No. 31 T_d $-43m$ [cubic] (polar)

表 1 rank 0

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
1	A_1	A1	–	–	$\mathbb{Q}_0^{(h,A_1)}$	Qh(0, A1, ,)	C_0

表 2 rank 1

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
2	T_2	T2	–	0	$\mathbb{Q}_{1,0}^{(h,T_2)}$	Qh(1, T2, , 0)	C_1
3	T_2	T2	–	1	$\mathbb{Q}_{1,1}^{(h,T_2)}$	Qh(1, T2, , 1)	S_1
4	T_2	T2	–	2	$\mathbb{Q}_{1,2}^{(h,T_2)}$	Qh(1, T2, , 2)	C_0

表 3 rank 2

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
5	E	E	–	0	$\mathbb{Q}_{2,0}^{(h,E)}$	Qh(2, E, , 0)	C_0
6	E	E	–	1	$\mathbb{Q}_{2,1}^{(h,E)}$	Qh(2, E, , 1)	C_2
7	T_2	T2	–	0	$\mathbb{Q}_{2,0}^{(h,T_2)}$	Qh(2, T2, , 0)	S_1
8	T_2	T2	–	1	$\mathbb{Q}_{2,1}^{(h,T_2)}$	Qh(2, T2, , 1)	C_1
9	T_2	T2	–	2	$\mathbb{Q}_{2,2}^{(h,T_2)}$	Qh(2, T2, , 2)	S_2

表 4 rank 3

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
10	A_1	A1	–	–	$\mathbb{Q}_3^{(h,A_1)}$	Qh(3, A1, ,)	S_2
11	T_1	T1	–	0	$\mathbb{Q}_{3,0}^{(h,T_1)}$	Qh(3, T1, , 0)	$-\frac{\sqrt{10}C_1}{4} - \frac{\sqrt{6}C_3}{4}$
12	T_1	T1	–	1	$\mathbb{Q}_{3,1}^{(h,T_1)}$	Qh(3, T1, , 1)	$\frac{\sqrt{10}S_1}{4} - \frac{\sqrt{6}S_3}{4}$
13	T_1	T1	–	2	$\mathbb{Q}_{3,2}^{(h,T_1)}$	Qh(3, T1, , 2)	C_2
14	T_2	T2	–	0	$\mathbb{Q}_{3,0}^{(h,T_2)}$	Qh(3, T2, , 0)	$-\frac{\sqrt{6}C_1}{4} + \frac{\sqrt{10}C_3}{4}$
15	T_2	T2	–	1	$\mathbb{Q}_{3,1}^{(h,T_2)}$	Qh(3, T2, , 1)	$-\frac{\sqrt{6}S_1}{4} - \frac{\sqrt{10}S_3}{4}$
16	T_2	T2	–	2	$\mathbb{Q}_{3,2}^{(h,T_2)}$	Qh(3, T2, , 2)	C_0

表 5 rank 4

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
17	A_1	A1	–	–	$\mathbb{Q}_4^{(h,A_1)}$	Qh(4, A1, ,)	$\frac{\sqrt{21}C_0}{6} + \frac{\sqrt{15}C_4}{6}$
18	E	E	–	0	$\mathbb{Q}_{4,0}^{(h,E)}$	Qh(4, E, , 0)	$\frac{\sqrt{15}C_0}{6} - \frac{\sqrt{21}C_4}{6}$
19	E	E	–	1	$\mathbb{Q}_{4,1}^{(h,E)}$	Qh(4, E, , 1)	$-C_2$
20	T_1	T1	–	0	$\mathbb{Q}_{4,0}^{(h,T_1)}$	Qh(4, T1, , 0)	$-\frac{\sqrt{14}S_1}{4} - \frac{\sqrt{2}S_3}{4}$
21	T_1	T1	–	1	$\mathbb{Q}_{4,1}^{(h,T_1)}$	Qh(4, T1, , 1)	$\frac{\sqrt{14}C_1}{4} - \frac{\sqrt{2}C_3}{4}$
22	T_1	T1	–	2	$\mathbb{Q}_{4,2}^{(h,T_1)}$	Qh(4, T1, , 2)	S_4
23	T_2	T2	–	0	$\mathbb{Q}_{4,0}^{(h,T_2)}$	Qh(4, T2, , 0)	$-\frac{\sqrt{2}S_1}{4} + \frac{\sqrt{14}S_3}{4}$
24	T_2	T2	–	1	$\mathbb{Q}_{4,1}^{(h,T_2)}$	Qh(4, T2, , 1)	$-\frac{\sqrt{2}C_1}{4} - \frac{\sqrt{14}C_3}{4}$
25	T_2	T2	–	2	$\mathbb{Q}_{4,2}^{(h,T_2)}$	Qh(4, T2, , 2)	S_2

