

# Model for “Oh1”

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## General Condition

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- Basis type: 1gs
- SAMB selection:
  - Type: [Q, G]
  - Rank: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
  - Irrep.: [A<sub>1g</sub>, A<sub>2g</sub>, E<sub>g</sub>, T<sub>1g</sub>, T<sub>2g</sub>, A<sub>1u</sub>, A<sub>2u</sub>, E<sub>u</sub>, T<sub>1u</sub>, T<sub>2u</sub>]
  - Spin (s): [0, 1]
- Atomic selection:
  - Type: [Q, G, M, T]
  - Rank: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
  - Irrep.: [A<sub>1g</sub>, A<sub>2g</sub>, E<sub>g</sub>, T<sub>1g</sub>, T<sub>2g</sub>, A<sub>1u</sub>, A<sub>2u</sub>, E<sub>u</sub>, T<sub>1u</sub>, T<sub>2u</sub>]
  - Spin (s): [0, 1]
- Site-cluster selection:
  - Rank: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
  - Irrep.: [A<sub>1g</sub>, A<sub>2g</sub>, E<sub>g</sub>, T<sub>1g</sub>, T<sub>2g</sub>, A<sub>1u</sub>, A<sub>2u</sub>, E<sub>u</sub>, T<sub>1u</sub>, T<sub>2u</sub>]
- Bond-cluster selection:
  - Type: [Q, G, M, T]
  - Rank: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
  - Irrep.: [A<sub>1g</sub>, A<sub>2g</sub>, E<sub>g</sub>, T<sub>1g</sub>, T<sub>2g</sub>, A<sub>1u</sub>, A<sub>2u</sub>, E<sub>u</sub>, T<sub>1u</sub>, T<sub>2u</sub>]
- Max. neighbor: 10
- Search cell range: (-2, 3), (-2, 3), (-2, 3)
- Toroidal priority: false

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## Group and Unit Cell

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- Group: SG No. 221 O<sub>h</sub><sup>1</sup> Pm $\bar{3}m$  [cubic]
- Associated point group: PG No. 221 O<sub>h</sub> m $\bar{3}m$  [cubic]
- Unit cell:  
 $a = 1.00000, b = 1.00000, c = 1.00000, \alpha = 90.0, \beta = 90.0, \gamma = 90.0$
- Lattice vectors (conventional cell):  
 $a_1 = [1.00000, 0.00000, 0.00000]$   
 $a_2 = [0.00000, 1.00000, 0.00000]$   
 $a_3 = [0.00000, 0.00000, 1.00000]$

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**Symmetry Operation**

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Table 1: Symmetry operation

#	SO	#	SO	#	SO	#	SO	#	SO
1	{1 0}	2	{2 <sub>001</sub>  0}	3	{2 <sub>010</sub>  0}	4	{2 <sub>100</sub>  0}	5	{3 <sub>111</sub> <sup>+ 0}</sup>
6	{3 <sub>-11-1</sub> <sup>+</sup>  0}	7	{3 <sub>1-1-1</sub> <sup>+</sup>  0}	8	{3 <sub>-1-11</sub> <sup>+</sup>  0}	9	{3 <sub>111</sub> <sup>-</sup>  0}	10	{3 <sub>1-1-1</sub> <sup>-</sup>  0}
11	{3 <sub>-1-11</sub> <sup>-</sup>  0}	12	{3 <sub>-11-1</sub> <sup>-</sup>  0}	13	{2 <sub>110</sub>  0}	14	{2 <sub>1-10</sub>  0}	15	{4 <sub>001</sub> <sup>-</sup>  0}
16	{4 <sub>001</sub> <sup>+</sup>  0}	17	{4 <sub>100</sub> <sup>-</sup>  0}	18	{2 <sub>011</sub>  0}	19	{2 <sub>01-1</sub>  0}	20	{4 <sub>100</sub> <sup>+</sup>  0}
21	{4 <sub>010</sub> <sup>+</sup>  0}	22	{2 <sub>101</sub>  0}	23	{4 <sub>010</sub> <sup>-</sup>  0}	24	{2 <sub>-101</sub>  0}	25	{-1 0}
26	{m <sub>001</sub>  0}	27	{m <sub>010</sub>  0}	28	{m <sub>100</sub>  0}	29	{-3 <sub>111</sub> <sup>+</sup>  0}	30	{-3 <sub>-11-1</sub> <sup>+</sup>  0}
31	{-3 <sub>1-1-1</sub> <sup>+</sup>  0}	32	{-3 <sub>-1-11</sub> <sup>+</sup>  0}	33	{-3 <sub>111</sub> <sup>-</sup>  0}	34	{-3 <sub>1-1-1</sub> <sup>-</sup>  0}	35	{-3 <sub>-1-11</sub> <sup>-</sup>  0}
36	{-3 <sub>-11-1</sub> <sup>-</sup>  0}	37	{m <sub>110</sub>  0}	38	{m <sub>1-10</sub>  0}	39	{-4 <sub>001</sub> <sup>-</sup>  0}	40	{-4 <sub>001</sub> <sup>+</sup>  0}
41	{-4 <sub>100</sub> <sup>-</sup>  0}	42	{m <sub>011</sub>  0}	43	{m <sub>01-1</sub>  0}	44	{-4 <sub>100</sub> <sup>+</sup>  0}	45	{-4 <sub>010</sub> <sup>+</sup>  0}
46	{m <sub>101</sub>  0}	47	{-4 <sub>010</sub> <sup>-</sup>  0}	48	{m <sub>-101</sub>  0}				

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**Harmonics**

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Table 2: Harmonics

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
1	$\mathbb{Q}_0(A_{1g})$	$A_{1g}$	0	$Q, T$	-	-	1
2	$\mathbb{Q}_4(A_{1g})$	$A_{1g}$	4	$Q, T$	-	-	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$
3	$\mathbb{G}_0(A_{1u})$	$A_{1u}$	0	$G, M$	-	-	1
4	$\mathbb{G}_4(A_{1u})$	$A_{1u}$	4	$G, M$	-	-	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$
5	$\mathbb{G}_3(A_{2g})$	$A_{2g}$	3	$G, M$	-	-	$\sqrt{15}xyz$
6	$\mathbb{Q}_3(A_{2u})$	$A_{2u}$	3	$Q, T$	-	-	$\sqrt{15}xyz$
7	$\mathbb{Q}_{2,1}(E_g)$	$E_g$	2	$Q, T$	-	1	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
8	$\mathbb{Q}_{2,2}(E_g)$					2	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
9	$\mathbb{Q}_{4,1}(E_g)$	$E_g$	4	$Q, T$	-	1	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
10	$\mathbb{Q}_{4,2}(E_g)$					2	$\frac{\sqrt{5}(x-y)(x+y)(x^2 + y^2 - 6z^2)}{4}$
11	$\mathbb{G}_{2,1}(E_u)$	$E_u$	2	$G, M$	-	1	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
12	$\mathbb{G}_{2,2}(E_u)$					2	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
13	$\mathbb{G}_{4,1}(E_u)$	$E_u$	4	$G, M$	-	1	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
14	$\mathbb{G}_{4,2}(E_u)$					2	$\frac{\sqrt{5}(x-y)(x+y)(x^2 + y^2 - 6z^2)}{4}$
15	$\mathbb{Q}_{5,1}(E_u)$	$E_u$	5	$Q, T$	-	1	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
16	$\mathbb{Q}_{5,2}(E_u)$					2	$\frac{\sqrt{105}xyz(x^2 + y^2 - 2z^2)}{2}$
17	$\mathbb{G}_{1,1}(T_{1g})$	$T_{1g}$	1	$G, M$	-	1	$x$
18	$\mathbb{G}_{1,2}(T_{1g})$					2	$y$
19	$\mathbb{G}_{1,3}(T_{1g})$					3	$z$
20	$\mathbb{G}_{3,1}(T_{1g})$	$T_{1g}$	3	$G, M$	-	1	$\frac{x(2x^2 - 3y^2 - 3z^2)}{2}$

continued ...

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
21	$\mathbb{G}_{3,2}(T_{1g})$					2	$-\frac{y(3x^2-2y^2+3z^2)}{2}$
22	$\mathbb{G}_{3,3}(T_{1g})$					3	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
23	$\mathbb{Q}_{4,1}(T_{1g})$	$T_{1g}$	4	$Q, T$	-	1	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
24	$\mathbb{Q}_{4,2}(T_{1g})$					2	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
25	$\mathbb{Q}_{4,3}(T_{1g})$					3	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
26	$\mathbb{Q}_{1,1}(T_{1u})$	$T_{1u}$	1	$Q, T$	-	1	$x$
27	$\mathbb{Q}_{1,2}(T_{1u})$					2	$y$
28	$\mathbb{Q}_{1,3}(T_{1u})$					3	$z$
29	$\mathbb{Q}_{3,1}(T_{1u})$	$T_{1u}$	3	$Q, T$	-	1	$\frac{x(2x^2-3y^2-3z^2)}{2}$
30	$\mathbb{Q}_{3,2}(T_{1u})$					2	$-\frac{y(3x^2-2y^2+3z^2)}{2}$
31	$\mathbb{Q}_{3,3}(T_{1u})$					3	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
32	$\mathbb{G}_{4,1}(T_{1u})$	$T_{1u}$	4	$G, M$	-	1	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
33	$\mathbb{G}_{4,2}(T_{1u})$					2	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
34	$\mathbb{G}_{4,3}(T_{1u})$					3	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
35	$\mathbb{Q}_{5,1}(T_{1u}, 2)$	$T_{1u}$	5	$Q, T$	2	1	$\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$
36	$\mathbb{Q}_{5,2}(T_{1u}, 2)$					2	$\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$
37	$\mathbb{Q}_{5,3}(T_{1u}, 2)$					3	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
38	$\mathbb{Q}_{2,1}(T_{2g})$	$T_{2g}$	2	$Q, T$	-	1	$\sqrt{3}yz$
39	$\mathbb{Q}_{2,2}(T_{2g})$					2	$\sqrt{3}xz$
40	$\mathbb{Q}_{2,3}(T_{2g})$					3	$\sqrt{3}xy$
41	$\mathbb{G}_{3,1}(T_{2g})$	$T_{2g}$	3	$G, M$	-	1	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
42	$\mathbb{G}_{3,2}(T_{2g})$					2	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
43	$\mathbb{G}_{3,3}(T_{2g})$					3	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
44	$\mathbb{Q}_{4,1}(T_{2g})$	$T_{2g}$	4	$Q, T$	-	1	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
45	$\mathbb{Q}_{4,2}(T_{2g})$					2	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$
46	$\mathbb{Q}_{4,3}(T_{2g})$					3	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
47	$\mathbb{G}_{2,1}(T_{2u})$	$T_{2u}$	2	$G, M$	-	1	$\sqrt{3}yz$
48	$\mathbb{G}_{2,2}(T_{2u})$					2	$\sqrt{3}xz$
49	$\mathbb{G}_{2,3}(T_{2u})$					3	$\sqrt{3}xy$
50	$\mathbb{Q}_{3,1}(T_{2u})$	$T_{2u}$	3	$Q, T$	-	1	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
51	$\mathbb{Q}_{3,2}(T_{2u})$					2	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
52	$\mathbb{Q}_{3,3}(T_{2u})$					3	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
53	$\mathbb{G}_{4,1}(T_{2u})$	$T_{2u}$	4	$G, M$	-	1	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
54	$\mathbb{G}_{4,2}(T_{2u})$					2	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$
55	$\mathbb{G}_{4,3}(T_{2u})$					3	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
56	$\mathbb{Q}_{5,1}(T_{2u})$	$T_{2u}$	5	$Q, T$	-	1	$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$
57	$\mathbb{Q}_{5,2}(T_{2u})$					2	$\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$
58	$\mathbb{Q}_{5,3}(T_{2u})$					3	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$

