]
0 & 0 \\[2mm]
0 & 0 \\[2mm]
0 & 0 \\[2mm]
-\sqrt{\dfrac{(b+e+g)\,(a+e+b)\,b}{(e+b)\,(a+b)}} & -\sqrt{\dfrac{(b+e+g)\,a\,e}{(e+b)\,(a+b)}} \\[4mm]
0 & 0 \\[2mm]
-\sqrt{\dfrac{a\,e\,g}{(e+b)\,(a+b)}} & \sqrt{\dfrac{(a+e+b)\,b\,g}{(e+b)\,(a+b)}} \\[4mm]
0 & 0
\end{bmatrix}
$$

$$[\,c=0,\ d=0,\ g=0\,]$$

$$
\begin{bmatrix}
-\sqrt{\dfrac{a\,(a+e+f)\,(a+e+b)}{(a+e)\,(a+b)}} & \sqrt{\dfrac{b\,e\,(a+e+f)}{(a+e)\,(a+b)}} \\[4mm]
0 & 0 \\[2mm]
\sqrt{\dfrac{b\,e\,f}{(a+e)\,(a+b)}} & \sqrt{\dfrac{a\,f\,(a+e+b)}{(a+e)\,(a+b)}} \\[4mm]
0 & 0 \\[2mm]
-\sqrt{\dfrac{(a+e+b)\,b}{a+b}} & -\sqrt{\dfrac{a\,e}{a+b}} \\[4mm]
0 & 0 \\[2mm]
0 & 0 \\[2mm]
0 & 0
\end{bmatrix}
$$

$$[\,c=0,\ e=0,\ f=0\,]$$

$$\begin{bmatrix} -\sqrt{a} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{\dfrac{(b+2d+g)(b+d)}{b+2d}} & 0 \\ 0 & \sqrt{\dfrac{(b+2d+g)d}{b+2d}} \\ 0 & \sqrt{\dfrac{(b+d)g}{b+2d}} \\ \sqrt{\dfrac{dg}{b+2d}} & 0 \end{bmatrix}$$

$$[\,c=0,\,e=0,\,g=0\,]$$

$$\begin{bmatrix} -\sqrt{a+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ -\sqrt{b+d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,c=0,\,f=0,\,g=0\,]$$

$$\begin{bmatrix} -\sqrt{\dfrac{a(a+e+b)}{a+b}} & \sqrt{\dfrac{be}{a+b}} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{\dfrac{(a+e+b)(b+d+e)b}{(a+b)(e+b)}} & -\sqrt{\dfrac{(b+d+e)ae}{(a+b)(e+b)}} \\ -\sqrt{\dfrac{ade}{(a+b)(e+b)}} & \sqrt{\dfrac{(a+e+b)bd}{(a+b)(e+b)}} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,d=0,\,e=0,\,f=0\,]$$

$$\begin{bmatrix} -\sqrt{a+c} & 0 \\ 0 & -\sqrt{c} \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b+g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$$[\,d=0,\,e=0,\,g=0\,]$$

$$\begin{bmatrix} -\sqrt{\dfrac{(a+2c+f)(a+c)}{a+2c}} & 0 \\[3ex] 0 & -\sqrt{\dfrac{(a+2c+f)c}{a+2c}} \\[3ex] 0 & \sqrt{\dfrac{f(a+c)}{a+2c}} \\[3ex] -\sqrt{\dfrac{cf}{a+2c}} & 0 \\[3ex] -\sqrt{b} & 0 \\[2ex] 0 & 0 \\[1ex] 0 & 0 \\[1ex] 0 & 0 \end{bmatrix}$$

$$[\,d=0,\,f=0,\,g=0\,]$$

$$\begin{bmatrix} -\sqrt{\dfrac{a(a+c+e)(a+e+b)}{(a+b)(a+e)}} & \sqrt{\dfrac{be(a+c+e)}{(a+b)(a+e)}} \\[3ex] -\sqrt{\dfrac{bce}{(a+b)(a+e)}} & -\sqrt{\dfrac{ac(a+e+b)}{(a+b)(a+e)}} \\[3ex] 0 & 0 \\[1ex] 0 & 0 \\[1ex] -\sqrt{\dfrac{(a+e+b)b}{a+b}} & -\sqrt{\dfrac{ae}{a+b}} \\[3ex] 0 & 0 \\[1ex] 0 & 0 \\[1ex] 0 & 0 \end{bmatrix}$$

$$[\,e=0,\,f=0,\,g=0\,]$$

$$\begin{bmatrix} -\sqrt{a+c} & 0 \\ 0 & -\sqrt{c} \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b+d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a=0, b=0, c=0, d=0]$

$$\begin{bmatrix} 0 & \sqrt{e+f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{e+g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$[a=0, b=0, c=0, e=0]$

$$\begin{bmatrix} 0 & \sqrt{f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{d+\dfrac{1}{2}g} & 0 \\ 0 & \sqrt{d+\dfrac{1}{2}g} \\ 0 & \dfrac{1}{2}\sqrt{2}\sqrt{g} \\ \dfrac{1}{2}\sqrt{2}\sqrt{g} & 0 \end{bmatrix}$$

$[a=0, b=0, c=0, f=0]$

$$\begin{bmatrix} 0 & \sqrt{e} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{\dfrac{(2d+e+g)(d+e)}{2d+e}} & 0 \\ 0 & \sqrt{\dfrac{(2d+e+g)d}{2d+e}} \\ 0 & \sqrt{\dfrac{(d+e)g}{2d+e}} \\ \sqrt{\dfrac{dg}{2d+e}} & 0 \end{bmatrix}$$

$$[\,a=0,\,b=0,\,c=0,\,g=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{e+f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{d+e} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,a=0,\,b=0,\,d=0,\,e=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{c + \frac{1}{2}f} \\ -\sqrt{c + \frac{1}{2}f} & 0 \\ \frac{1}{2}\sqrt{2}\sqrt{f} & 0 \\ 0 & \frac{1}{2}\sqrt{2}\sqrt{f} \\ -\sqrt{g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$[a = 0, b = 0, d = 0, f = 0]$

$$\begin{bmatrix} 0 & \sqrt{c + e} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{e + g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$[a = 0, b = 0, d = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{\dfrac{(2c+e+f)(c+e)}{2c+e}} \\[2em] -\sqrt{\dfrac{c(2c+e+f)}{2c+e}} & 0 \\[2em] \sqrt{\dfrac{f(c+e)}{2c+e}} & 0 \\[2em] 0 & \sqrt{\dfrac{cf}{2c+e}} \\[2em] -\sqrt{e} & 0 \\[1em] 0 & 0 \\[1em] 0 & 0 \\[1em] 0 & 0 \end{bmatrix}$$

$$[a = 0,\, b = 0,\, e = 0,\, f = 0]$$

$$\begin{bmatrix} 0 & \sqrt{c} \\[1em] -\sqrt{c} & 0 \\[1em] 0 & 0 \\[1em] 0 & 0 \\[1em] -\sqrt{d + \dfrac{1}{2}g} & 0 \\[2em] 0 & \sqrt{d + \dfrac{1}{2}g} \\[2em] 0 & \dfrac{1}{2}\sqrt{2}\sqrt{g} \\[2em] \dfrac{1}{2}\sqrt{2}\sqrt{g} & 0 \end{bmatrix}$$

$$[a = 0,\, b = 0,\, e = 0,\, g = 0]$$

$$\begin{bmatrix} 0 & \sqrt{c + \frac{1}{2} f} \\ -\sqrt{c + \frac{1}{2} f} & 0 \\ \frac{1}{2} \sqrt{2} \sqrt{f} & 0 \\ 0 & \frac{1}{2} \sqrt{2} \sqrt{f} \\ -\sqrt{d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, b = 0, f = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{c + e} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{d + e} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, c = 0, d = 0, e = 0]$

$$\begin{bmatrix} 0 & \sqrt{f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{b + g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$[a = 0, c = 0, d = 0, f = 0]$

$$\begin{bmatrix} 0 & \sqrt{e} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b+e+g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$[a = 0, c = 0, d = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{e+f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{e+b} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, c = 0, e = 0, f = 0]$

$$\begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{\dfrac{(b+2d+g)(b+d)}{b+2d}} & 0 \\ 0 & \sqrt{\dfrac{(b+2d+g)d}{b+2d}} \\ 0 & \sqrt{\dfrac{(b+d)g}{b+2d}} \\ \sqrt{\dfrac{dg}{b+2d}} & 0 \end{bmatrix}$$