表 6　rank 5

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
26	E	`E`	–	0	$\mathbb{Q}_{5,0}^{(h,E)}$	`Qh(5,E,,0)`	$-S_2$
27	E	`E`	–	1	$\mathbb{Q}_{5,1}^{(h,E)}$	`Qh(5,E,,1)`	$-S_4$
28	T_1	`T1`	–	0	$\mathbb{Q}_{5,0}^{(h,T_1)}$	`Qh(5,T1,,0)`	$\frac{\sqrt{7}C_1}{4} - \frac{\sqrt{6}C_3}{8} - \frac{\sqrt{30}C_5}{8}$
29	T_1	`T1`	–	1	$\mathbb{Q}_{5,1}^{(h,T_1)}$	`Qh(5,T1,,1)`	$-\frac{\sqrt{7}S_1}{4} - \frac{\sqrt{6}S_3}{8} + \frac{\sqrt{30}S_5}{8}$
30	T_1	`T1`	–	2	$\mathbb{Q}_{5,2}^{(h,T_1)}$	`Qh(5,T1,,2)`	C_2
31	T_2	`T2`	1	0	$\mathbb{Q}_{5,0}^{(h,T_2,1)}$	`Qh(5,T2,1,0)`	$\frac{\sqrt{15}C_1}{8} - \frac{\sqrt{70}C_3}{16} + \frac{3\sqrt{14}C_5}{16}$
32	T_2	`T2`	1	1	$\mathbb{Q}_{5,1}^{(h,T_2,1)}$	`Qh(5,T2,1,1)`	$\frac{\sqrt{15}S_1}{8} + \frac{\sqrt{70}S_3}{16} + \frac{3\sqrt{14}S_5}{16}$
33	T_2	`T2`	1	2	$\mathbb{Q}_{5,2}^{(h,T_2,1)}$	`Qh(5,T2,1,2)`	C_0
34	T_2	`T2`	2	0	$\mathbb{Q}_{5,0}^{(h,T_2,2)}$	`Qh(5,T2,2,0)`	$\frac{\sqrt{21}C_1}{8} + \frac{9\sqrt{2}C_3}{16} + \frac{\sqrt{10}C_5}{16}$
35	T_2	`T2`	2	1	$\mathbb{Q}_{5,1}^{(h,T_2,2)}$	`Qh(5,T2,2,1)`	$\frac{\sqrt{21}S_1}{8} - \frac{9\sqrt{2}S_3}{16} + \frac{\sqrt{10}S_5}{16}$
36	T_2	`T2`	2	2	$\mathbb{Q}_{5,2}^{(h,T_2,2)}$	`Qh(5,T2,2,2)`	C_4