— Basis in full matrix —

Table 3: dimension = 8

#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)
0	$ s, \uparrow\rangle @A(1)$	1	$ s, \downarrow\rangle @A(1)$	2	$ p_x, \uparrow\rangle @A(1)$	3	$ p_x, \downarrow\rangle @A(1)$	4	$ p_y, \uparrow\rangle @A(1)$
5	$ p_y, \downarrow\rangle @A(1)$	6	$ p_z, \uparrow\rangle @A(1)$	7	$ p_z, \downarrow\rangle @A(1)$				

Table 4: Atomic basis (orbital part only)

orbital	definition
$ s\rangle$	1
$ p_x\rangle$	$x$
$ p_y\rangle$	$y$
$ p_z\rangle$	$z$

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## SAMB

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261 (all 604) SAMBs

- 'A' site-cluster
  - \* bra:  $\langle s, \uparrow |, \langle s, \downarrow |$
  - \* ket:  $|s, \uparrow \rangle, |s, \downarrow \rangle$
  - \* wyckoff: **1a**

$$\boxed{z1} \quad Q_0^{(c)}(A_{1g}) = Q_0^{(a)}(A_{1g})Q_0^{(s)}(A_{1g})$$

- 'A' site-cluster

- \* bra:  $\langle s, \uparrow |, \langle s, \downarrow |$

- \* ket:  $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

- \* wyckoff: **1a**

[z269]  $\mathbb{G}_0^{(1,1;c)}(A_{1u}) = \mathbb{G}_0^{(1,1;a)}(A_{1u})\mathbb{Q}_0^{(s)}(A_{1g})$

[z300]  $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$

[z301]  $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$

[z362]  $\mathbb{Q}_{1,1}^{(c)}(T_{1u}) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$

[z363]  $\mathbb{Q}_{1,2}^{(c)}(T_{1u}) = \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$

[z364]  $\mathbb{Q}_{1,3}^{(c)}(T_{1u}) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$

[z365]  $\mathbb{Q}_{1,1}^{(1,0;c)}(T_{1u}) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$

[z366]  $\mathbb{Q}_{1,2}^{(1,0;c)}(T_{1u}) = \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$

[z367]  $\mathbb{Q}_{1,3}^{(1,0;c)}(T_{1u}) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$

[z485]  $\mathbb{G}_{2,1}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$

[z486]  $\mathbb{G}_{2,2}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$

[z487]  $\mathbb{G}_{2,3}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$

- 'A' site-cluster

- \* bra:  $\langle p_x, \uparrow |, \langle p_x, \downarrow |, \langle p_y, \uparrow |, \langle p_y, \downarrow |, \langle p_z, \uparrow |, \langle p_z, \downarrow |$

- \* ket:  $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

- \* wyckoff: 1a

$$\boxed{\text{z2}} \quad \mathbb{Q}_0^{(c)}(A_{1g}) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z3}} \quad \mathbb{Q}_0^{(1,1;c)}(A_{1g}) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z30}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$$

$$\boxed{\text{z31}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$$

$$\boxed{\text{z32}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$$

$$\boxed{\text{z33}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$$

$$\boxed{\text{z86}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$$

$$\boxed{\text{z87}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$$

$$\boxed{\text{z88}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$$

$$\boxed{\text{z170}} \quad \mathbb{Q}_{2,1}^{(c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$$

$$\boxed{\text{z171}} \quad \mathbb{Q}_{2,2}^{(c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$$

$$\boxed{\text{z172}} \quad \mathbb{Q}_{2,3}^{(c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$$

$$\boxed{\text{z173}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$$

$$\boxed{\text{z174}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$$

$$\boxed{\text{z175}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_0^{(s)}(A_{1g})}{3}$$

- 'A'-'A' bond-cluster

- \* bra:  $\langle s, \uparrow |, \langle s, \downarrow |$

- \* ket:  $|s, \uparrow \rangle, |s, \downarrow \rangle$

- \* wyckoff: **3a@3d**

$$\boxed{\text{z4}} \quad \mathbb{Q}_0^{(c)}(A_{1g}) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z34}} \quad \mathbb{G}_0^{(1,-1;c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z35}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z270}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z302}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u) = -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z303}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z368}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_{1u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z369}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_{1u}) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z370}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_{1u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z488}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z489}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z490}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

• 'A'-'A' bond-cluster

\* bra:  $\langle s, \uparrow |, \langle s, \downarrow |$

\* ket:  $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

\* wyckoff: 3a@3d

$$\boxed{\text{z5}} \quad \mathbb{Q}_0^{(c)}(A_{1g}) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z6}} \quad \mathbb{Q}_0^{(1,0;c)}(A_{1g}) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z21}} \quad \mathbb{G}_0^{(1,-1;c)}(A_{1u}) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z36}} \quad \mathbb{G}_0^{(1,1;c)}(A_{1u}) = \mathbb{G}_0^{(1,1;a)}(A_{1u})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z37}} \quad \mathbb{G}_3^{(1,-1;c)}(A_{2g}) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z38}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z39}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g) = -\frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z40}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g) = \frac{\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z41}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g) = -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z89}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g) = -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z90}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g) = -\frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z91}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g) = \frac{\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z92}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u, a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z93}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u, a) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z94}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u, b) = \frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z95}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u, b) = -\frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z96}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(E_u) = \frac{\sqrt{2}\mathbb{G}_0^{(1,1;a)}(A_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z97}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(E_u) = \frac{\sqrt{2}\mathbb{G}_0^{(1,1;a)}(A_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z98}} \quad \mathbb{G}_{1,1}^{(c)}(T_{1g}) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z99}} \quad \mathbb{G}_{1,2}^{(c)}(T_{1g}) = -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z100}} \quad \mathbb{G}_{1,3}^{(c)}(T_{1g}) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z101}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(T_{1g}) = -\frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{30} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z102}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(T_{1g}) = -\frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{30} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{10} - \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z103}} \quad \mathbb{G}_{1,3}^{(1,-1;c)}(T_{1g}) = \frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z176}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_{1g}) = -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z177}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_{1g}) = -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z178}} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_{1g}) = \frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{5} - \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z179}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_{1g}) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z180}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_{1g}) = -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z181}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_{1g}) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z182}} \quad \mathbb{G}_{1,1}^{(1,1;c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z183}} \quad \mathbb{G}_{1,2}^{(1,1;c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z184}} \quad \mathbb{G}_{1,3}^{(1,1;c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z185}} \quad \mathbb{Q}_{1,1}^{(c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z186}} \quad \mathbb{Q}_{1,2}^{(c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z187}} \quad \mathbb{Q}_{1,3}^{(c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z271}} \quad \mathbb{Q}_{1,1}^{(c)}(T_{1u}, b) = -\frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z272}} \quad \mathbb{Q}_{1,2}^{(c)}(T_{1u}, b) = -\frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z287}} \quad \mathbb{Q}_{1,3}^{(c)}(T_{1u}, b) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z304}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_{1u}) = \frac{\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z305}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_{1u}) = -\frac{\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z306}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_{1u}) = -\frac{\sqrt{3}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z307}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z308}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z309}} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z371}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_{1u}, b) = -\frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z372}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_{1u}, b) = -\frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z373}} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_{1u}, b) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z374}} \quad \mathbb{Q}_{2,1}^{(c)}(T_{2g}) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z375}} \quad \mathbb{Q}_{2,2}^{(c)}(T_{2g}) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z376}} \quad \mathbb{Q}_{2,3}^{(c)}(T_{2g}) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z377}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_{2g}) = \frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{2}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z378}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_{2g}) = -\frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{2}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z379}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_{2g}) = -\frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z380}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(T_{2g}) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z381}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(T_{2g}) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z382}} \quad \mathbb{Q}_{2,3}^{(1,0;c)}(T_{2g}) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z383}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_{2g}) = -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z384}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z385}} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_{2g}) = -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z491}} \quad \mathbb{Q}_{3,1}^{(c)}(T_{2u}) = -\frac{\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z492}} \quad \mathbb{Q}_{3,2}^{(c)}(T_{2u}) = \frac{\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z493}} \quad \mathbb{Q}_{3,3}^{(c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z494}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z495}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z496}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z497}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_{2u}) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z498}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_{2u}) = \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z499}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z500}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z501}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z502}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

• 'A-'A' bond-cluster

- \* bra:  $\langle p_x, \uparrow |, \langle p_x, \downarrow |, \langle p_y, \uparrow |, \langle p_y, \downarrow |, \langle p_z, \uparrow |, \langle p_z, \downarrow |$
- \* ket:  $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$
- \* wyckoff: 3a@3d

$$\boxed{\text{z7}} \quad \mathbb{Q}_0^{(c)}(A_{1g}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z8}} \quad \mathbb{Q}_0^{(c)}(A_{1g}, b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z9}} \quad \mathbb{Q}_0^{(1,-1;c)}(A_{1g}) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z10}} \quad \mathbb{Q}_0^{(1,1;c)}(A_{1g}) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z22}} \quad \mathbb{G}_0^{(c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z23}} \quad \mathbb{G}_0^{(1,-1;c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z42}} \quad \mathbb{G}_4^{(1,-1;c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z43}} \quad \mathbb{G}_0^{(1,1;c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z44}} \quad \mathbb{G}_3^{(c)}(A_{2g}) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z45}} \quad \mathbb{G}_3^{(1,-1;c)}(A_{2g}) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z46}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}) = -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} - \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z47}} \quad \mathbb{Q}_3^{(1,0;c)}(A_{2u}) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z48}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z49}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z50}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z51}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, b) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z52}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, c) = \frac{\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z53}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, c) = -\frac{\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z104}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z105}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z106}} \quad \mathbb{Q}_{2,1}^{(1,-1;a)}(E_g) \mathbb{Q}_{2,1}^{(b)}(E_g) - \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g) \mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z107}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, b) = -\frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g) \mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g) \mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z108}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E_g) = \frac{\sqrt{2} \mathbb{Q}_0^{(1,1;a)}(A_{1g}) \mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z109}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E_g) = \frac{\sqrt{2} \mathbb{Q}_0^{(1,1;a)}(A_{1g}) \mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z110}} \quad \mathbb{G}_{2,1}^{(c)}(E_u) = -\frac{\sqrt{3} \mathbb{M}_{1,1}^{(a)}(T_{1g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3} \mathbb{M}_{1,2}^{(a)}(T_{1g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3} \mathbb{M}_{1,3}^{(a)}(T_{1g}) \mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z111}} \quad \mathbb{G}_{2,2}^{(c)}(E_u) = \frac{\mathbb{M}_{1,1}^{(a)}(T_{1g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(T_{1g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z112}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u, a) = -\frac{\sqrt{42} \mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} - \frac{\sqrt{70} \mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} - \frac{\sqrt{42} \mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} + \frac{\sqrt{70} \mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} + \frac{\sqrt{42} \mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,3}^{(b)}(T_{1u})}{14}$$