$[a = 0, c = 0, e = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{b+d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, c = 0, f = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{e} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b+d+e} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, d = 0, e = 0, f = 0]$

$$\begin{bmatrix} 0 & \sqrt{c} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b+g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$[a = 0, d = 0, e = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{c+\frac{1}{2}f} \\ -\sqrt{c+\frac{1}{2}f} & 0 \\ \frac{1}{2}\sqrt{2}\sqrt{f} & 0 \\ 0 & \frac{1}{2}\sqrt{2}\sqrt{f} \\ -\sqrt{b} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a=0, d=0, f=0, g=0]$

$$\begin{bmatrix} 0 & \sqrt{c+e} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{e+b} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a=0, e=0, f=0, g=0]$

$$\begin{bmatrix} 0 & \sqrt{c} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b+d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[b=0, c=0, d=0, e=0]$

$$\begin{bmatrix} -\sqrt{a+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ 0 & -\sqrt{g} \\ 0 & 0 \\ -\sqrt{g} & 0 \\ 0 & 0 \end{bmatrix}$$

$[b=0, c=0, d=0, f=0]$

$$\begin{bmatrix} -\sqrt{a+e} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{e+g} \\ 0 & 0 \\ -\sqrt{g} & 0 \\ 0 & 0 \end{bmatrix}$$

$[b=0, c=0, d=0, g=0]$

$$\begin{bmatrix} -\sqrt{a+e+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ 0 & -\sqrt{e} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[b=0, c=0, e=0, f=0]$

$$\begin{bmatrix} -\sqrt{a} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{d+\dfrac{1}{2}g} \\ -\sqrt{d+\dfrac{1}{2}g} & 0 \\ -\dfrac{1}{2}\sqrt{2}\sqrt{g} & 0 \\ 0 & \dfrac{1}{2}\sqrt{2}\sqrt{g} \end{bmatrix}$$

$$[b=0,\, c=0,\, e=0,\, g=0]$$

$$\begin{bmatrix} -\sqrt{a+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ 0 & -\sqrt{d} \\ -\sqrt{d} & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[b=0,\, c=0,\, f=0,\, g=0]$$

$$\begin{bmatrix} -\sqrt{a+e} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{d+e} \\ -\sqrt{d} & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[b=0,\, d=0,\, e=0,\, f=0]$$

$$\begin{bmatrix} -\sqrt{a+c} & 0 \\ 0 & -\sqrt{c} \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{g} \\ 0 & 0 \\ -\sqrt{g} & 0 \\ 0 & 0 \end{bmatrix}$$

$$[b=0, d=0, e=0, g=0]$$

$$\begin{bmatrix} -\sqrt{\dfrac{(a+2c+f)(a+c)}{a+2c}} & 0 \\[2ex] 0 & -\sqrt{\dfrac{(a+2c+f)c}{a+2c}} \\[2ex] 0 & \sqrt{\dfrac{f(a+c)}{a+2c}} \\[2ex] -\sqrt{\dfrac{cf}{a+2c}} & 0 \\[2ex] 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[b=0, d=0, f=0, g=0]$$

$$\begin{bmatrix} -\sqrt{a+c+e} & 0 \\ 0 & -\sqrt{c} \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{e} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[b=0, e=0, f=0, g=0]$$

$$\begin{bmatrix} -\sqrt{a+c} & 0 \\ 0 & -\sqrt{c} \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{d} \\ -\sqrt{d} & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[c = 0, d = 0, e = 0, f = 0]$

$$\begin{bmatrix} -\sqrt{a} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b+g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$[c = 0, d = 0, e = 0, g = 0]$

$$\begin{bmatrix} -\sqrt{a+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ -\sqrt{b} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[c = 0, d = 0, f = 0, g = 0]$

$$\begin{bmatrix} -\sqrt{\dfrac{a\,(a+e+b)}{a+b}} & \sqrt{\dfrac{b\,e}{a+b}} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{\dfrac{(a+e+b)\,b}{a+b}} & -\sqrt{\dfrac{a\,e}{a+b}} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,c=0,\,e=0,\,f=0,\,g=0\,]$$

$$\begin{bmatrix} -\sqrt{a} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b+d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,d=0,\,e=0,\,f=0,\,g=0\,]$$

$$\begin{bmatrix} -\sqrt{a+c} & 0 \\ 0 & -\sqrt{c} \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[\,a=0,\,b=0,\,c=0,\,d=0,\,e=0\,]$$

$$\begin{bmatrix} 0 & \sqrt{f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$[a = 0, b = 0, c = 0, d = 0, f = 0]$

$$\begin{bmatrix} 0 & \sqrt{e} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{e+g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$[a = 0, b = 0, c = 0, d = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{e+f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{e} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, b = 0, c = 0, e = 0, f = 0]$

$$\begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{d + \frac{1}{2}\,g} & 0 \\ 0 & \sqrt{d + \frac{1}{2}\,g} \\ 0 & \frac{1}{2}\,\sqrt{2}\,\sqrt{g} \\ \frac{1}{2}\,\sqrt{2}\,\sqrt{g} & 0 \end{bmatrix}$$

$[a = 0,\, b = 0,\, c = 0,\, e = 0,\, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0,\, b = 0,\, c = 0,\, f = 0,\, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{e} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{d + e} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0,\, b = 0,\, d = 0,\, e = 0,\, f = 0]$

$$\begin{bmatrix} 0 & \sqrt{c} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$$[a = 0, b = 0, d = 0, e = 0, g = 0]$$

$$\begin{bmatrix} 0 & \sqrt{c + \tfrac{1}{2}f} \\ -\sqrt{c + \tfrac{1}{2}f} & 0 \\ \tfrac{1}{2}\sqrt{2}\sqrt{f} & 0 \\ 0 & \tfrac{1}{2}\sqrt{2}\sqrt{f} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[a = 0, b = 0, d = 0, f = 0, g = 0]$$

$$\begin{bmatrix} 0 & \sqrt{c + e} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{e} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$[a = 0, b = 0, e = 0, f = 0, g = 0]$$

$$\begin{bmatrix} 0 & \sqrt{c} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, c = 0, d = 0, e = 0, f = 0]$

$$\begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b+g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$[a = 0, c = 0, d = 0, e = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ -\sqrt{b} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, c = 0, d = 0, f = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{e} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{e+b} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, c = 0, e = 0, f = 0, g = 0]$

$$\begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b+d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, d = 0, e = 0, f = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{c} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[b = 0, c = 0, d = 0, e = 0, f = 0]$

$$\begin{bmatrix} -\sqrt{a} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{g} \\ 0 & 0 \\ -\sqrt{g} & 0 \\ 0 & 0 \end{bmatrix}$$

$[b = 0, c = 0, d = 0, e = 0, g = 0]$

$$\begin{bmatrix} -\sqrt{a+f} & 0 \\ 0 & 0 \\ 0 & \sqrt{f} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[b = 0, c = 0, d = 0, f = 0, g = 0]$

$$\begin{bmatrix} -\sqrt{a+e} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{e} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[b = 0, c = 0, e = 0, f = 0, g = 0]$

$$\begin{bmatrix} -\sqrt{a} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & -\sqrt{d} \\ -\sqrt{d} & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[b = 0, d = 0, e = 0, f = 0, g = 0]$

$$\begin{bmatrix} -\sqrt{a+c} & 0 \\ 0 & -\sqrt{c} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[c = 0, d = 0, e = 0, f = 0, g = 0]$

$$\begin{bmatrix} -\sqrt{a} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, b = 0, c = 0, d = 0, e = 0, f = 0]$

$$\begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{g} & 0 \\ 0 & 0 \\ 0 & \sqrt{g} \\ 0 & 0 \end{bmatrix}$$

$[a = 0, b = 0, c = 0, d = 0, e = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{f} \\ 0 & 0 \\ \sqrt{f} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, b = 0, c = 0, d = 0, f = 0, g = 0]$

$$\begin{bmatrix} 0 & \sqrt{e} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{e} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[a = 0, b = 0, c = 0, e = 0, f = 0, g = 0]$

$$\begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{d} & 0 \\ 0 & \sqrt{d} \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[\,a = 0,\, b = 0,\, d = 0,\, e = 0,\, f = 0,\, g = 0\,]$

$$\begin{bmatrix} 0 & \sqrt{c} \\ -\sqrt{c} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[\,a = 0,\, c = 0,\, d = 0,\, e = 0,\, f = 0,\, g = 0\,]$

$$\begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -\sqrt{b} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$[\,b = 0,\, c = 0,\, d = 0,\, e = 0,\, f = 0,\, g = 0\,]$

(30)

$$\begin{bmatrix} -\sqrt{a} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix} \qquad (30)$$

%%

Finally we complete the verification that our action is well-behaved by showing that condition (4) in Lemma 3.5 applies. For each subset of the parameters (a,...,g) we obtained above a spherical point for the weight with those parameters set equal to zero. We must also check that the fundamental highest weight vectors associated with the complementary parameters are non-zero at this spherical point. For example at the spherical point Z for a weight of the sort aA1+0A2+cA3+0A4+0A5+fA6+gA7 (i.e. with b=d=e=0) we require that each of h1(Z), h3(Z), h6(Z) and h7(Z) be non-zero.