表 7　rank 6

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
37	A_1	`A1`	–	–	$\mathbb{Q}_{6}^{(h,A_1)}$	`Qh(6,A1,,)`	$\frac{\sqrt{2}C_0}{4} - \frac{\sqrt{14}C_4}{4}$
38	A_2	`A2`	–	–	$\mathbb{Q}_{6}^{(h,A_2)}$	`Qh(6,A2,,)`	$\frac{\sqrt{11}C_2}{4} - \frac{\sqrt{5}C_6}{4}$
39	E	`E`	–	0	$\mathbb{Q}_{6,0}^{(h,E)}$	`Qh(6,E,,0)`	$\frac{\sqrt{14}C_0}{4} + \frac{\sqrt{2}C_4}{4}$
40	E	`E`	–	1	$\mathbb{Q}_{6,1}^{(h,E)}$	`Qh(6,E,,1)`	$\frac{\sqrt{5}C_2}{4} + \frac{\sqrt{11}C_6}{4}$
41	T_1	`T1`	–	0	$\mathbb{Q}_{6,0}^{(h,T_1)}$	`Qh(6,T1,,0)`	$\frac{\sqrt{3}S_1}{4} - \frac{\sqrt{30}S_3}{8} - \frac{\sqrt{22}S_5}{8}$
42	T_1	`T1`	–	1	$\mathbb{Q}_{6,1}^{(h,T_1)}$	`Qh(6,T1,,1)`	$-\frac{\sqrt{3}C_1}{4} - \frac{\sqrt{30}C_3}{8} + \frac{\sqrt{22}C_5}{8}$
43	T_1	`T1`	–	2	$\mathbb{Q}_{6,2}^{(h,T_1)}$	`Qh(6,T1,,2)`	S_4
44	T_2	`T2`	1	0	$\mathbb{Q}_{6,0}^{(h,T_2,1)}$	`Qh(6,T2,1,0)`	$\frac{3\sqrt{22}S_1}{16} + \frac{\sqrt{55}S_3}{16} + \frac{\sqrt{3}S_5}{16}$
45	T_2	`T2`	1	1	$\mathbb{Q}_{6,1}^{(h,T_2,1)}$	`Qh(6,T2,1,1)`	$\frac{3\sqrt{22}C_1}{16} - \frac{\sqrt{55}C_3}{16} + \frac{\sqrt{3}C_5}{16}$
46	T_2	`T2`	1	2	$\mathbb{Q}_{6,2}^{(h,T_2,1)}$	`Qh(6,T2,1,2)`	S_6
47	T_2	`T2`	2	0	$\mathbb{Q}_{6,0}^{(h,T_2,2)}$	`Qh(6,T2,2,0)`	$\frac{\sqrt{10}S_1}{16} - \frac{9S_3}{16} + \frac{\sqrt{165}S_5}{16}$
48	T_2	`T2`	2	1	$\mathbb{Q}_{6,1}^{(h,T_2,2)}$	`Qh(6,T2,2,1)`	$\frac{\sqrt{10}C_1}{16} + \frac{9C_3}{16} + \frac{\sqrt{165}C_5}{16}$
49	T_2	`T2`	2	2	$\mathbb{Q}_{6,2}^{(h,T_2,2)}$	`Qh(6,T2,2,2)`	S_2