$$\boxed{\text{z113}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u, a) = \frac{3\sqrt{14} \mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} - \frac{\sqrt{210} \mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{84} - \frac{3\sqrt{14} \mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} - \frac{\sqrt{210} \mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{84} + \frac{\sqrt{210} \mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g}) \mathbb{T}_{1,3}^{(b)}(T_{1u})}{42}$$

$$\boxed{\text{z114}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u, b) = -\frac{\sqrt{3} \mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3} \mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3} \mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z115}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u, b) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z188}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(E_u) = -\frac{\sqrt{210} \mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{84} + \frac{3\sqrt{14} \mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} - \frac{\sqrt{210} \mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{84} - \frac{3\sqrt{14} \mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} + \frac{\sqrt{210} \mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,3}^{(b)}(T_{1u})}{42}$$

$$\boxed{\text{z189}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(E_u) = \frac{\sqrt{70} \mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} + \frac{\sqrt{42} \mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} - \frac{\sqrt{70} \mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} + \frac{\sqrt{42} \mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} - \frac{\sqrt{42} \mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g}) \mathbb{T}_{1,3}^{(b)}(T_{1u})}{14}$$

$$\boxed{\text{z190}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(E_u) = -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z191}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E_u) = -\frac{\sqrt{3} \mathbb{T}_{2,1}^{(1,0;a)}(T_{2g}) \mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3} \mathbb{T}_{2,2}^{(1,0;a)}(T_{2g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3} \mathbb{T}_{2,3}^{(1,0;a)}(T_{2g}) \mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z192}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(E_u) = -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z193}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(E_u) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z194}} \quad \mathbb{Q}_{4,1}^{(c)}(T_{1g}) = -\frac{\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z195}} \quad \mathbb{Q}_{4,2}^{(c)}(T_{1g}) = \frac{\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z196}} \quad \mathbb{Q}_{4,3}^{(c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z197}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(T_{1g}) = -\frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z198}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(T_{1g}) = \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z199}} \quad \mathbb{Q}_{4,3}^{(1,-1;c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z200}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_{1g}, a) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z201}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_{1g}, a) = \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z202}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_{1g}, a) = \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z273}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_{1g}, b) = -\frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z274}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_{1g}, b) = -\frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z275}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_{1g}, b) = \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z276}} \quad \mathbb{Q}_{1,1}^{(c)}(T_{1u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z288}} \quad \mathbb{Q}_{1,2}^{(c)}(T_{1u}) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z289}} \quad \mathbb{Q}_{1,3}^{(c)}(T_{1u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z310}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_{1u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z311}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_{1u}) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z312}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_{1u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z313}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_{1u}) = -\frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12}$$

$$\boxed{\text{z314}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_{1u}) = \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12}$$

$$\boxed{\text{z315}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_{1u}) = -\frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12}$$

$$\boxed{\text{z316}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_{1u}) = -\frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{30} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z317}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_{1u}) = -\frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{30} + \frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{10} - \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z318}} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_{1u}) = \frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} + \frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z319}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_{1u}) = -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} + \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z320}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_{1u}) = -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z321}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_{1u}) = \frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{5} - \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z386}} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(T_{1u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z387}} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(T_{1u}) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z388}} \quad \mathbb{Q}_{1,3}^{(1,1;c)}(T_{1u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z389}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_{1u}) = \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{4}$$

$$\boxed{\text{z390}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(T_{1u}) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{4} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{4}$$

$$\boxed{\text{z391}} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_{1u}) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{4}$$

$$\boxed{\text{z392}} \quad \mathbb{Q}_{2,1}^{(c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z393}} \quad \mathbb{Q}_{2,2}^{(c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z394}} \quad \mathbb{Q}_{2,3}^{(c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z395}} \quad \mathbb{Q}_{2,1}^{(c)}(T_{2g}, b) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z396}} \quad \mathbb{Q}_{2,2}^{(c)}(T_{2g}, b) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z397}} \quad \mathbb{Q}_{2,3}^{(c)}(T_{2g}, b) = -\frac{\sqrt{3}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z398}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z399}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z400}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z401}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_{2g}, b) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z402}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_{2g}, b) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z403}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_{2g}, b) = -\frac{\sqrt{3}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z404}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(T_{2g}) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z405}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(T_{2g}) = \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z406}} \quad \mathbb{Q}_{2,3}^{(1,0;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z503}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z504}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z505}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z506}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_{2u}) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z507}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z508}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_{2u}) = -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{z509} \quad \mathbb{G}_{2,1}^{(c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z510}} \quad \mathbb{G}_{2,2}^{(c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{z511} \quad \mathbb{G}_{2,3}^{(c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\mathbb{G}_{2,1}^{(1,-1;c)}(T_{2u}, a) = -\frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{21} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{21} - \frac{\sqrt{21}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{21} - \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{21}$$

$$\mathbb{G}_{2,2}^{(1,-1;c)}(T_{2u}, a) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{21} - \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{21} - \frac{\sqrt{21}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{21} + \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{21}$$

$$\mathbb{G}_{2,3}^{(1,-1;c)}(T_{2u}, a) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{21} + \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{21} - \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{21} - \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{21}$$

$$\boxed{z515} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_{2u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{c} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{c}$$

$$\boxed{\text{z516}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_{2u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{c_3} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{c_1}$$

$$\boxed{\text{z517}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_{2u},b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{c_2} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{c_3}$$

$$\boxed{z518} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})} - \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})} + \frac{3\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})} + \frac{\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}$$

$$\boxed{z519} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})} + \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})} - \frac{3\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{\mathbb{M}_{3}^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})} + \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}$$

$$\boxed{z520} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{-\frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{-\frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{+\frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{+\frac{\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}}}}$$

$$\boxed{\text{_____}} \quad \sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u}) \quad -\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u}) \quad \sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u}) \quad \sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})$$

$$\begin{array}{cccc} \square & \square & \square & \square \\ 6 & 6 & 6 & 6 \\ \square = (1,0;a) & \square = (b) & \square = (c) & \square = (d) \end{array}$$

$$\text{z522 } \mathbb{G}_{2,2}^{(r_1, r_2)}(T_{2u}) = -\frac{r_1}{6} + \frac{r_2}{6} + \frac{r_3}{6} - \frac{r_4}{6}$$

$$\boxed{\text{z523}} \quad \mathbb{G}_{2,3}^{(1,0;c)}(T_{2u}) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z524}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z525}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z526}} \quad \mathbb{G}_{2,3}^{(1,1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

• 'A'-'A' bond-cluster

- \* bra:  $\langle s, \uparrow |, \langle s, \downarrow |$
- \* ket:  $|s, \uparrow \rangle, |s, \downarrow \rangle$
- \* wyckoff: **6b@3c**

$$\boxed{\text{z11}} \quad \mathbb{Q}_0^{(c)}(A_{1g}) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z54}} \quad \mathbb{G}_0^{(1,-1;c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z55}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z203}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z204}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z205}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u, a) = -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z277}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u, a) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z290}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u, b) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{2}$$

$$\boxed{\text{z322}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u, b) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z323}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_{1u}, a) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z324}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_{1u}, a) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z325}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_{1u}, a) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z407}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z408}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z409}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z410}} \quad \mathbb{Q}_{2,1}^{(c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z411}} \quad \mathbb{Q}_{2,2}^{(c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z412}} \quad \mathbb{Q}_{2,3}^{(c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z527}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z528}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z529}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z530}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z531}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z532}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

• 'A'-'A' bond-cluster

\* bra:  $\langle s, \uparrow |, \langle s, \downarrow |$

\* ket:  $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

\* wyckoff: **6b03c**

$$\boxed{\text{z12}} \quad \mathbb{Q}_0^{(c)}(A_{1g}) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z13}} \quad \mathbb{Q}_0^{(1,-1;c)}(A_{1g}) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z14}} \quad \mathbb{Q}_0^{(1,0;c)}(A_{1g}) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z24}} \quad \mathbb{G}_0^{(1,-1;c)}(A_{1u}) = \frac{\sqrt{5}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g)}{5} + \frac{\sqrt{5}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{5} + \frac{\sqrt{5}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g)}{5} + \frac{\sqrt{5}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{5} + \frac{\sqrt{5}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{5}$$

$$\boxed{\text{z25}} \quad \mathbb{G}_4^{(1,-1;c)}(A_{1u}) = \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15} - \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15}$$

$$\boxed{\text{z26}} \quad \mathbb{G}_0^{(1,1;c)}(A_{1u}) = \mathbb{G}_0^{(1,1;a)}(A_{1u})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z56}} \quad \mathbb{G}_3^{(c)}(A_{2g}) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z57}} \quad \mathbb{G}_3^{(1,-1;c)}(A_{2g}) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z58}} \quad \mathbb{G}_3^{(1,0;c)}(A_{2g}) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z59}} \quad \mathbb{Q}_3^{(c)}(A_{2u}) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z60}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z61}} \quad \mathbb{Q}_3^{(1,0;c)}(A_{2u}) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z62}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, a) = -\frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z63}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, a) = \frac{\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z64}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, b) = \frac{\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{2}$$

$$\boxed{\text{z65}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, b) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z66}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, a) = -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z67}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, a) = -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z116}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, b) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z117}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, b) = -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{2} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{2}$$

$$\boxed{\text{z118}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, a) = -\frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z119}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, a) = \frac{\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$$

$$\boxed{\text{z120}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, b) = \frac{\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{2}$$

$$\boxed{\text{z121}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, b) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z122}} \quad \mathbb{G}_{2,1}^{(c)}(E_u) = \frac{\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{2}$$

$$\boxed{\text{z123}} \quad \mathbb{G}_{2,2}^{(c)}(E_u) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{6} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{6} - \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z124}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u, a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z125}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u, a) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z126}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u, b) = \frac{\sqrt{7}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g)}{7} + \frac{\sqrt{7}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} - \frac{\sqrt{7}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g)}{7} + \frac{\sqrt{7}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14} - \frac{\sqrt{7}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{7}$$