The code below generates the following output for each of the 126 proper non-empty subsets of {a=0, b= 0, c=0, d=0, e=0, f=0, g=0}:

   - A listing of the subset. These parameters are set to zero in succession to obtain a non-generic (generalized) spherical point as in the previous output.

   - A list of the fundamental highest weight vectors (h1...h7) associated with the complementary parameters.

   - A list of values for these hj's at the spherical point.

The output shows that in all cases each fundamental highest weight vector for a complementary parameter takes a non-zero value at the limiting spherical point in question. Thus condition (4) from Lemma 3.5 does hold here, completing our analysis for this example.

```
> [1,2,3,4,5,6,7]: ch:=[seq(choose(%)[i],i=2..127)]:
  h:=[h1,h2,h3,h4,h5,h6,h7]: hn:=[h1n,h2n,h3n,h4n,h5n,h6n,h7n]:
  zs:=[a=0,b=0,c=0,d=0,e=0,f=0,g=0]:
> for i from 1 to nops(ch) do:
      s:=map(x->zs[x],ch[i]):
      print(s);
      zc:=[op({1,2,3,4,5,6,7}minus{op(ch[i])})]:
      hs:=map(x->hn[x],zc):
      for j from 1 to nops(s) do:
          hs:=subs(s[j],hs):
      end do:
      print(map(x->h[x],zc));
      print(hs);
  end do:
```

$$[a = 0]$$
$$[h2, h3, h4, h5, h6, h7]$$
$$\left[-\frac{\sqrt{b+d+e}\,\sqrt{b+2d+e+g}}{\sqrt{b+2d+e}},\ \frac{\sqrt{c+e}\,(2c+e+f)\,\sqrt{c}}{2c+e}, \right.$$

$$-\frac{\sqrt{b+d+e}\,(b+2\,d+e+g)\,\sqrt{d}}{b+2\,d+e},$$

$$\frac{\sqrt{c+e}\,\sqrt{2\,c+e+f}\,\sqrt{b+d+e}\,\sqrt{b+2\,d+e+g}}{\sqrt{b+2\,d+e}\,\sqrt{2\,c+e}},\ -\sqrt{2\,c+e+f}\,\sqrt{f},$$

$$-\sqrt{b+2\,d+e+g}\,\sqrt{g}\,\Big]$$

$$[b=0]$$
$$[h1,h3,h4,h5,h6,h7]$$

$$\Big[-\frac{\sqrt{a+c+e}\,\sqrt{a+2\,c+e+f}}{\sqrt{a+2\,c+e}},\ \frac{\sqrt{a+c+e}\,(a+2\,c+e+f)\,\sqrt{c}}{a+2\,c+e},$$

$$-\frac{\sqrt{d+e}\,(2\,d+e+g)\,\sqrt{d}}{2\,d+e},\ \frac{\sqrt{a+c+e}\,\sqrt{a+2\,c+e+f}\,\sqrt{d+e}\,\sqrt{2\,d+e+g}}{\sqrt{2\,d+e}\,\sqrt{a+2\,c+e}},$$

$$-\sqrt{a+2\,c+e+f}\,\sqrt{f},\ -\sqrt{2\,d+e+g}\,\sqrt{g}\,\Big]$$

$$[a=0,b=0]$$
$$[h3,h4,h5,h6,h7]$$

$$\Big[\frac{\sqrt{c+e}\,(2\,c+e+f)\,\sqrt{c}}{2\,c+e},\ -\frac{\sqrt{d+e}\,(2\,d+e+g)\,\sqrt{d}}{2\,d+e},$$

$$\frac{\sqrt{c+e}\,\sqrt{2\,c+e+f}\,\sqrt{d+e}\,\sqrt{2\,d+e+g}}{\sqrt{2\,d+e}\,\sqrt{2\,c+e}},\ -\sqrt{2\,c+e+f}\,\sqrt{f},$$

$$-\sqrt{2\,d+e+g}\,\sqrt{g}\,\Big]$$

$$[c=0]$$
$$[h1,h2,h4,h5,h6,h7]$$

$$\Big[-\frac{\sqrt{a}\,\sqrt{a+e+b}\,\sqrt{a+e+f}}{\sqrt{a+e}\,\sqrt{a+b}},\ -\frac{\sqrt{b}\,\sqrt{a+e+b}\,\sqrt{b+d+e}\,\sqrt{b+2\,d+e+g}}{\sqrt{a+b}\,\sqrt{e+b}\,\sqrt{b+2\,d+e}},$$

$$-\frac{\sqrt{b+d+e}\,(b+2\,d+e+g)\,\sqrt{d}}{b+2\,d+e},$$

$$\frac{\sqrt{a+e+b}\,\sqrt{a+e+f}\,\sqrt{e}\,\sqrt{b+d+e}\,\sqrt{b+2\,d+e+g}}{\sqrt{a+e}\,\sqrt{b+2\,d+e}\,\sqrt{e+b}},\ -\sqrt{a+e+f}\,\sqrt{f},$$

$$-\sqrt{b+2\,d+e+g}\,\sqrt{g}\,\Big]$$

$$[a=0,c=0]$$
$$[h2,h4,h5,h6,h7]$$

$$\Big[-\frac{\sqrt{b+d+e}\,\sqrt{b+2\,d+e+g}}{\sqrt{b+2\,d+e}},\ -\frac{\sqrt{b+d+e}\,(b+2\,d+e+g)\,\sqrt{d}}{b+2\,d+e},$$

$$\frac{\sqrt{e+f}\,\sqrt{b+d+e}\,\sqrt{b+2\,d+e+g}}{\sqrt{b+2\,d+e}},\ -\sqrt{e+f}\,\sqrt{f},\ -\sqrt{b+2\,d+e+g}\,\sqrt{g}\,\Big]$$

$$[b = 0, c = 0]$$
$$[h1, h4, h5, h6, h7]$$

$$\left[-\sqrt{a+e+f}, \ -\frac{\sqrt{d+e}\ (2d+e+g)\ \sqrt{d}}{2d+e}, \ \frac{\sqrt{a+e+f}\ \sqrt{d+e}\ \sqrt{2d+e+g}}{\sqrt{2d+e}}, \right.$$
$$\left. -\sqrt{a+e+f}\ \sqrt{f}, \ -\sqrt{2d+e+g}\ \sqrt{g} \right]$$

$$[a = 0, b = 0, c = 0]$$
$$[h4, h5, h6, h7]$$

$$\left[-\frac{\sqrt{d+e}\ (2d+e+g)\ \sqrt{d}}{2d+e}, \ \frac{\sqrt{e+f}\ \sqrt{d+e}\ \sqrt{2d+e+g}}{\sqrt{2d+e}}, \ -\sqrt{e+f}\ \sqrt{f}, \right.$$
$$\left. -\sqrt{2d+e+g}\ \sqrt{g} \right]$$

$$[d = 0]$$
$$[h1, h2, h3, h5, h6, h7]$$

$$\left[-\frac{\sqrt{a}\ \sqrt{a+c+e}\ \sqrt{a+e+b}\ \sqrt{a+2c+e+f}}{\sqrt{a+b}\ \sqrt{a+e}\ \sqrt{a+2c+e}}, \ -\frac{\sqrt{b}\ \sqrt{a+e+b}\ \sqrt{b+e+g}}{\sqrt{e+b}\ \sqrt{a+b}}, \right.$$
$$\frac{\sqrt{a+c+e}\ (a+2c+e+f)\ \sqrt{c}}{a+2c+e},$$
$$\left. \frac{\sqrt{a+c+e}\ \sqrt{a+e+b}\ \sqrt{a+2c+e+f}\ \sqrt{e}\ \sqrt{b+e+g}}{\sqrt{e+b}\ \sqrt{a+2c+e}\ \sqrt{a+e}}, \ -\sqrt{a+2c+e+f}\ \sqrt{f}, \right.$$
$$\left. -\sqrt{b+e+g}\ \sqrt{g} \right]$$

$$[a = 0, d = 0]$$
$$[h2, h3, h5, h6, h7]$$

$$\left[-\sqrt{b+e+g}, \ \frac{\sqrt{c+e}\ (2c+e+f)\ \sqrt{c}}{2c+e}, \ \frac{\sqrt{c+e}\ \sqrt{2c+e+f}\ \sqrt{b+e+g}}{\sqrt{2c+e}}, \right.$$
$$\left. -\sqrt{2c+e+f}\ \sqrt{f}, \ -\sqrt{b+e+g}\ \sqrt{g} \right]$$

$$[b = 0, d = 0]$$
$$[h1, h3, h5, h6, h7]$$

$$\left[-\frac{\sqrt{a+c+e}\ \sqrt{a+2c+e+f}}{\sqrt{a+2c+e}}, \ \frac{\sqrt{a+c+e}\ (a+2c+e+f)\ \sqrt{c}}{a+2c+e}, \right.$$
$$\left. \frac{\sqrt{a+c+e}\ \sqrt{a+2c+e+f}\ \sqrt{e+g}}{\sqrt{a+2c+e}}, \ -\sqrt{a+2c+e+f}\ \sqrt{f}, \ -\sqrt{e+g}\ \sqrt{g} \right]$$

$$[a = 0, b = 0, d = 0]$$
$$[h3, h5, h6, h7]$$

$$\left[\frac{\sqrt{c+e}\ (2c+e+f)\ \sqrt{c}}{2c+e}, \ \frac{\sqrt{c+e}\ \sqrt{2c+e+f}\ \sqrt{e+g}}{\sqrt{2c+e}}, \ -\sqrt{2c+e+f}\ \sqrt{f}, \right.$$

$$-\sqrt{e+g}\,\sqrt{g}\,\Bigg]$$

$$[c=0,d=0]$$
$$[h1,h2,h5,h6,h7]$$

$$\left[-\frac{\sqrt{a}\,\sqrt{a+e+b}\,\sqrt{a+e+f}}{\sqrt{a+e}\,\sqrt{a+b}}, \; -\frac{\sqrt{b}\,\sqrt{a+e+b}\,\sqrt{b+e+g}}{\sqrt{e+b}\,\sqrt{a+b}},\right.$$

$$\left.\frac{\sqrt{a+e+b}\,\sqrt{a+e+f}\,\sqrt{e}\,\sqrt{b+e+g}}{\sqrt{a+e}\,\sqrt{e+b}}, \; -\sqrt{a+e+f}\,\sqrt{f}, \; -\sqrt{b+e+g}\,\sqrt{g}\,\right]$$

$$[a=0,c=0,d=0]$$
$$[h2,h5,h6,h7]$$
$$\left[-\sqrt{b+e+g}, \; \sqrt{e+f}\,\sqrt{b+e+g}, \; -\sqrt{e+f}\,\sqrt{f}, \; -\sqrt{b+e+g}\,\sqrt{g}\,\right]$$

$$[b=0,c=0,d=0]$$
$$[h1,h5,h6,h7]$$
$$\left[-\sqrt{a+e+f}, \; \sqrt{a+e+f}\,\sqrt{e+g}, \; -\sqrt{a+e+f}\,\sqrt{f}, \; -\sqrt{e+g}\,\sqrt{g}\,\right]$$

$$[a=0,b=0,c=0,d=0]$$
$$[h5,h6,h7]$$
$$\left[\sqrt{e+f}\,\sqrt{e+g}, \; -\sqrt{e+f}\,\sqrt{f}, \; -\sqrt{e+g}\,\sqrt{g}\,\right]$$

$$[e=0]$$
$$[h1,h2,h3,h4,h6,h7]$$

$$\left[-\frac{\sqrt{a+c}\,\sqrt{a+2c+f}}{\sqrt{a+2c}}, \; -\frac{\sqrt{b+d}\,\sqrt{b+2d+g}}{\sqrt{b+2d}}, \; \frac{\sqrt{a+c}\,(a+2c+f)\,\sqrt{c}}{a+2c},\right.$$

$$\left.-\frac{\sqrt{b+d}\,(b+2d+g)\,\sqrt{d}}{b+2d}, \; -\sqrt{a+2c+f}\,\sqrt{f}, \; -\sqrt{b+2d+g}\,\sqrt{g}\,\right]$$

$$[a=0,e=0]$$
$$[h2,h3,h4,h6,h7]$$

$$\left[-\frac{\sqrt{b+d}\,\sqrt{b+2d+g}}{\sqrt{b+2d}}, \; c+\frac{1}{2}\,f, \; -\frac{\sqrt{b+d}\,(b+2d+g)\,\sqrt{d}}{b+2d}, \; -\sqrt{2c+f}\,\sqrt{f},\right.$$

$$\left.-\sqrt{b+2d+g}\,\sqrt{g}\,\right]$$

$$[b=0,e=0]$$
$$[h1,h3,h4,h6,h7]$$

$$\left[-\frac{\sqrt{a+c}\,\sqrt{a+2c+f}}{\sqrt{a+2c}}, \; \frac{\sqrt{a+c}\,(a+2c+f)\,\sqrt{c}}{a+2c}, \; -d-\frac{1}{2}\,g, \; -\sqrt{a+2c+f}\,\sqrt{f},\right.$$

$$\left.-\sqrt{2d+g}\,\sqrt{g}\,\right]$$

$$[a=0,b=0,e=0]$$
$$[h3,h4,h6,h7]$$
$$\left[c+\frac{1}{2}\,f, \; -d-\frac{1}{2}\,g, \; -\sqrt{2c+f}\,\sqrt{f}, \; -\sqrt{2d+g}\,\sqrt{g}\,\right]$$

$$[c=0,e=0]$$
$$[h1,h2,h4,h6,h7]$$

$$\left[-\sqrt{a+f},\ -\frac{\sqrt{b+d}\ \sqrt{b+2\,d+g}}{\sqrt{b+2\,d}},\ -\frac{\sqrt{b+d}\ (b+2\,d+g)\ \sqrt{d}}{b+2\,d},\ -\sqrt{a+f}\ \sqrt{f},\right.$$

$$\left.-\sqrt{b+2\,d+g}\ \sqrt{g}\right]$$

$$[\,a=0,\ c=0,\ e=0\,]$$
$$[\,h2,\ h4,\ h6,\ h7\,]$$

$$\left[-\frac{\sqrt{b+d}\ \sqrt{b+2\,d+g}}{\sqrt{b+2\,d}},\ -\frac{\sqrt{b+d}\ (b+2\,d+g)\ \sqrt{d}}{b+2\,d},\ -f,\ -\sqrt{b+2\,d+g}\ \sqrt{g}\right]$$

$$[\,b=0,\ c=0,\ e=0\,]$$
$$[\,h1,\ h4,\ h6,\ h7\,]$$

$$\left[-\sqrt{a+f},\ -d-\frac{1}{2}\ g,\ -\sqrt{a+f}\ \sqrt{f},\ -\sqrt{2\,d+g}\ \sqrt{g}\right]$$

$$[\,a=0,\ b=0,\ c=0,\ e=0\,]$$
$$[\,h4,\ h6,\ h7\,]$$

$$\left[-d-\frac{1}{2}\ g,\ -f,\ -\sqrt{2\,d+g}\ \sqrt{g}\right]$$

$$[\,d=0,\ e=0\,]$$
$$[\,h1,\ h2,\ h3,\ h6,\ h7\,]$$

$$\left[-\frac{\sqrt{a+c}\ \sqrt{a+2\,c+f}}{\sqrt{a+2\,c}},\ -\sqrt{b+g},\ \frac{\sqrt{a+c}\ (a+2\,c+f)\ \sqrt{c}}{a+2\,c},\ -\sqrt{a+2\,c+f}\ \sqrt{f},\right.$$

$$\left.-\sqrt{b+g}\ \sqrt{g}\right]$$

$$[\,a=0,\ d=0,\ e=0\,]$$
$$[\,h2,\ h3,\ h6,\ h7\,]$$

$$\left[-\sqrt{b+g},\ c+\frac{1}{2}\ f,\ -\sqrt{2\,c+f}\ \sqrt{f},\ -\sqrt{b+g}\ \sqrt{g}\right]$$

$$[\,b=0,\ d=0,\ e=0\,]$$
$$[\,h1,\ h3,\ h6,\ h7\,]$$

$$\left[-\frac{\sqrt{a+c}\ \sqrt{a+2\,c+f}}{\sqrt{a+2\,c}},\ \frac{\sqrt{a+c}\ (a+2\,c+f)\ \sqrt{c}}{a+2\,c},\ -\sqrt{a+2\,c+f}\ \sqrt{f},\ -g\right]$$

$$[\,a=0,\ b=0,\ d=0,\ e=0\,]$$
$$[\,h3,\ h6,\ h7\,]$$

$$\left[c+\frac{1}{2}\ f,\ -\sqrt{2\,c+f}\ \sqrt{f},\ -g\right]$$

$$[\,c=0,\ d=0,\ e=0\,]$$
$$[\,h1,\ h2,\ h6,\ h7\,]$$

$$\left[-\sqrt{a+f},\ -\sqrt{b+g},\ -\sqrt{a+f}\ \sqrt{f},\ -\sqrt{b+g}\ \sqrt{g}\right]$$