$$\boxed{\text{z127}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u, b) = -\frac{\sqrt{7}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g)}{7} - \frac{\sqrt{21}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} - \frac{\sqrt{7}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g)}{7} + \frac{\sqrt{21}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14}$$

$$\boxed{\text{z128}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(E_u) = \frac{\sqrt{21}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g)}{14} - \frac{\sqrt{21}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{21} - \frac{\sqrt{21}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} - \frac{\sqrt{21}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{21} + \frac{2\sqrt{21}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21}$$

$$\boxed{\text{z129}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(E_u) = -\frac{\sqrt{21}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} + \frac{\sqrt{7}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{7} - \frac{\sqrt{21}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g)}{14} - \frac{\sqrt{7}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{7}$$

$$\boxed{\text{z130}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(E_u) = \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{2}$$

$$\boxed{\text{z131}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E_u) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{6} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{6} - \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z132}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(E_u) = \frac{\sqrt{2}\mathbb{G}_0^{(1,1;a)}(A_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z133}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(E_u) = \frac{\sqrt{2}\mathbb{G}_0^{(1,1;a)}(A_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z134}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(T_{1g}) = -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{2} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z135}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(T_{1g}) = \frac{\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{2} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z136}} \quad \mathbb{Q}_{4,3}^{(1,-1;c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z137}} \quad \mathbb{G}_{1,1}^{(c)}(T_{1g}, a) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z138}} \quad \mathbb{G}_{1,2}^{(c)}(T_{1g}, a) = -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z139}} \quad \mathbb{G}_{1,3}^{(c)}(T_{1g}, a) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z140}} \quad \mathbb{G}_{1,1}^{(c)}(T_{1g}, b) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z141}} \quad \mathbb{G}_{1,2}^{(c)}(T_{1g}, b) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z142}} \quad \mathbb{G}_{1,3}^{(c)}(T_{1g}, b) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z206}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(T_{1g}, a) = -\frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{30} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z207}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(T_{1g}, a) = -\frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{30} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{10} - \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z208}} \quad \mathbb{G}_{1,3}^{(1,-1;c)}(T_{1g}, a) = \frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z209}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(T_{1g}, b) = -\frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z210}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(T_{1g}, b) = \frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} - \frac{\sqrt{6}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z211}} \quad \mathbb{G}_{1,3}^{(1,-1;c)}(T_{1g}, b) = -\frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z212}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_{1g}) = -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z213}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_{1g}) = -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z214}} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_{1g}) = \frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{5} - \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z215}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_{1g}, a) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z216}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_{1g}, a) = -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z217}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_{1g}, a) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z218}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_{1g}, b) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z219}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_{1g}, b) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z220}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_{1g}, b) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z221}} \quad \mathbb{G}_{1,1}^{(1,1;c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z222}} \quad \mathbb{G}_{1,2}^{(1,1;c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z223}} \quad \mathbb{G}_{1,3}^{(1,1;c)}(T_{1g}) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z224}} \quad \mathbb{Q}_{1,1}^{(c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z225}} \quad \mathbb{Q}_{1,2}^{(c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z226}} \quad \mathbb{Q}_{1,3}^{(c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z227}} \quad \mathbb{Q}_{1,1}^{(c)}(T_{1u}, b) = -\frac{\sqrt{30}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{30} + \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{10}$$

$$\boxed{\text{z228}} \quad \mathbb{Q}_{1,2}^{(c)}(T_{1u}, b) = \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{10} - \frac{\sqrt{30}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{30} - \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{10}$$

$$\boxed{\text{z229}} \quad \mathbb{Q}_{1,3}^{(c)}(T_{1u}, b) = \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{10} + \frac{\sqrt{30}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{15}$$

$$\boxed{\text{z230}} \quad \mathbb{Q}_{3,1}^{(c)}(T_{1u}) = -\frac{\sqrt{5}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} - \frac{\sqrt{15}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15}$$

$$\boxed{\text{z231}} \quad \mathbb{Q}_{3,2}^{(c)}(T_{1u}) = -\frac{\sqrt{15}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} - \frac{\sqrt{5}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15}$$

$$\boxed{\text{z232}} \quad \mathbb{Q}_{3,3}^{(c)}(T_{1u}) = -\frac{\sqrt{15}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15} + \frac{\sqrt{5}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{5}$$

$$\boxed{\text{z278}} \quad \begin{aligned} \mathbb{Q}_{1,1}^{(1,-1;c)}(T_{1u}) &= -\frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{10} + \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{30} \\ &\quad - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{30} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{30} + \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{30} \end{aligned}$$

$$\boxed{\text{z279}} \quad \begin{aligned} \mathbb{Q}_{1,2}^{(1,-1;c)}(T_{1u}) &= \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{10} + \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{30} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{30} \\ &\quad - \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{30} - \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{30} \end{aligned}$$

$$\boxed{\text{z280}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_{1u}) = -\frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{30} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{30} - \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{15}$$

$$\boxed{\text{z291}} \quad \begin{aligned} \mathbb{Q}_{3,1}^{(1,-1;c)}(T_{1u}) &= \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{20} - \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{20} - \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{60} \\ &\quad + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{60} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15} \end{aligned}$$

$$\boxed{\text{z292}} \quad \begin{aligned} \mathbb{Q}_{3,2}^{(1,-1;c)}(T_{1u}) &= -\frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{20} + \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{60} \\ &\quad + \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{20} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{60} - \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15} \end{aligned}$$

$$\boxed{\text{z293}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_{1u}) = -\frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{30} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{30}$$

$$\boxed{\text{z326}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z327}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z328}} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z329}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_{1u}, b) = -\frac{\sqrt{30}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{30} + \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{10}$$

$$\boxed{\text{z330}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_{1u}, b) = \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{10} - \frac{\sqrt{30}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{30} - \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{10}$$

$$\boxed{\text{z331}} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_{1u}, b) = \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{10} + \frac{\sqrt{30}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{15}$$

$$\boxed{\text{z332}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_{1u}) = -\frac{\sqrt{5}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} - \frac{\sqrt{15}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15}$$

$$\boxed{\text{z333}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_{1u}) = -\frac{\sqrt{15}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} - \frac{\sqrt{5}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15}$$

$$\boxed{\text{z334}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_{1u}) = -\frac{\sqrt{15}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15} + \frac{\sqrt{5}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{5}$$

$$\boxed{\text{z335}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_{1u}) = -\frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{4} - \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{4} - \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{12} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{12}$$

$$\boxed{\text{z336}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(T_{1u}) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{4} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{12} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{4} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{12}$$

$$\boxed{\text{z337}} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_{1u}) = \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{6}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z413}} \quad \mathbb{Q}_{2,1}^{(c)}(T_{2g}, a) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z414}} \quad \mathbb{Q}_{2,2}^{(c)}(T_{2g}, a) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z415}} \quad \mathbb{Q}_{2,3}^{(c)}(T_{2g}, a) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z416}} \quad \mathbb{Q}_{2,1}^{(c)}(T_{2g}, b) = -\frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z417}} \quad \mathbb{Q}_{2,2}^{(c)}(T_{2g}, b) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z418}} \quad \mathbb{Q}_{2,3}^{(c)}(T_{2g}, b) = -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z419}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_{2g}, a) = \frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{2}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z420}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_{2g}, a) = -\frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{2}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z421}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_{2g}, a) = -\frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z422}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_{2g}, b) = \frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{30} - \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{10}$$

$$\boxed{\text{z423}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_{2g}, b) = \frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{30} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{10}$$

$$\boxed{\text{z424}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_{2g}, b) = -\frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{M}_{2,3}^{(b)}(T_{2u})}{15} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{10}$$

$$\boxed{\text{z425}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(T_{2g}) = -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{10} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{10} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{15} + \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{15}$$

$$\boxed{\text{z426}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(T_{2g}) = -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{10} + \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{15} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{10} + \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{15}$$

$$\boxed{\text{z427}} \quad \mathbb{Q}_{4,3}^{(1,-1;c)}(T_{2g}) = \frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{M}_{2,3}^{(b)}(T_{2u})}{5} + \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{15} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{15}$$

$$\boxed{\text{z428}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(T_{2g}, a) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z429}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(T_{2g}, a) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z430}} \quad \mathbb{Q}_{2,3}^{(1,0;c)}(T_{2g}, a) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z431}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(T_{2g}, b) = -\frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z432}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(T_{2g}, b) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z433}} \quad \mathbb{Q}_{2,3}^{(1,0;c)}(T_{2g}, b) = -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z434}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_{1u})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z435}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_{1u})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z436}} \quad \mathbb{Q}_{2,3}^{(1,1;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_{1u})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z437}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_{2g}) = -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z438}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z439}} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_{2g}) = -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z533}} \quad \mathbb{Q}_{3,1}^{(c)}(T_{2u}) = -\frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} + \frac{\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3} - \frac{\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z534}} \quad \mathbb{Q}_{3,2}^{(c)}(T_{2u}) = -\frac{\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} + \frac{\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z535}} \quad \mathbb{Q}_{3,3}^{(c)}(T_{2u}) = \frac{\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3} - \frac{\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3} + \frac{\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z536}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{12} - \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{12} + \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{4} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{4}$$

$$\boxed{\text{z537}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{12} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{4} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{12} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{4}$$

$$\boxed{\text{z538}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{6}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z539}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_{2u}) = -\frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} + \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3} - \frac{\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z540}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_{2u}) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} + \frac{\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z541}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_{2u}) = \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3} + \frac{\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z542}} \quad \mathbb{G}_{2,1}^{(c)}(T_{2u}) = -\frac{\sqrt{6}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{6}$$

$$\boxed{\text{z543}} \quad \mathbb{G}_{2,2}^{(c)}(T_{2u}) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{6}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{6}$$

$$\boxed{\text{z544}} \quad \mathbb{G}_{2,3}^{(c)}(T_{2u}) = -\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z545}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_{2u}, a) = \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z546}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_{2u}, a) = \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z547}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_{2u}, a) = \frac{\sqrt{3}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z548}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_{2u}, b) = \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{42} + \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{42} - \frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} \\ - \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14}$$

$$\boxed{\text{z549}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_{2u}, b) = \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{42} + \frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14} \\ + \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{42} + \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} + \frac{\sqrt{14}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14}$$

$$\boxed{\text{z550}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_{2u}, b) = -\frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21} + \frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} - \frac{\sqrt{42}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{21}$$

$$\boxed{\text{z551}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{28} - \frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{28} + \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{28} \\ + \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{28} + \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21} + \frac{\sqrt{42}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{21}$$

$$\boxed{\text{z552}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{28} + \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21} - \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{28} \\ - \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{28} - \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{28} + \frac{\sqrt{42}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{21}$$

$$\boxed{\text{z553}} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{14} + \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{21} + \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{21} + \frac{\sqrt{14}\mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{14}$$

$$\boxed{\text{z554}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(T_{2u}) = -\frac{\sqrt{6}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{6}$$

$$\boxed{\text{z555}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(T_{2u}) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{6}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{6}$$

$$\boxed{\text{z556}} \quad \mathbb{G}_{2,3}^{(1,0;c)}(T_{2u}) = -\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z557}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{G}_0^{(1,1;a)}(A_{1u})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z558}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{G}_0^{(1,1;a)}(A_{1u})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z559}} \quad \mathbb{G}_{2,3}^{(1,1;c)}(T_{2u}) = \frac{\sqrt{3}\mathbb{G}_0^{(1,1;a)}(A_{1u})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3}$$

• 'A'-A' bond-cluster

\* bra:  $\langle p_x, \uparrow |, \langle p_x, \downarrow |, \langle p_y, \uparrow |, \langle p_y, \downarrow |, \langle p_z, \uparrow |, \langle p_z, \downarrow |$

\* ket:  $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

\* wyckoff: 6b@3c

$$\boxed{\text{z15}} \quad \mathbb{Q}_0^{(c)}(A_{1g}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z16}} \quad \mathbb{Q}_0^{(c)}(A_{1g}, b) = \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{5}$$

$$\boxed{\text{z17}} \quad \mathbb{Q}_4^{(c)}(A_{1g}) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15}$$

$$\boxed{\text{z18}} \quad \mathbb{Q}_0^{(1,-1;c)}(A_{1g}) = \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{5}$$

$$\boxed{\text{z19}} \quad \mathbb{Q}_4^{(1,-1;c)}(A_{1g}) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15}$$

$$\boxed{\text{z20}} \quad \mathbb{Q}_0^{(1,1;c)}(A_{1g}) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z27}} \quad \mathbb{G}_0^{(c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z28}} \quad \mathbb{G}_0^{(1,-1;c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z29}} \quad \mathbb{G}_4^{(1,-1;c)}(A_{1u}, a) = \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z68}} \quad \mathbb{G}_4^{(1,-1;c)}(A_{1u}, b) = -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3} - \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z69}} \quad \mathbb{G}_0^{(1,0;c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z70}} \quad \mathbb{G}_0^{(1,1;c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z71}} \quad \mathbb{G}_3^{(c)}(A_{2g}) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z72}} \quad \mathbb{G}_3^{(1,-1;c)}(A_{2g}) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z73}} \quad \mathbb{G}_3^{(1,0;c)}(A_{2g}) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3} + \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3} + \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z74}} \quad \mathbb{Q}_3^{(c)}(A_{2u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z75}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}, a) = -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} - \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z76}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}, b) = -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3} - \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z77}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}, c) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z78}} \quad \mathbb{Q}_3^{(1,0;c)}(A_{2u}) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\sqrt{3}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z79}} \quad \mathbb{Q}_3^{(1,1;c)}(A_{2u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z80}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z81}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z82}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z83}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, b) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z84}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, c) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{7} + \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{7} + \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{7}$$

$$\boxed{\text{z85}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, c) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{7} - \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{7} + \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14}$$

$$\boxed{\text{z143}} \quad \mathbb{Q}_{4,1}^{(c)}(E_g) = \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{14} - \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{21} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{21} + \frac{2\sqrt{21}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21}$$

$$\boxed{\text{z144}} \quad \mathbb{Q}_{4,2}^{(c)}(E_g) = -\frac{\sqrt{21}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} + \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{7} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{7}$$

$$\boxed{\text{z145}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z146}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z147}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, b) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{7} + \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{7} + \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{7}$$

$$\boxed{\text{z148}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, b) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{7} - \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{7} + \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14}$$

$$\boxed{\text{z149}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g) = \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{14} - \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{21} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{21} + \frac{2\sqrt{21}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21}$$

$$\boxed{\text{z150}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g) = -\frac{\sqrt{21}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} + \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{7} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{7}$$

$$\boxed{\text{z151}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{2}$$

$$\boxed{\text{z152}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{6} + \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{6} - \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z153}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z154}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

- [z155]  $\mathbb{Q}_{5,1}^{(1,-1;c)}(E_u) = \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{28} - \frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{28} - \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{28} - \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{28} + \frac{\sqrt{42}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{14}$
- [z156]  $\mathbb{Q}_{5,2}^{(1,-1;c)}(E_u) = \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{84} + \frac{3\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{28} + \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{84} - \frac{3\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{28} - \frac{\sqrt{210}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{42}$
- [z157]  $\mathbb{G}_{2,1}^{(c)}(E_u, a) = -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$
- [z158]  $\mathbb{G}_{2,2}^{(c)}(E_u, a) = \frac{\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$
- [z159]  $\mathbb{G}_{2,1}^{(c)}(E_u, b) = \frac{\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{2}$
- [z160]  $\mathbb{G}_{2,2}^{(c)}(E_u, b) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{3}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$
- [z161]  $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, a) = -\frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} - \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} - \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} + \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} + \frac{\sqrt{42}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{14}$
- [z162]  $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, a) = \frac{3\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} - \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{84} - \frac{3\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{84} + \frac{\sqrt{210}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{42}$
- [z163]  $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, b) = -\frac{3\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{28} - \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{84} + \frac{3\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{28} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{84} + \frac{\sqrt{210}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{42}$
- [z164]  $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, b) = -\frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{28} + \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{28} - \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{28} - \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{28} + \frac{\sqrt{42}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{14}$
- [z165]  $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, c) = -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$
- [z166]  $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, c) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$
- [z167]  $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, d) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{2}$

- [z168]  $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, d) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$
- [z169]  $\mathbb{G}_{4,1}^{(1,-1;c)}(E_u) = -\frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{84} + \frac{3\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{84} - \frac{3\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} + \frac{\sqrt{210}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{42}$
- [z233]  $\mathbb{G}_{4,2}^{(1,-1;c)}(E_u) = \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} + \frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{28} - \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} + \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{28} - \frac{\sqrt{42}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{14}$
- [z234]  $\mathbb{G}_{2,1}^{(1,0;c)}(E_u, a) = -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$
- [z235]  $\mathbb{G}_{2,2}^{(1,0;c)}(E_u, a) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$
- [z236]  $\mathbb{G}_{2,1}^{(1,0;c)}(E_u, b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{3}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$
- [z237]  $\mathbb{G}_{2,2}^{(1,0;c)}(E_u, b) = -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{2} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{2}$
- [z238]  $\mathbb{G}_{2,1}^{(1,1;c)}(E_u, a) = -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$
- [z239]  $\mathbb{G}_{2,2}^{(1,1;c)}(E_u, a) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{2}$
- [z240]  $\mathbb{G}_{2,1}^{(1,1;c)}(E_u, b) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{2}$
- [z241]  $\mathbb{G}_{2,2}^{(1,1;c)}(E_u, b) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$
- [z242]  $\mathbb{Q}_{4,1}^{(c)}(T_{1g}) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{4} - \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{12} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{12}$
- [z243]  $\mathbb{Q}_{4,2}^{(c)}(T_{1g}) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{12}$
- [z244]  $\mathbb{Q}_{4,3}^{(c)}(T_{1g}) = \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$

$$\text{z245} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(T_{1g}) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{4} - \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{12} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{12}$$

$$\boxed{z246} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(T_{1g}) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{12}$$

$$\boxed{z247} \quad \mathbb{Q}_{4,3}^{(1,-1;c)}(T_{1g}) = \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6}$$

$$\mathbb{G}_{1,1}^{(c)}(T_{1g}) = -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{10} + \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{20} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{20} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{20} + \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{20}$$

$$\text{z249} \quad \mathbb{G}_{1,1,2}^{(c)}(T_{1g}) = \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{12} + \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{30} - \frac{\sqrt{10}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{12} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{30}$$

$$\boxed{z250} \quad \mathbb{G}_{1,3}^{(c)}(T_{1g}) = -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{20} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{20} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{15}$$

$$\boxed{\text{z251}} \quad \mathbb{G}_{\mathfrak{R}_3}^{(c)}(T_{1q}) = \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{\mathfrak{S}_2} - \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{\mathfrak{S}_2} - \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{\mathfrak{S}_2} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{\mathfrak{S}_2} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{\mathfrak{S}_2} + \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{\mathfrak{S}_2}$$

$$\boxed{\text{z252}} \quad \mathbb{G}_{3,2}^{(c)}(T_{1g}) = -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})} + \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)} + \frac{\sqrt{10}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}$$

$$\boxed{\text{z253}} \quad \mathbb{G}_{3,2}^{(c)}(T_{1g}) = -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{-\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{+\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}$$

$$\overline{\square} = \begin{pmatrix} 1 & -1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}, \quad \sqrt{10}\mathbb{Q}_{\beta,i}^{(1,-1;a)}(E_{\alpha})\mathbb{Q}_{\beta,j}^{(b)}(T_{2\alpha}) = \sqrt{10}\mathbb{Q}_{\beta,i}^{(1,-1;a)}(T_{2\alpha})\mathbb{Q}_{\beta,j}^{(b)}(E_{\alpha}), \quad \sqrt{30}\mathbb{Q}_{\beta,i}^{(1,-1;a)}(T_{2\alpha})\mathbb{Q}_{\beta,j}^{(b)}(E_{\alpha}).$$

$$\begin{aligned} \text{zz54 } \mathbb{Q}_{1,1}(T_{1g}) = & -\frac{10}{-\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})} + \frac{10}{-\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})} + \frac{30}{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})} \\ & - \frac{30}{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})} - \frac{30}{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})} + \frac{30}{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})} \end{aligned}$$

$$\begin{aligned} \text{z255 } \mathbb{G}_{1,2}^{(1,-1;c)}(T_{1g}) = & \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{30} \\ & - \frac{\sqrt{10}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{30} \end{aligned}$$

$$\mathbb{G}_{1,3}^{(1,-1;c)}(T_{1g}) = -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{30} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{15}$$

$$\boxed{\text{z257}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_{1g}) = \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{20} - \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{20} - \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{60} \\ + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{60} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15}$$

$$\boxed{\text{z258}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_{1g}) = -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{20} + \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{60} \\ + \frac{\sqrt{10}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{20} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{60} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15}$$

$$\boxed{\text{z259}} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_{1g}) = -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{30} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{30}$$

$$\boxed{\text{z260}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_{1g}, a) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z261}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_{1g}, a) = \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z262}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_{1g}, a) = \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z263}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_{1g}, b) = -\frac{\sqrt{30}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{30} + \frac{\sqrt{10}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{10}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{10} + \frac{\sqrt{10}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{10}$$

$$\boxed{\text{z264}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_{1g}, b) = \frac{\sqrt{10}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{10} - \frac{\sqrt{30}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{30} - \frac{\sqrt{10}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{10}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{10}$$

$$\boxed{\text{z265}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_{1g}, b) = \frac{\sqrt{10}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{10} + \frac{\sqrt{10}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{10} + \frac{\sqrt{30}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{15}$$