$$[\,a=0,\ c=0,\ d=0,\ e=0\,]$$
$$[\,h2,\ h6,\ h7\,]$$

$$\left[-\sqrt{b+g},\ -f,\ -\sqrt{b+g}\ \sqrt{g}\right]$$

$$[\,b=0,\ c=0,\ d=0,\ e=0\,]$$
$$[\,h1,\ h6,\ h7\,]$$

$$\left[-\sqrt{a+f},\ -\sqrt{a+f}\ \sqrt{f},\ -g\right]$$

$$[a = 0, b = 0, c = 0, d = 0, e = 0]$$
$$[h6, h7]$$
$$[-f, -g]$$
$$[f = 0]$$
$$[h1, h2, h3, h4, h5, h7]$$

$$\left[-\frac{\sqrt{a}\,\sqrt{a+c+e}\,\sqrt{a+e+b}}{\sqrt{a+b}\,\sqrt{a+e}}, \; -\frac{\sqrt{b}\,\sqrt{a+e+b}\,\sqrt{b+d+e}\,\sqrt{b+2d+e+g}}{\sqrt{a+b}\,\sqrt{e+b}\,\sqrt{b+2d+e}},\right.$$

$$\sqrt{a+c+e}\,\sqrt{c}, \; -\frac{\sqrt{b+d+e}\,(b+2d+e+g)\,\sqrt{d}}{b+2d+e},$$

$$\frac{\sqrt{a+c+e}\,\sqrt{a+e+b}\,\sqrt{e}\,\sqrt{b+d+e}\,\sqrt{b+2d+e+g}}{\sqrt{b+2d+e}\,\sqrt{e+b}\,\sqrt{a+e}},$$

$$\left.-\sqrt{b+2d+e+g}\,\sqrt{g}\right]$$

$$[a = 0, f = 0]$$
$$[h2, h3, h4, h5, h7]$$

$$\left[-\frac{\sqrt{b+d+e}\,\sqrt{b+2d+e+g}}{\sqrt{b+2d+e}}, \sqrt{c+e}\,\sqrt{c}, \; -\frac{\sqrt{b+d+e}\,(b+2d+e+g)\,\sqrt{d}}{b+2d+e},\right.$$

$$\left.\frac{\sqrt{c+e}\,\sqrt{b+d+e}\,\sqrt{b+2d+e+g}}{\sqrt{b+2d+e}}, \; -\sqrt{b+2d+e+g}\,\sqrt{g}\right]$$

$$[b = 0, f = 0]$$
$$[h1, h3, h4, h5, h7]$$

$$\left[-\sqrt{a+c+e}, \sqrt{a+c+e}\,\sqrt{c}, \; -\frac{\sqrt{d+e}\,(2d+e+g)\,\sqrt{d}}{2d+e},\right.$$

$$\left.\frac{\sqrt{a+c+e}\,\sqrt{d+e}\,\sqrt{2d+e+g}}{\sqrt{2d+e}}, \; -\sqrt{2d+e+g}\,\sqrt{g}\right]$$

$$[a = 0, b = 0, f = 0]$$
$$[h3, h4, h5, h7]$$

$$\left[\sqrt{c+e}\,\sqrt{c}, \; -\frac{\sqrt{d+e}\,(2d+e+g)\,\sqrt{d}}{2d+e}, \frac{\sqrt{c+e}\,\sqrt{d+e}\,\sqrt{2d+e+g}}{\sqrt{2d+e}},\right.$$

$$\left.-\sqrt{2d+e+g}\,\sqrt{g}\right]$$

$$[c = 0, f = 0]$$
$$[h1, h2, h4, h5, h7]$$

$$\left[-\frac{\sqrt{a}\,\sqrt{a+e+b}}{\sqrt{a+b}}, \; -\frac{\sqrt{b}\,\sqrt{a+e+b}\,\sqrt{b+d+e}\,\sqrt{b+2d+e+g}}{\sqrt{a+b}\,\sqrt{e+b}\,\sqrt{b+2d+e}},\right.$$

$$-\frac{\sqrt{b+d+e}\,(b+2d+e+g)\,\sqrt{d}}{b+2d+e},$$

$$\left.\frac{\sqrt{a+e+b}\,\sqrt{e}\,\sqrt{b+d+e}\,\sqrt{b+2d+e+g}}{\sqrt{b+2d+e}\,\sqrt{e+b}}, \; -\sqrt{b+2d+e+g}\,\sqrt{g}\right]$$

$$[a = 0, c = 0, f = 0]$$
$$[h2, h4, h5, h7]$$

$$\left[-\frac{\sqrt{b+d+e}\,\sqrt{b+2d+e+g}}{\sqrt{b+2d+e}},\ -\frac{\sqrt{b+d+e}\,(b+2d+e+g)\,\sqrt{d}}{b+2d+e}, \right.$$
$$\left. \frac{\sqrt{e}\,\sqrt{b+d+e}\,\sqrt{b+2d+e+g}}{\sqrt{b+2d+e}},\ -\sqrt{b+2d+e+g}\,\sqrt{g} \right]$$

$$[b = 0, c = 0, f = 0]$$
$$[h1, h4, h5, h7]$$

$$\left[-\sqrt{a+e},\ -\frac{\sqrt{d+e}\,(2d+e+g)\,\sqrt{d}}{2d+e},\ \frac{\sqrt{a+e}\,\sqrt{d+e}\,\sqrt{2d+e+g}}{\sqrt{2d+e}}, \right.$$
$$\left. -\sqrt{2d+e+g}\,\sqrt{g} \right]$$

$$[a = 0, b = 0, c = 0, f = 0]$$
$$[h4, h5, h7]$$

$$\left[-\frac{\sqrt{d+e}\,(2d+e+g)\,\sqrt{d}}{2d+e},\ \frac{\sqrt{e}\,\sqrt{d+e}\,\sqrt{2d+e+g}}{\sqrt{2d+e}},\ -\sqrt{2d+e+g}\,\sqrt{g} \right]$$

$$[d = 0, f = 0]$$
$$[h1, h2, h3, h5, h7]$$

$$\left[-\frac{\sqrt{a}\,\sqrt{a+c+e}\,\sqrt{a+e+b}}{\sqrt{a+b}\,\sqrt{a+e}},\ -\frac{\sqrt{b}\,\sqrt{a+e+b}\,\sqrt{b+e+g}}{\sqrt{e+b}\,\sqrt{a+b}},\ \sqrt{a+c+e}\,\sqrt{c}, \right.$$
$$\left. \frac{\sqrt{a+c+e}\,\sqrt{a+e+b}\,\sqrt{e}\,\sqrt{b+e+g}}{\sqrt{e+b}\,\sqrt{a+e}},\ -\sqrt{b+e+g}\,\sqrt{g} \right]$$

$$[a = 0, d = 0, f = 0]$$
$$[h2, h3, h5, h7]$$

$$\left[-\sqrt{b+e+g},\ \sqrt{c+e}\,\sqrt{c},\ \sqrt{c+e}\,\sqrt{b+e+g},\ -\sqrt{b+e+g}\,\sqrt{g} \right]$$

$$[b = 0, d = 0, f = 0]$$
$$[h1, h3, h5, h7]$$

$$\left[-\sqrt{a+c+e},\ \sqrt{a+c+e}\,\sqrt{c},\ \sqrt{a+c+e}\,\sqrt{e+g},\ -\sqrt{e+g}\,\sqrt{g} \right]$$

$$[a = 0, b = 0, d = 0, f = 0]$$
$$[h3, h5, h7]$$

$$\left[\sqrt{c+e}\,\sqrt{c},\ \sqrt{c+e}\,\sqrt{e+g},\ -\sqrt{e+g}\,\sqrt{g} \right]$$

$$[c = 0, d = 0, f = 0]$$
$$[h1, h2, h5, h7]$$

$$\left[-\frac{\sqrt{a}\,\sqrt{a+e+b}}{\sqrt{a+b}},\ -\frac{\sqrt{b}\,\sqrt{a+e+b}\,\sqrt{b+e+g}}{\sqrt{e+b}\,\sqrt{a+b}},\ \frac{\sqrt{a+e+b}\,\sqrt{e}\,\sqrt{b+e+g}}{\sqrt{e+b}}, \right.$$
$$\left. -\sqrt{b+e+g}\,\sqrt{g} \right]$$

$$[a = 0, c = 0, d = 0, f = 0]$$
$$[h2, h5, h7]$$

$$\left[-\sqrt{b+e+g},\ \sqrt{e}\,\sqrt{b+e+g},\ -\sqrt{b+e+g}\,\sqrt{g} \right]$$

$$[b = 0, c = 0, d = 0, f = 0]$$

$$[h1, h5, h7]$$
$$\left[-\sqrt{a+e}, \sqrt{a+e}\ \sqrt{e+g}, -\sqrt{e+g}\ \sqrt{g}\right]$$
$$[a = 0, b = 0, c = 0, d = 0, f = 0]$$
$$[h5, h7]$$
$$\left[\sqrt{e}\ \sqrt{e+g}, -\sqrt{e+g}\ \sqrt{g}\right]$$
$$[e = 0, f = 0]$$
$$[h1, h2, h3, h4, h7]$$
$$\left[-\sqrt{a+c}, -\frac{\sqrt{b+d}\ \sqrt{b+2\,d+g}}{\sqrt{b+2\,d}}, \sqrt{a+c}\ \sqrt{c}, -\frac{\sqrt{b+d}\ (b+2\,d+g)\ \sqrt{d}}{b+2\,d}, \right.$$
$$\left. -\sqrt{b+2\,d+g}\ \sqrt{g}\right]$$

$$[a = 0, e = 0, f = 0]$$
$$[h2, h3, h4, h7]$$
$$\left[-\frac{\sqrt{b+d}\ \sqrt{b+2\,d+g}}{\sqrt{b+2\,d}}, c, -\frac{\sqrt{b+d}\ (b+2\,d+g)\ \sqrt{d}}{b+2\,d}, -\sqrt{b+2\,d+g}\ \sqrt{g}\right]$$
$$[b = 0, e = 0, f = 0]$$
$$[h1, h3, h4, h7]$$
$$\left[-\sqrt{a+c}, \sqrt{a+c}\ \sqrt{c}, -d-\frac{1}{2}\,g, -\sqrt{2\,d+g}\ \sqrt{g}\right]$$
$$[a = 0, b = 0, e = 0, f = 0]$$
$$[h3, h4, h7]$$
$$\left[c, -d-\frac{1}{2}\,g, -\sqrt{2\,d+g}\ \sqrt{g}\right]$$
$$[c = 0, e = 0, f = 0]$$
$$[h1, h2, h4, h7]$$
$$\left[-\sqrt{a}, -\frac{\sqrt{b+d}\ \sqrt{b+2\,d+g}}{\sqrt{b+2\,d}}, -\frac{\sqrt{b+d}\ (b+2\,d+g)\ \sqrt{d}}{b+2\,d}, -\sqrt{b+2\,d+g}\ \sqrt{g}\right]$$
$$[a = 0, c = 0, e = 0, f = 0]$$
$$[h2, h4, h7]$$
$$\left[-\frac{\sqrt{b+d}\ \sqrt{b+2\,d+g}}{\sqrt{b+2\,d}}, -\frac{\sqrt{b+d}\ (b+2\,d+g)\ \sqrt{d}}{b+2\,d}, -\sqrt{b+2\,d+g}\ \sqrt{g}\right]$$
$$[b = 0, c = 0, e = 0, f = 0]$$
$$[h1, h4, h7]$$
$$\left[-\sqrt{a}, -d-\frac{1}{2}\,g, -\sqrt{2\,d+g}\ \sqrt{g}\right]$$
$$[a = 0, b = 0, c = 0, e = 0, f = 0]$$
$$[h4, h7]$$
$$\left[-d-\frac{1}{2}\,g, -\sqrt{2\,d+g}\ \sqrt{g}\right]$$
$$[d = 0, e = 0, f = 0]$$
$$[h1, h2, h3, h7]$$
$$\left[-\sqrt{a+c}, -\sqrt{b+g}, \sqrt{a+c}\ \sqrt{c}, -\sqrt{b+g}\ \sqrt{g}\right]$$
$$[a = 0, d = 0, e = 0, f = 0]$$

$$[h2, h3, h7]$$
$$\left[-\sqrt{b+g},\, c,\, -\sqrt{b+g}\,\sqrt{g}\,\right]$$
$$[b=0, d=0, e=0, f=0]$$
$$[h1, h3, h7]$$
$$\left[-\sqrt{a+c},\, \sqrt{a+c}\,\sqrt{c},\, -g\,\right]$$
$$[a=0, b=0, d=0, e=0, f=0]$$
$$[h3, h7]$$
$$[c, -g]$$
$$[c=0, d=0, e=0, f=0]$$
$$[h1, h2, h7]$$
$$\left[-\sqrt{a},\, -\sqrt{b+g},\, -\sqrt{b+g}\,\sqrt{g}\,\right]$$
$$[a=0, c=0, d=0, e=0, f=0]$$
$$[h2, h7]$$
$$\left[-\sqrt{b+g},\, -\sqrt{b+g}\,\sqrt{g}\,\right]$$
$$[b=0, c=0, d=0, e=0, f=0]$$
$$[h1, h7]$$
$$\left[-\sqrt{a},\, -g\,\right]$$
$$[a=0, b=0, c=0, d=0, e=0, f=0]$$
$$[h7]$$
$$[-g]$$
$$[g=0]$$
$$[h1, h2, h3, h4, h5, h6]$$
$$\left[-\frac{\sqrt{a}\,\sqrt{a+c+e}\,\sqrt{a+e+b}\,\sqrt{a+2c+e+f}}{\sqrt{a+b}\,\sqrt{a+e}\,\sqrt{a+2c+e}},\, -\frac{\sqrt{b}\,\sqrt{a+e+b}\,\sqrt{b+d+e}}{\sqrt{a+b}\,\sqrt{e+b}},\right.$$
$$\frac{\sqrt{a+c+e}\,(a+2c+e+f)\,\sqrt{c}}{a+2c+e},\, -\sqrt{b+d+e}\,\sqrt{d},$$
$$\left.\frac{\sqrt{a+c+e}\,\sqrt{a+e+b}\,\sqrt{a+2c+e+f}\,\sqrt{e}\,\sqrt{b+d+e}}{\sqrt{e+b}\,\sqrt{a+2c+e}\,\sqrt{a+e}},\, -\sqrt{a+2c+e+f}\,\sqrt{f}\,\right]$$
$$[a=0, g=0]$$
$$[h2, h3, h4, h5, h6]$$
$$\left[-\sqrt{b+d+e},\, \frac{\sqrt{c+e}\,(2c+e+f)\,\sqrt{c}}{2c+e},\, -\sqrt{b+d+e}\,\sqrt{d},\right.$$
$$\left.\frac{\sqrt{c+e}\,\sqrt{2c+e+f}\,\sqrt{b+d+e}}{\sqrt{2c+e}},\, -\sqrt{2c+e+f}\,\sqrt{f}\,\right]$$
$$[b=0, g=0]$$
$$[h1, h3, h4, h5, h6]$$
$$\left[-\frac{\sqrt{a+c+e}\,\sqrt{a+2c+e+f}}{\sqrt{a+2c+e}},\, \frac{\sqrt{a+c+e}\,(a+2c+e+f)\,\sqrt{c}}{a+2c+e},\, -\sqrt{d+e}\,\sqrt{d},\right.$$
$$\left.\frac{\sqrt{a+c+e}\,\sqrt{a+2c+e+f}\,\sqrt{d+e}}{\sqrt{a+2c+e}},\, -\sqrt{a+2c+e+f}\,\sqrt{f}\,\right]$$
$$[a=0, b=0, g=0]$$
$$[h3, h4, h5, h6]$$

$$\left[\frac{\sqrt{c+e}\,(2\,c+e+f)\,\sqrt{c}}{2\,c+e},\; -\sqrt{d+e}\,\sqrt{d},\; \frac{\sqrt{c+e}\,\sqrt{2\,c+e+f}\,\sqrt{d+e}}{\sqrt{2\,c+e}},\right.$$

$$\left. -\sqrt{2\,c+e+f}\,\sqrt{f}\right]$$

$$[c=0,\,g=0]$$
$$[h1,\,h2,\,h4,\,h5,\,h6\,]$$

$$\left[-\frac{\sqrt{a}\,\sqrt{a+e+b}\,\sqrt{a+e+f}}{\sqrt{a+e}\,\sqrt{a+b}},\; -\frac{\sqrt{b}\,\sqrt{a+e+b}\,\sqrt{b+d+e}}{\sqrt{a+b}\,\sqrt{e+b}},\; -\sqrt{b+d+e}\,\sqrt{d},\right.$$

$$\left. \frac{\sqrt{a+e+b}\,\sqrt{a+e+f}\,\sqrt{e}\,\sqrt{b+d+e}}{\sqrt{a+e}\,\sqrt{e+b}},\; -\sqrt{a+e+f}\,\sqrt{f}\right]$$

$$[a=0,\,c=0,\,g=0]$$
$$[h2,\,h4,\,h5,\,h6\,]$$

$$\left[-\sqrt{b+d+e},\; -\sqrt{b+d+e}\,\sqrt{d},\; \sqrt{e+f}\,\sqrt{b+d+e},\; -\sqrt{e+f}\,\sqrt{f}\right]$$