$$\boxed{\text{z266}} \quad \mathbb{G}_{3,1}^{(1,0;c)}(T_{1g}) = -\frac{\sqrt{5}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} - \frac{\sqrt{15}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15}$$

$$\boxed{\text{z267}} \quad \mathbb{G}_{3,2}^{(1,0;c)}(T_{1g}) = -\frac{\sqrt{15}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{15} - \frac{\sqrt{5}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15}$$

$$\boxed{\text{z268}} \quad \mathbb{G}_{3,3}^{(1,0;c)}(T_{1g}) = -\frac{\sqrt{15}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{15} - \frac{\sqrt{15}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{15} + \frac{\sqrt{5}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{5}$$

$$\boxed{\text{z281}} \quad \mathbb{Q}_{1,1}^{(c)}(T_{1u}, a) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z282}} \quad \mathbb{Q}_{1,2}^{(c)}(T_{1u}, a) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z283}} \quad \mathbb{Q}_{1,3}^{(c)}(T_{1u}, a) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z284}} \quad \mathbb{Q}_{1,1}^{(c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z285}} \quad \mathbb{Q}_{1,2}^{(c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z286}} \quad \mathbb{Q}_{1,3}^{(c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z294}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_{1u}, a) = -\frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{21} - \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{21} - \frac{\sqrt{21}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{21} + \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{21}$$

$$\boxed{\text{z295}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_{1u}, a) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{21} + \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{21} - \frac{\sqrt{21}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{21} - \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{21}$$

$$\boxed{\text{z296}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_{1u}, a) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{21} - \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{21} - \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{21} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{21}$$

$$\boxed{\text{z297}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z298}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_{1u}, b) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z299}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z338}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_{1u}, c) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z339}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_{1u}, c) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z340}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_{1u}, c) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z341}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_{1u}, a) = -\frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12}$$

$$\boxed{\text{z342}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_{1u}, a) = \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12}$$

$$\boxed{\text{z343}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_{1u}, a) = -\frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12}$$

$$\boxed{\text{z344}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_{1u}, b) = -\frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{84} - \frac{5\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{84} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{84} \\ + \frac{5\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{84} - \frac{4\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{21}$$

$$\boxed{\text{z345}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_{1u}, b) = -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{84} + \frac{5\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{84} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{84} \\ - \frac{5\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{84} - \frac{4\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{21}$$

$$\boxed{\text{z346}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_{1u}, b) = -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{84} - \frac{5\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{84} - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{84} \\ + \frac{5\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{84} - \frac{4\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{21}$$

$$\boxed{\text{z347}} \quad \mathbb{Q}_{5,1}^{(1,-1;c)}(T_{1u}, 2) = \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{4} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{12} + \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{4}$$

$$\boxed{\text{z348}} \quad \mathbb{Q}_{5,2}^{(1,-1;c)}(T_{1u}, 2) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{12} + \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{4} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{4}$$

$$\boxed{\text{z349}} \quad \mathbb{Q}_{5,3}^{(1,-1;c)}(T_{1u}, 2) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{4} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{12} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{4}$$

$$\boxed{\text{z350}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_{1u}, a) = -\frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{30} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z351}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_{1u}, a) = -\frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{30} + \frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{10} - \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z352}} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_{1u}, a) = \frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} + \frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10}$$

$$\boxed{\text{z353}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_{1u}, b) = -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{2}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z354}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{2}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z355}} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_{1u}, b) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z356}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_{1u}, a) = -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} + \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z357}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_{1u}, a) = -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{10} - \frac{\sqrt{15}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z358}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_{1u}, a) = \frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{5} - \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{15} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{15}$$

$$\boxed{\text{z359}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_{1u}, b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3} + \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z360}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_{1u}, b) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z361}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_{1u}, b) = -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{3} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z440}} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(T_{1u}, a) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z441}} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(T_{1u}, a) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z442}} \quad \mathbb{Q}_{1,3}^{(1,1;c)}(T_{1u}, a) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z443}} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z444}} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z445}} \quad \mathbb{Q}_{1,3}^{(1,1;c)}(T_{1u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z446}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_{1u}) = \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{4}$$

$$\boxed{\text{z447}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(T_{1u}) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{4} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{4}$$

$$\boxed{\text{z448}} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_{1u}) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{4}$$

$$\boxed{\text{z449}} \quad \mathbb{Q}_{2,1}^{(c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z450}} \quad \mathbb{Q}_{2,2}^{(c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z451}} \quad \mathbb{Q}_{2,3}^{(c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z452}} \quad \mathbb{Q}_{2,1}^{(c)}(T_{2g}, b) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z453}} \quad \mathbb{Q}_{2,2}^{(c)}(T_{2g}, b) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z454}} \quad \mathbb{Q}_{2,3}^{(c)}(T_{2g}, b) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z455}} \quad \mathbb{Q}_{2,1}^{(c)}(T_{2g}, c) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{42} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{42} - \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} - \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14}$$

$$\boxed{\text{z456}} \quad \mathbb{Q}_{2,2}^{(c)}(T_{2g}, c) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{42} + \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{42} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14}$$

$$\boxed{\text{z457}} \quad \mathbb{Q}_{2,3}^{(c)}(T_{2g}, c) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21} + \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} - \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{21}$$

$$\boxed{\text{z458}} \quad \mathbb{Q}_{4,1}^{(c)}(T_{2g}) = -\frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{28} - \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21} + \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{21}$$

$$\boxed{\text{z459}} \quad \mathbb{Q}_{4,2}^{(c)}(T_{2g}) = -\frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{28} - \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{28} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{21}$$

$$\boxed{\text{z460}} \quad \mathbb{Q}_{4,3}^{(c)}(T_{2g}) = \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{21} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{21} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{14}$$

$$\boxed{\text{z461}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z462}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z463}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_{2g}, a) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_0^{(b)}(A_{1g})}{3}$$

$$\boxed{\text{z464}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_{2g}, b) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{42} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{42} - \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} \\ - \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14}$$

$$\boxed{\text{z465}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_{2g}, b) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{42} + \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14} \\ + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{42} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14}$$

$$\boxed{\text{z466}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_{2g}, b) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21} + \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{14} - \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{21}$$

$$\boxed{\text{z467}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(T_{2g}) = -\frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{28} - \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{28} \\ + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21} + \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{21}$$

$$\boxed{\text{z468}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(T_{2g}) = -\frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{21} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{28} \\ - \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{28} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{21}$$

$$\boxed{\text{z469}} \quad \mathbb{Q}_{4,3}^{(1,-1;c)}(T_{2g}) = \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{21} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{21} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{14}$$

$$\boxed{\text{z470}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(T_{2g}) = -\frac{\sqrt{6}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{2}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{6}$$

$$\boxed{\text{z471}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(T_{2g}) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{6}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{2}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{6}$$

$$\boxed{\text{z472}} \quad \mathbb{Q}_{2,3}^{(1,0;c)}(T_{2g}) = -\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{6} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{6} + \frac{\sqrt{2}\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z473}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z474}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z475}} \quad \mathbb{Q}_{2,3}^{(1,1;c)}(T_{2g}) = \frac{\sqrt{3}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z476}} \quad \mathbb{G}_{3,1}^{(c)}(T_{2g}) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{12} - \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{4} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{4}$$

$$\boxed{\text{z477}} \quad \mathbb{G}_{3,2}^{(c)}(T_{2g}) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{12} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{4}$$

$$\boxed{\text{z478}} \quad \mathbb{G}_{3,3}^{(c)}(T_{2g}) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,3}^{(a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z479}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_{2g}) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{12} - \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{4} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{4}$$

$$\boxed{\text{z480}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_{2g}) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{12} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{4}$$

$$\boxed{\text{z481}} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_{2g}) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6}$$

$$\boxed{\text{z482}} \quad \mathbb{G}_{3,1}^{(1,0;c)}(T_{2g}) = -\frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} + \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3} - \frac{\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z483}} \quad \mathbb{G}_{3,2}^{(1,0;c)}(T_{2g}) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,3}^{(b)}(T_{2g})}{3} + \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} + \frac{\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3}$$

$$\boxed{\text{z484}} \quad \mathbb{G}_{3,3}^{(1,0;c)}(T_{2g}) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(T_{2g})}{3} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,1}^{(b)}(T_{2g})}{3} + \frac{\mathbb{G}_{1,3}^{(1,0;a)}(T_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{3}$$

$$\boxed{\text{z560}} \quad \mathbb{Q}_{3,1}^{(c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z561}} \quad \mathbb{Q}_{3,2}^{(c)}(T_{2u}) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z562}} \quad \mathbb{Q}_{3,3}^{(c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z563}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_{2u}, a) = \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z564}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_{2u}, a) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{12} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z565}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_{2u}, a) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{12} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z566}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_{2u}, b) = \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{24} - \frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{24} - \frac{\sqrt{10}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{8}$$

$$\boxed{\text{z567}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_{2u}, b) = -\frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{24} - \frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{8} + \frac{\sqrt{6}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{24} - \frac{\sqrt{10}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{8}$$

$$\boxed{\text{z568}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_{2u}, b) = \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{24} - \frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{24} - \frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{8}$$

$$\boxed{\text{z569}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_{2u}, c) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z570}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_{2u}, c) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z571}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_{2u}, c) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z572}} \quad \mathbb{Q}_{5,1}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{24} + \frac{\sqrt{10}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{24}$$

$$\boxed{\text{z573}} \quad \mathbb{Q}_{5,2}^{(1,-1;c)}(T_{2u}) = \frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{24} - \frac{\sqrt{10}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{24}$$

$$\boxed{\text{z574}} \quad \mathbb{Q}_{5,3}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{24} + \frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{24}$$

$$\boxed{\text{z575}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_{2u}, a) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z576}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_{2u}, a) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z577}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_{2u}, a) = -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{3}$$

$$\boxed{\text{z578}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_{2u}, b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{2,1}^{(b)}(T_{2u})}{2}$$

$$\boxed{\text{z579}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_{2u}, b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{2,2}^{(b)}(T_{2u})}{2}$$

$$\boxed{\text{z580}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_{2u}, b) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_{2,3}^{(b)}(T_{2u})}{3}$$

$$\boxed{\text{z581}} \quad \mathbb{Q}_{3,1}^{(1,1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z582}} \quad \mathbb{Q}_{3,2}^{(1,1;c)}(T_{2u}) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z583}} \quad \mathbb{Q}_{3,3}^{(1,1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$[z584] \quad \mathbb{G}_{2,1}^{(c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{z855} \quad \mathbb{G}_{2,2}^{(c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{z586} \quad \mathbb{G}_{2,3}^{(c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{z587} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_{2u}, a) = -\frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{21} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{21} - \frac{\sqrt{21}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{21} - \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{21}$$

$$\mathbb{G}_{2,2}^{(1,-1;c)}(T_{2u}, a) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{21} - \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{21} - \frac{\sqrt{21}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{21} + \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{21}$$