$$[b=0,\,c=0,\,g=0]$$
$$[h1,\,h4,\,h5,\,h6\,]$$

$$\left[-\sqrt{a+e+f},\; -\sqrt{d+e}\,\sqrt{d},\; \sqrt{a+e+f}\,\sqrt{d+e},\; -\sqrt{a+e+f}\,\sqrt{f}\right]$$

$$[a=0,\,b=0,\,c=0,\,g=0]$$
$$[h4,\,h5,\,h6\,]$$

$$\left[-\sqrt{d+e}\,\sqrt{d},\; \sqrt{e+f}\,\sqrt{d+e},\; -\sqrt{e+f}\,\sqrt{f}\right]$$

$$[d=0,\,g=0]$$
$$[h1,\,h2,\,h3,\,h5,\,h6\,]$$

$$\left[-\frac{\sqrt{a}\,\sqrt{a+c+e}\,\sqrt{a+e+b}\,\sqrt{a+2\,c+e+f}}{\sqrt{a+b}\,\sqrt{a+e}\,\sqrt{a+2\,c+e}},\; -\frac{\sqrt{b}\,\sqrt{a+e+b}}{\sqrt{a+b}},\right.$$

$$\left. \frac{\sqrt{a+c+e}\,(a+2\,c+e+f)\,\sqrt{c}}{a+2\,c+e},\; \frac{\sqrt{a+c+e}\,\sqrt{a+e+b}\,\sqrt{a+2\,c+e+f}\,\sqrt{e}}{\sqrt{a+2\,c+e}\,\sqrt{a+e}},\right.$$

$$\left. -\sqrt{a+2\,c+e+f}\,\sqrt{f}\right]$$

$$[a=0,\,d=0,\,g=0]$$
$$[h2,\,h3,\,h5,\,h6\,]$$

$$\left[-\sqrt{e+b},\; \frac{\sqrt{c+e}\,(2\,c+e+f)\,\sqrt{c}}{2\,c+e},\; \frac{\sqrt{c+e}\,\sqrt{2\,c+e+f}\,\sqrt{e+b}}{\sqrt{2\,c+e}},\right.$$

$$\left. -\sqrt{2\,c+e+f}\,\sqrt{f}\right]$$

$$[b=0,\,d=0,\,g=0]$$
$$[h1,\,h3,\,h5,\,h6\,]$$

$$\left[-\frac{\sqrt{a+c+e}\,\sqrt{a+2\,c+e+f}}{\sqrt{a+2\,c+e}},\; \frac{\sqrt{a+c+e}\,(a+2\,c+e+f)\,\sqrt{c}}{a+2\,c+e},\right.$$

$$\left. \frac{\sqrt{a+c+e}\,\sqrt{a+2\,c+e+f}\,\sqrt{e}}{\sqrt{a+2\,c+e}},\; -\sqrt{a+2\,c+e+f}\,\sqrt{f}\right]$$

$$[a=0,\,b=0,\,d=0,\,g=0]$$

$$[h3, h5, h6]$$

$$\left[\frac{\sqrt{c+e}\,(2\,c+e+f)\,\sqrt{c}}{2\,c+e},\ \frac{\sqrt{c+e}\,\sqrt{2\,c+e+f}\,\sqrt{e}}{\sqrt{2\,c+e}},\ -\sqrt{2\,c+e+f}\,\sqrt{f}\right]$$

$$[c = 0, d = 0, g = 0]$$

$$[h1, h2, h5, h6]$$

$$\left[-\frac{\sqrt{a}\,\sqrt{a+e+b}\,\sqrt{a+e+f}}{\sqrt{a+e}\,\sqrt{a+b}},\ -\frac{\sqrt{b}\,\sqrt{a+e+b}}{\sqrt{a+b}},\ \frac{\sqrt{a+e+b}\,\sqrt{a+e+f}\,\sqrt{e}}{\sqrt{a+e}},\right.$$

$$\left.-\sqrt{a+e+f}\,\sqrt{f}\right]$$

$$[a = 0, c = 0, d = 0, g = 0]$$

$$[h2, h5, h6]$$

$$\left[-\sqrt{e+b},\ \sqrt{e+f}\,\sqrt{e+b},\ -\sqrt{e+f}\,\sqrt{f}\right]$$

$$[b = 0, c = 0, d = 0, g = 0]$$

$$[h1, h5, h6]$$

$$\left[-\sqrt{a+e+f},\ \sqrt{a+e+f}\,\sqrt{e},\ -\sqrt{a+e+f}\,\sqrt{f}\right]$$

$$[a = 0, b = 0, c = 0, d = 0, g = 0]$$

$$[h5, h6]$$

$$\left[\sqrt{e+f}\,\sqrt{e},\ -\sqrt{e+f}\,\sqrt{f}\right]$$

$$[e = 0, g = 0]$$

$$[h1, h2, h3, h4, h6]$$

$$\left[-\frac{\sqrt{a+c}\,\sqrt{a+2\,c+f}}{\sqrt{a+2\,c}},\ -\sqrt{b+d},\ \frac{\sqrt{a+c}\,(a+2\,c+f)\,\sqrt{c}}{a+2\,c},\ -\sqrt{b+d}\,\sqrt{d},\right.$$

$$\left.-\sqrt{a+2\,c+f}\,\sqrt{f}\right]$$

$$[a = 0, e = 0, g = 0]$$

$$[h2, h3, h4, h6]$$

$$\left[-\sqrt{b+d},\ c+\frac{1}{2}\,f,\ -\sqrt{b+d}\,\sqrt{d},\ -\sqrt{2\,c+f}\,\sqrt{f}\right]$$

$$[b = 0, e = 0, g = 0]$$

$$[h1, h3, h4, h6]$$

$$\left[-\frac{\sqrt{a+c}\,\sqrt{a+2\,c+f}}{\sqrt{a+2\,c}},\ \frac{\sqrt{a+c}\,(a+2\,c+f)\,\sqrt{c}}{a+2\,c},\ -d,\ -\sqrt{a+2\,c+f}\,\sqrt{f}\right]$$

$$[a = 0, b = 0, e = 0, g = 0]$$

$$[h3, h4, h6]$$

$$\left[c+\frac{1}{2}\,f,\ -d,\ -\sqrt{2\,c+f}\,\sqrt{f}\right]$$

$$[c = 0, e = 0, g = 0]$$

$$[h1, h2, h4, h6]$$

$$\left[-\sqrt{a+f},\ -\sqrt{b+d},\ -\sqrt{b+d}\,\sqrt{d},\ -\sqrt{a+f}\,\sqrt{f}\right]$$

$$[a = 0, c = 0, e = 0, g = 0]$$

$$[h2, h4, h6]$$

$$\left[-\sqrt{b+d},\ -\sqrt{b+d}\,\sqrt{d},\ -f\right]$$

$$[b = 0, c = 0, e = 0, g = 0]$$
$$[h1, h4, h6]$$
$$\left[-\sqrt{a+f}, -d, -\sqrt{a+f}\,\sqrt{f}\right]$$
$$[a = 0, b = 0, c = 0, e = 0, g = 0]$$
$$[h4, h6]$$
$$[-d, -f]$$
$$[d = 0, e = 0, g = 0]$$
$$[h1, h2, h3, h6]$$
$$\left[-\frac{\sqrt{a+c}\,\sqrt{a+2\,c+f}}{\sqrt{a+2\,c}}, -\sqrt{b}, \frac{\sqrt{a+c}\,(a+2\,c+f)\,\sqrt{c}}{a+2\,c}, -\sqrt{a+2\,c+f}\,\sqrt{f}\right]$$
$$[a = 0, d = 0, e = 0, g = 0]$$
$$[h2, h3, h6]$$
$$\left[-\sqrt{b}, c+\frac{1}{2}\,f, -\sqrt{2\,c+f}\,\sqrt{f}\right]$$
$$[b = 0, d = 0, e = 0, g = 0]$$
$$[h1, h3, h6]$$
$$\left[-\frac{\sqrt{a+c}\,\sqrt{a+2\,c+f}}{\sqrt{a+2\,c}}, \frac{\sqrt{a+c}\,(a+2\,c+f)\,\sqrt{c}}{a+2\,c}, -\sqrt{a+2\,c+f}\,\sqrt{f}\right]$$
$$[a = 0, b = 0, d = 0, e = 0, g = 0]$$
$$[h3, h6]$$
$$\left[c+\frac{1}{2}\,f, -\sqrt{2\,c+f}\,\sqrt{f}\right]$$
$$[c = 0, d = 0, e = 0, g = 0]$$
$$[h1, h2, h6]$$
$$\left[-\sqrt{a+f}, -\sqrt{b}, -\sqrt{a+f}\,\sqrt{f}\right]$$
$$[a = 0, c = 0, d = 0, e = 0, g = 0]$$
$$[h2, h6]$$
$$\left[-\sqrt{b}, -f\right]$$
$$[b = 0, c = 0, d = 0, e = 0, g = 0]$$
$$[h1, h6]$$
$$\left[-\sqrt{a+f}, -\sqrt{a+f}\,\sqrt{f}\right]$$
$$[a = 0, b = 0, c = 0, d = 0, e = 0, g = 0]$$
$$[h6]$$
$$[-f]$$
$$[f = 0, g = 0]$$
$$[h1, h2, h3, h4, h5]$$
$$\left[-\frac{\sqrt{a}\,\sqrt{a+c+e}\,\sqrt{a+e+b}}{\sqrt{a+b}\,\sqrt{a+e}}, -\frac{\sqrt{b}\,\sqrt{a+e+b}\,\sqrt{b+d+e}}{\sqrt{a+b}\,\sqrt{e+b}}, \sqrt{a+c+e}\,\sqrt{c},\right.$$
$$\left.-\sqrt{b+d+e}\,\sqrt{d}, \frac{\sqrt{a+c+e}\,\sqrt{a+e+b}\,\sqrt{e}\,\sqrt{b+d+e}}{\sqrt{e+b}\,\sqrt{a+e}}\right]$$
$$[a = 0, f = 0, g = 0]$$
$$[h2, h3, h4, h5]$$
$$\left[-\sqrt{b+d+e}, \sqrt{c+e}\,\sqrt{c}, -\sqrt{b+d+e}\,\sqrt{d}, \sqrt{c+e}\,\sqrt{b+d+e}\right]$$
$$[b = 0, f = 0, g = 0]$$

$$[h1, h3, h4, h5]$$
$$\left[-\sqrt{a+c+e},\ \sqrt{a+c+e}\ \sqrt{c},\ -\sqrt{d+e}\ \sqrt{d},\ \sqrt{a+c+e}\ \sqrt{d+e}\right]$$
$$[a=0,\ b=0,\ f=0,\ g=0]$$
$$[h3, h4, h5]$$
$$\left[\sqrt{c+e}\ \sqrt{c},\ -\sqrt{d+e}\ \sqrt{d},\ \sqrt{c+e}\ \sqrt{d+e}\right]$$
$$[c=0,\ f=0,\ g=0]$$
$$[h1, h2, h4, h5]$$
$$\left[-\frac{\sqrt{a}\ \sqrt{a+e+b}}{\sqrt{a+b}},\ -\frac{\sqrt{b}\ \sqrt{a+e+b}\ \sqrt{b+d+e}}{\sqrt{a+b}\ \sqrt{e+b}},\ -\sqrt{b+d+e}\ \sqrt{d},\right.$$
$$\left.\frac{\sqrt{a+e+b}\ \sqrt{e}\ \sqrt{b+d+e}}{\sqrt{e+b}}\right]$$
$$[a=0,\ c=0,\ f=0,\ g=0]$$
$$[h2, h4, h5]$$
$$\left[-\sqrt{b+d+e},\ -\sqrt{b+d+e}\ \sqrt{d},\ \sqrt{e}\ \sqrt{b+d+e}\right]$$
$$[b=0,\ c=0,\ f=0,\ g=0]$$
$$[h1, h4, h5]$$
$$\left[-\sqrt{a+e},\ -\sqrt{d+e}\ \sqrt{d},\ \sqrt{a+e}\ \sqrt{d+e}\right]$$
$$[a=0,\ b=0,\ c=0,\ f=0,\ g=0]$$
$$[h4, h5]$$
$$\left[-\sqrt{d+e}\ \sqrt{d},\ \sqrt{e}\ \sqrt{d+e}\right]$$
$$[d=0,\ f=0,\ g=0]$$
$$[h1, h2, h3, h5]$$
$$\left[-\frac{\sqrt{a}\ \sqrt{a+c+e}\ \sqrt{a+e+b}}{\sqrt{a+b}\ \sqrt{a+e}},\ -\frac{\sqrt{b}\ \sqrt{a+e+b}}{\sqrt{a+b}},\ \sqrt{a+c+e}\ \sqrt{c},\right.$$
$$\left.\frac{\sqrt{a+c+e}\ \sqrt{a+e+b}\ \sqrt{e}}{\sqrt{a+e}}\right]$$
$$[a=0,\ d=0,\ f=0,\ g=0]$$
$$[h2, h3, h5]$$
$$\left[-\sqrt{e+b},\ \sqrt{c+e}\ \sqrt{c},\ \sqrt{c+e}\ \sqrt{e+b}\right]$$
$$[b=0,\ d=0,\ f=0,\ g=0]$$
$$[h1, h3, h5]$$
$$\left[-\sqrt{a+c+e},\ \sqrt{a+c+e}\ \sqrt{c},\ \sqrt{a+c+e}\ \sqrt{e}\right]$$
$$[a=0,\ b=0,\ d=0,\ f=0,\ g=0]$$
$$[h3, h5]$$
$$\left[\sqrt{c+e}\ \sqrt{c},\ \sqrt{c+e}\ \sqrt{e}\right]$$
$$[c=0,\ d=0,\ f=0,\ g=0]$$
$$[h1, h2, h5]$$
$$\left[-\frac{\sqrt{a}\ \sqrt{a+e+b}}{\sqrt{a+b}},\ -\frac{\sqrt{b}\ \sqrt{a+e+b}}{\sqrt{a+b}},\ \sqrt{a+e+b}\ \sqrt{e}\right]$$
$$[a=0,\ c=0,\ d=0,\ f=0,\ g=0]$$
$$[h2, h5]$$
$$\left[-\sqrt{e+b},\ \sqrt{e}\ \sqrt{e+b}\right]$$

$$[\,b = 0,\, c = 0,\, d = 0,\, f = 0,\, g = 0\,]$$
$$[\,h1,\, h5\,]$$
$$\left[\,-\sqrt{a+e}\,,\, \sqrt{a+e}\,\sqrt{e}\,\right]$$
$$[\,a = 0,\, b = 0,\, c = 0,\, d = 0,\, f = 0,\, g = 0\,]$$
$$[\,h5\,]$$
$$[\,e\,]$$
$$[\,e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h1,\, h2,\, h3,\, h4\,]$$
$$\left[\,-\sqrt{a+c}\,,\, -\sqrt{b+d}\,,\, \sqrt{a+c}\,\sqrt{c}\,,\, -\sqrt{b+d}\,\sqrt{d}\,\right]$$
$$[\,a = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h2,\, h3,\, h4\,]$$
$$\left[\,-\sqrt{b+d}\,,\, c,\, -\sqrt{b+d}\,\sqrt{d}\,\right]$$
$$[\,b = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h1,\, h3,\, h4\,]$$
$$\left[\,-\sqrt{a+c}\,,\, \sqrt{a+c}\,\sqrt{c}\,,\, -d\,\right]$$
$$[\,a = 0,\, b = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h3,\, h4\,]$$
$$[\,c,\, -d\,]$$
$$[\,c = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h1,\, h2,\, h4\,]$$
$$\left[\,-\sqrt{a}\,,\, -\sqrt{b+d}\,,\, -\sqrt{b+d}\,\sqrt{d}\,\right]$$
$$[\,a = 0,\, c = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h2,\, h4\,]$$
$$\left[\,-\sqrt{b+d}\,,\, -\sqrt{b+d}\,\sqrt{d}\,\right]$$
$$[\,b = 0,\, c = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h1,\, h4\,]$$
$$\left[\,-\sqrt{a}\,,\, -d\,\right]$$
$$[\,a = 0,\, b = 0,\, c = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h4\,]$$
$$[\,-d\,]$$
$$[\,d = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h1,\, h2,\, h3\,]$$
$$\left[\,-\sqrt{a+c}\,,\, -\sqrt{b}\,,\, \sqrt{a+c}\,\sqrt{c}\,\right]$$
$$[\,a = 0,\, d = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h2,\, h3\,]$$
$$\left[\,-\sqrt{b}\,,\, c\,\right]$$
$$[\,b = 0,\, d = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h1,\, h3\,]$$
$$\left[\,-\sqrt{a+c}\,,\, \sqrt{a+c}\,\sqrt{c}\,\right]$$
$$[\,a = 0,\, b = 0,\, d = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h3\,]$$
$$[\,c\,]$$
$$[\,c = 0,\, d = 0,\, e = 0,\, f = 0,\, g = 0\,]$$
$$[\,h1,\, h2\,]$$
$$\left[\,-\sqrt{a}\,,\, -\sqrt{b}\,\right]$$

$$[a = 0, c = 0, d = 0, e = 0, f = 0, g = 0]$$
$$[h2]$$
$$\left[-\sqrt{b}\right]$$
$$[b = 0, c = 0, d = 0, e = 0, f = 0, g = 0]$$
$$[h1]$$
$$\left[-\sqrt{a}\right]$$

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