$$\boxed{z589} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_{2u}, a) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{\mathfrak{P}_1} + \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{\mathfrak{P}_1} - \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{\mathfrak{P}_1} - \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{\mathfrak{P}_1} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{\mathfrak{P}_1}$$

$$\boxed{\text{z590}} \quad \mathbb{G}_{\frac{1}{2}, \frac{1}{2}}^{(1, -1; c)}(T_{2u}, b) = \frac{\sqrt{6} \mathbb{M}_{1,2}^{(1, -1; a)}(T_{1g}) \mathbb{T}_{1,3}^{(b)}(T_{1u})}{c} + \frac{\sqrt{6} \mathbb{M}_{1,3}^{(1, -1; a)}(T_{1g}) \mathbb{T}_{1,2}^{(b)}(T_{1u})}{c}$$

$$\boxed{\text{z591}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_{2u}, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{\mathbb{T}_{1,3}^{(b)}(T_{1u})} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{\mathbb{T}_{1,1}^{(b)}(T_{1u})}$$

$$\boxed{\text{z592}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_{2u},b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{c_2} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{c_3}$$

$$\boxed{z593} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})} - \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})} + \frac{3\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{\mathbb{M}_3^{(1,-1;a)}(A_{2g})} + \frac{\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{\mathbb{M}_3^{(1,-1;a)}(A_{2g})}$$

$$\boxed{z594} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})} + \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})} - \frac{3\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{\mathbb{M}_{3}^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})} + \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{\mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}$$

$$\boxed{z95} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_{2u}) = -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})} - \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})} - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})} + \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})} + \frac{\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}$$

$$\boxed{\text{z596}} \quad \mathbb{G}_{\mathbb{R}, 1}^{(1, 0; c)}(T_{2u}, a) = \frac{\sqrt{6}\mathbb{T}_{2, 1}^{(1, 0; a)}(E_g)\mathbb{T}_{1, 1}^{(b)}(T_{1u})}{\mathbb{T}_{2, 2}^{(1, 0; a)}(E_g)\mathbb{T}_{1, 1}^{(b)}(T_{1u})} + \frac{\sqrt{2}\mathbb{T}_{2, 2}^{(1, 0; a)}(E_g)\mathbb{T}_{1, 1}^{(b)}(T_{1u})}{\mathbb{T}_{2, 2}^{(1, 0; a)}(T_{2g})\mathbb{T}_{1, 3}^{(b)}(T_{1u})} - \frac{\sqrt{2}\mathbb{T}_{2, 2}^{(1, 0; a)}(T_{2g})\mathbb{T}_{1, 3}^{(b)}(T_{1u})}{\mathbb{T}_{2, 3}^{(1, 0; a)}(T_{2g})\mathbb{T}_{1, 2}^{(b)}(T_{1u})} + \frac{\sqrt{2}\mathbb{T}_{2, 3}^{(1, 0; a)}(T_{2g})\mathbb{T}_{1, 2}^{(b)}(T_{1u})}{\mathbb{T}_{2, 2}^{(1, 0; a)}(E_g)\mathbb{T}_{1, 1}^{(b)}(T_{1u})}$$

$$\boxed{z597} \quad \mathbb{G}_{\mathbb{R}, 0, 0}^{(1, 0; c)}(T_{2u}, a) = -\frac{\sqrt{6}\mathbb{T}_{2, 1}^{(1, 0; a)}(E_g)\mathbb{T}_{1, 2}^{(b)}(T_{1u})}{\mathbb{T}_{2, 1}^{(1, 0; a)}(T_{2g})\mathbb{T}_{1, 3}^{(b)}(T_{1u})} + \frac{\sqrt{2}\mathbb{T}_{2, 1}^{(1, 0; a)}(T_{2g})\mathbb{T}_{1, 3}^{(b)}(T_{1u})}{\mathbb{T}_{2, 2}^{(1, 0; a)}(E_g)\mathbb{T}_{1, 2}^{(b)}(T_{1u})} - \frac{\sqrt{2}\mathbb{T}_{2, 3}^{(1, 0; a)}(T_{2g})\mathbb{T}_{1, 1}^{(b)}(T_{1u})}{\mathbb{T}_{2, 2}^{(1, 0; a)}(E_g)\mathbb{T}_{1, 2}^{(b)}(T_{1u})}$$

$$\boxed{\text{z598}} \quad \mathbb{G}_{2,3}^{(1,0;c)}(T_{2u}, a) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,3}^{(b)}(T_{1u})}{3} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z599}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(T_{2u}, b) = \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z600}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(T_{2u}, b) = \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,3}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{2,3}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z601}} \quad \mathbb{G}_{2,3}^{(1,0;c)}(T_{2u}, b) = \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,2}^{(b)}(T_{2u})}{6} + \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(T_{2g})\mathbb{M}_{2,1}^{(b)}(T_{2u})}{6}$$

$$\boxed{\text{z602}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z603}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,3}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

$$\boxed{\text{z604}} \quad \mathbb{G}_{2,3}^{(1,1;c)}(T_{2u}) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,2}^{(b)}(T_{1u})}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_{1g})\mathbb{T}_{1,1}^{(b)}(T_{1u})}{6}$$

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### — Atomic SAMB —

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- bra:  $\langle s, \uparrow |, \langle s, \downarrow |$
- ket:  $|s, \uparrow \rangle, |s, \downarrow \rangle$

$$\boxed{\text{x1}} \quad \mathbb{Q}_0^{(a)}(A_{1g}) = \begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \end{bmatrix}$$

$$\boxed{\text{x2}} \quad \mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g}) = \begin{bmatrix} 0 & \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} & 0 \end{bmatrix}$$

$$\boxed{\text{x3}} \quad \mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g}) = \begin{bmatrix} 0 & -\frac{\sqrt{2}i}{2} \\ \frac{\sqrt{2}i}{2} & 0 \end{bmatrix}$$

$$\boxed{\text{x4}} \quad \mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g}) = \begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & -\frac{\sqrt{2}}{2} \end{bmatrix}$$

- bra:  $\langle s, \uparrow |$ ,  $\langle s, \downarrow |$
- ket:  $|p_x, \uparrow\rangle$ ,  $|p_x, \downarrow\rangle$ ,  $|p_y, \uparrow\rangle$ ,  $|p_y, \downarrow\rangle$ ,  $|p_z, \uparrow\rangle$ ,  $|p_z, \downarrow\rangle$

$$\boxed{x5} \quad \mathbb{Q}_{1,1}^{(a)}(T_{1u}) = \begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x6} \quad \mathbb{Q}_{1,2}^{(a)}(T_{1u}) = \begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$$

$$\boxed{x7} \quad \mathbb{Q}_{1,3}^{(a)}(T_{1u}) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \end{bmatrix}$$

$$\boxed{x8} \quad \mathbb{Q}_{1,1}^{(1,0;a)}(T_{1u}) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$$

$$\boxed{x9} \quad \mathbb{Q}_{1,2}^{(1,0;a)}(T_{1u}) = \begin{bmatrix} \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$$

$$\boxed{x10} \quad \mathbb{Q}_{1,3}^{(1,0;a)}(T_{1u}) = \begin{bmatrix} 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x11} \quad \mathbb{G}_{2,1}^{(1,-1;a)}(E_u) = \begin{bmatrix} 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \end{bmatrix}$$

$$\boxed{x12} \quad \mathbb{G}_{2,2}^{(1,-1;a)}(E_u) = \begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x13} \quad \mathbb{G}_{2,1}^{(1,-1;a)}(T_{2u}) = \begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$$

$$\boxed{x14} \quad \mathbb{G}_{2,2}^{(1,-1;a)}(T_{2u}) = \begin{bmatrix} \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$$

$$\boxed{x15} \quad \mathbb{G}_{2,3}^{(1,-1;a)}(T_{2u}) = \begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x16} \quad \mathbb{G}_0^{(1,1;a)}(A_{1u}) = \begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$$

$$\boxed{x17} \quad \mathbb{M}_{2,1}^{(1,-1;a)}(E_u) = \begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{6} & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$$

$$\boxed{x18} \quad \mathbb{M}_{2,2}^{(1,-1;a)}(E_u) = \begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x19} \quad \mathbb{M}_{2,1}^{(1,-1;a)}(T_{2u}) = \begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$$

$$\boxed{x20} \quad \mathbb{M}_{2,2}^{(1,-1;a)}(T_{2u}) = \begin{bmatrix} \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \end{bmatrix}$$

$$\boxed{x21} \quad \mathbb{M}_{2,3}^{(1,-1;a)}(T_{2u}) = \begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x22} \quad \mathbb{M}_0^{(1,1;a)}(A_{1u}) = \begin{bmatrix} 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} \end{bmatrix}$$

$$\boxed{x23} \quad \mathbb{T}_{1,1}^{(a)}(T_{1u}) = \begin{bmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x24} \quad \mathbb{T}_{1,2}^{(a)}(T_{1u}) = \begin{bmatrix} 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$$

$$\boxed{x25} \quad \mathbb{T}_{1,3}^{(a)}(T_{1u}) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$$

$$\boxed{x26} \quad \mathbb{T}_{1,1}^{(1,0;a)}(T_{1u}) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$$

$$\boxed{x27} \quad \mathbb{T}_{1,2}^{(1,0;a)}(T_{1u}) = \begin{bmatrix} \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$$

$$\boxed{x28} \quad \mathbb{T}_{1,3}^{(1,0;a)}(T_{1u}) = \begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

- bra:  $\langle p_x, \uparrow |, \langle p_x, \downarrow |, \langle p_y, \uparrow |, \langle p_y, \downarrow |, \langle p_z, \uparrow |, \langle p_z, \downarrow |$

- ket:  $|p_x, \uparrow\rangle, |p_x, \downarrow\rangle, |p_y, \uparrow\rangle, |p_y, \downarrow\rangle, |p_z, \uparrow\rangle, |p_z, \downarrow\rangle$

$$\boxed{x29} \quad \mathbb{Q}_0^{(a)}(A_{1g}) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{bmatrix}$$

$$\boxed{x30} \quad \mathbb{Q}_{2,1}^{(a)}(E_g) = \begin{bmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} \end{bmatrix}$$

$$\boxed{x31} \quad \mathbb{Q}_{2,2}^{(a)}(E_g) = \begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x32} \quad \mathbb{Q}_{2,1}^{(a)}(T_{2g}) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$$

$$\boxed{x33} \quad \mathbb{Q}_{2,2}^{(a)}(T_{2g}) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x34} \quad \mathbb{Q}_{2,3}^{(a)}(T_{2g}) = \begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x35} \quad \mathbb{Q}_{2,1}^{(1,-1;a)}(E_g) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x36} \quad \mathbb{Q}_{2,2}^{(1,-1;a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x37} \quad \mathbb{Q}_{2,1}^{(1,-1;a)}(T_{2g}) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x38} \quad \mathbb{Q}_{2,2}^{(1,-1;a)}(T_{2g}) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$$

$$\boxed{x39} \quad \mathbb{Q}_{2,3}^{(1,-1;a)}(T_{2g}) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x40} \quad \mathbb{Q}_0^{(1,1;a)}(A_{1g}) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x41} \quad \mathbb{G}_{1,1}^{(1,0;a)}(T_{1g}) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x42} \quad \mathbb{G}_{1,2}^{(1,0;a)}(T_{1g}) = \begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$$

$$\boxed{x43} \quad \mathbb{G}_{1,3}^{(1,0;a)}(T_{1g}) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x44} \quad \mathbb{M}_{1,1}^{(a)}(T_{1g}) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$$

$$\boxed{x45} \quad \mathbb{M}_{1,2}^{(a)}(T_{1g}) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x46}} \quad \mathbb{M}_{1,3}^{(a)}(T_{1g}) = \begin{bmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x47}} \quad \mathbb{M}_3^{(1,-1;a)}(A_{2g}) = \begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x48}} \quad \mathbb{M}_{1,1}^{(1,-1;a)}(T_{1g}) = \begin{bmatrix} 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x49}} \quad \mathbb{M}_{1,2}^{(1,-1;a)}(T_{1g}) = \begin{bmatrix} 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x50}} \quad \mathbb{M}_{1,3}^{(1,-1;a)}(T_{1g}) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$$

$$\boxed{x51} \quad \mathbb{M}_{3,1}^{(1,-1;a)}(T_{1g}) = \begin{bmatrix} 0 & \frac{\sqrt{5}}{5} & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{5}}{10} & 0 \\ \frac{\sqrt{5}}{5} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$$

$$\boxed{x52} \quad \mathbb{M}_{3,2}^{(1,-1;a)}(T_{1g}) = \begin{bmatrix} 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{5} & -\frac{\sqrt{5}}{10} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$$

$$\boxed{x53} \quad \mathbb{M}_{3,3}^{(1,-1;a)}(T_{1g}) = \begin{bmatrix} -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{5} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{5} \end{bmatrix}$$

$$\boxed{x54} \quad \mathbb{M}_{3,1}^{(1,-1;a)}(T_{2g}) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \end{bmatrix}$$

$$\boxed{x55} \quad \mathbb{M}_{3,2}^{(1,-1;a)}(T_{2g}) = \begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$$

$$\boxed{x56} \quad \mathbb{M}_{3,3}^{(1,-1;a)}(T_{2g}) = \begin{bmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x57} \quad \mathbb{M}_{1,1}^{(1,1;a)}(T_{1g}) = \begin{bmatrix} 0 & \frac{\sqrt{30}}{15} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{15} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 \end{bmatrix}$$

$$\boxed{x58} \quad \mathbb{M}_{1,2}^{(1,1;a)}(T_{1g}) = \begin{bmatrix} 0 & \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{15} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{30}i}{30} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & -\frac{\sqrt{30}i}{30} & 0 \end{bmatrix}$$

$$\boxed{x59} \quad \mathbb{M}_{1,3}^{(1,1;a)}(T_{1g}) = \begin{bmatrix} -\frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{30} & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \end{bmatrix}$$

$$\boxed{x60} \quad \mathbb{T}_{2,1}^{(1,0;a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x61} \quad \mathbb{T}_{2,2}^{(1,0;a)}(E_g) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{x62} \quad \mathbb{T}_{2,1}^{(1,0;a)}(T_{2g}) = \begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \end{bmatrix}$$

$$\boxed{x63} \quad \mathbb{T}_{2,2}^{(1,0;a)}(T_{2g}) = \begin{bmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$$

$$\boxed{x64} \quad \mathbb{T}_{2,3}^{(1,0;a)}(T_{2g}) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$$

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### Cluster SAMB

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- Site cluster

\*\* Wyckoff: 1a

$$\boxed{y1} \quad \mathbb{Q}_0^{(s)}(A_{1g}) = [1]$$

- Bond cluster

\*\* Wyckoff: 3a@3d

$$\boxed{y2} \quad \mathbb{Q}_0^{(s)}(A_{1g}) = \left[ \frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3} \right]$$

$$\boxed{y3} \quad \mathbb{Q}_{2,1}^{(s)}(E_g) = \left[ -\frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{3} \right]$$

$$\boxed{y4} \quad \mathbb{Q}_{2,2}^{(s)}(E_g) = \left[ \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}, 0 \right]$$

$$\boxed{y5} \quad \mathbb{T}_{1,1}^{(s)}(T_{1u}) = [i, 0, 0]$$

$$\boxed{y6} \quad \mathbb{T}_{1,2}^{(s)}(T_{1u}) = [0, i, 0]$$

$$\boxed{y7} \quad \mathbb{T}_{1,3}^{(s)}(T_{1u}) = [0, 0, i]$$

\*\* Wyckoff: 6b@3c

$$\boxed{y8} \quad \mathbb{Q}_0^{(s)}(A_{1g}) = \left[ \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6} \right]$$

$$\boxed{y9} \quad \mathbb{Q}_{2,1}^{(s)}(E_g) = \left[ -\frac{\sqrt{3}}{6}, -\frac{\sqrt{3}}{6}, -\frac{\sqrt{3}}{6}, -\frac{\sqrt{3}}{6}, \frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3} \right]$$

$$\boxed{y10} \quad \mathbb{Q}_{2,2}^{(s)}(E_g) = \left[ \frac{1}{2}, \frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}, 0, 0 \right]$$

$$\boxed{y11} \quad \mathbb{T}_{1,1}^{(s)}(T_{1u}) = \left[ 0, 0, \frac{i}{2}, \frac{i}{2}, \frac{i}{2}, -\frac{i}{2} \right]$$

$$\boxed{y12} \quad \mathbb{T}_{1,2}^{(s)}(T_{1u}) = \left[ \frac{i}{2}, -\frac{i}{2}, 0, 0, \frac{i}{2}, \frac{i}{2} \right]$$

$$\boxed{y13} \quad \mathbb{T}_{1,3}^{(s)}(T_{1u}) = \left[ \frac{i}{2}, \frac{i}{2}, \frac{i}{2}, -\frac{i}{2}, 0, 0 \right]$$

$$\boxed{y14} \quad \mathbb{Q}_{2,1}^{(s)}(T_{2g}) = \left[ \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}, 0, 0, 0, 0 \right]$$

[y15]  $\mathbb{Q}_{2,2}^{(s)}(T_{2g}) = \left[ 0, 0, \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}, 0, 0 \right]$

[y16]  $\mathbb{Q}_{2,3}^{(s)}(T_{2g}) = \left[ 0, 0, 0, 0, \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \right]$

[y17]  $\mathbb{M}_{2,1}^{(s)}(T_{2u}) = \left[ 0, 0, \frac{i}{2}, \frac{i}{2}, -\frac{i}{2}, \frac{i}{2} \right]$

[y18]  $\mathbb{M}_{2,2}^{(s)}(T_{2u}) = \left[ -\frac{i}{2}, \frac{i}{2}, 0, 0, \frac{i}{2}, \frac{i}{2} \right]$

[y19]  $\mathbb{M}_{2,3}^{(s)}(T_{2u}) = \left[ \frac{i}{2}, \frac{i}{2}, -\frac{i}{2}, \frac{i}{2}, 0, 0 \right]$

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— Site and Bond —

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Table 5: Orbital of each site

#	site	orbital
1	A	$ s, \uparrow\rangle,  s, \downarrow\rangle,  p_x, \uparrow\rangle,  p_x, \downarrow\rangle,  p_y, \uparrow\rangle,  p_y, \downarrow\rangle,  p_z, \uparrow\rangle,  p_z, \downarrow\rangle$

Table 6: Neighbor and bra-ket of each bond

#	head	tail	neighbor	head (bra)	tail (ket)
1	A	A	[1, 2]	[s, p]	[s, p]

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### — Site in Unit Cell —

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Sites in (conventional) cell (no plus set), SL = sublattice

Table 7: 'A' (#1) site cluster (1a), m=3m

SL	position ( $s$ )	mapping
1	[ 0.00000, 0.00000, 0.00000]	[1,2,3,4,⋯,48]

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### — Bond in Unit Cell —

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Bonds in (conventional) cell (no plus set): tail, head = (SL, plus set), (N)D = (non)directional (listed up to 5th neighbor at most)

Table 8: 1-th 'A'-'A' [1] (#1) bond cluster (3a@3d), ND,  $|v|=1.0$  (cartesian)

SL	vector ( $v$ )	center ( $c$ )	mapping	head	tail	$R$ (primitive)
1	[-1.00000, 0.00000, 0.00000]	[ 0.50000, 0.00000, 0.00000]	[1,-2,-3,4,17,-18,-19,20,-25,26,27,-28,-41,42,43,-44]	(1,1)	(1,1)	[1,0,0]
2	[ 0.00000,-1.00000, 0.00000]	[ 0.00000, 0.50000, 0.00000]	[5,-6,-7,8,13,-14,-15,16,-29,30,31,-32,-37,38,39,-40]	(1,1)	(1,1)	[0,1,0]
3	[ 0.00000, 0.00000,-1.00000]	[ 0.00000, 0.00000, 0.50000]	[9,-10,-11,12,-21,22,23,-24,-33,34,35,-36,45,-46,-47,48]	(1,1)	(1,1)	[0,0,1]

Table 9: 2-th 'A'-'A' [1] (#2) bond cluster (6b@3c), ND,  $|\mathbf{v}| = 1.41421$  (cartesian)

SL	vector ( $\mathbf{v}$ )	center ( $\mathbf{c}$ )	mapping	head	tail	$\mathbf{R}$ (primitive)
1	[ 0.00000, -1.00000, -1.00000]	[ 0.00000, 0.50000, 0.50000]	[1,-4,18,-19,-25,28,-42,43]	(1,1)	(1,1)	[0,1,1]
2	[ 0.00000, 1.00000, -1.00000]	[ 0.00000, 0.50000, 0.50000]	[2,-3,-17,20,-26,27,41,-44]	(1,1)	(1,1)	[0,-1,1]
3	[-1.00000, 0.00000, -1.00000]	[ 0.50000, 0.00000, 0.50000]	[5,-8,-14,15,-29,32,38,-39]	(1,1)	(1,1)	[1,0,1]
4	[-1.00000, 0.00000, 1.00000]	[ 0.50000, 0.00000, 0.50000]	[6,-7,13,-16,-30,31,-37,40]	(1,1)	(1,1)	[1,0,-1]
5	[-1.00000, -1.00000, 0.00000]	[ 0.50000, 0.50000, 0.00000]	[9,-12,21,-24,-33,36,-45,48]	(1,1)	(1,1)	[1,1,0]
6	[ 1.00000, -1.00000, 0.00000]	[ 0.50000, 0.50000, 0.00000]	[10,-11,-22,23,-34,35,46,-47]	(1,1)	(1,1)	[-1,1,0]