表 8　rank 7

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
50	A_1	A1	–	–	$\mathbb{Q}_7^{(h,A_1)}$	Qh(7, A1, ,)	$\frac{\sqrt{78}S_2}{12} + \frac{\sqrt{66}S_6}{12}$
51	E	E	–	0	$\mathbb{Q}_{7,0}^{(h,E)}$	Qh(7, E, , 0)	$\frac{\sqrt{66}S_2}{12} - \frac{\sqrt{78}S_6}{12}$
52	E	E	–	1	$\mathbb{Q}_{7,1}^{(h,E)}$	Qh(7, E, , 1)	$-S_4$
53	T_1	T1	1	0	$\mathbb{Q}_{7,0}^{(h,T_1,1)}$	Qh(7, T1, 1, 0)	$-\frac{\sqrt{858}C_1}{64} - \frac{3\sqrt{286}C_3}{64} - \frac{5\sqrt{26}C_5}{64} - \frac{\sqrt{14}C_7}{64}$
54	T_1	T1	1	1	$\mathbb{Q}_{7,1}^{(h,T_1,1)}$	Qh(7, T1, 1, 1)	$\frac{\sqrt{858}S_1}{64} - \frac{3\sqrt{286}S_3}{64} + \frac{5\sqrt{26}S_5}{64} - \frac{\sqrt{14}S_7}{64}$
55	T_1	T1	1	2	$\mathbb{Q}_{7,2}^{(h,T_1,1)}$	Qh(7, T1, 1, 2)	C_6
56	T_1	T1	2	0	$\mathbb{Q}_{7,0}^{(h,T_1,2)}$	Qh(7, T1, 2, 0)	$-\frac{15\sqrt{6}C_1}{64} + \frac{19\sqrt{2}C_3}{64} - \frac{\sqrt{22}C_5}{64} - \frac{\sqrt{2002}C_7}{64}$
57	T_1	T1	2	1	$\mathbb{Q}_{7,1}^{(h,T_1,2)}$	Qh(7, T1, 2, 1)	$\frac{15\sqrt{6}S_1}{64} + \frac{19\sqrt{2}S_3}{64} + \frac{\sqrt{22}S_5}{64} - \frac{\sqrt{2002}S_7}{64}$
58	T_1	T1	2	2	$\mathbb{Q}_{7,2}^{(h,T_1,2)}$	Qh(7, T1, 2, 2)	C_2
59	T_2	T2	1	0	$\mathbb{Q}_{7,0}^{(h,T_2,1)}$	Qh(7, T2, 1, 0)	$-\frac{5\sqrt{7}C_1}{32} + \frac{3\sqrt{21}C_3}{32} - \frac{\sqrt{231}C_5}{32} + \frac{\sqrt{429}C_7}{32}$
60	T_2	T2	1	1	$\mathbb{Q}_{7,1}^{(h,T_2,1)}$	Qh(7, T2, 1, 1)	$-\frac{5\sqrt{7}S_1}{32} - \frac{3\sqrt{21}S_3}{32} - \frac{\sqrt{231}S_5}{32} - \frac{\sqrt{429}S_7}{32}$
61	T_2	T2	1	2	$\mathbb{Q}_{7,2}^{(h,T_2,1)}$	Qh(7, T2, 1, 2)	C_0
62	T_2	T2	2	0	$\mathbb{Q}_{7,0}^{(h,T_2,2)}$	Qh(7, T2, 2, 0)	$-\frac{3\sqrt{33}C_1}{32} - \frac{\sqrt{11}C_3}{32} + \frac{25C_5}{32} + \frac{\sqrt{91}C_7}{32}$
63	T_2	T2	2	1	$\mathbb{Q}_{7,1}^{(h,T_2,2)}$	Qh(7, T2, 2, 1)	$-\frac{3\sqrt{33}S_1}{32} + \frac{\sqrt{11}S_3}{32} + \frac{25S_5}{32} - \frac{\sqrt{91}S_7}{32}$
64	T_2	T2	2	2	$\mathbb{Q}_{7,2}^{(h,T_2,2)}$	Qh(7, T2, 2, 2)	C_4

表 9　rank 8

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
65	A_1	A1	–	–	$\mathbb{Q}_8^{(h,A_1)}$	Qh(8, A1, ,)	$\frac{\sqrt{33}C_0}{8} + \frac{\sqrt{21}C_4}{12} + \frac{\sqrt{195}C_8}{24}$
66	E	E	1	0	$\mathbb{Q}_{8,0}^{(h,E,1)}$	Qh(8, E, 1, 0)	$-\frac{\sqrt{286}C_0}{32} + \frac{\sqrt{182}C_4}{16} + \frac{\sqrt{10}C_8}{32}$
67	E	E	1	1	$\mathbb{Q}_{8,1}^{(h,E,1)}$	Qh(8, E, 1, 1)	C_6
68	E	E	2	0	$\mathbb{Q}_{8,0}^{(h,E,2)}$	Qh(8, E, 2, 0)	$-\frac{\sqrt{210}C_0}{32} - \frac{\sqrt{330}C_4}{48} + \frac{\sqrt{6006}C_8}{96}$
69	E	E	2	1	$\mathbb{Q}_{8,1}^{(h,E,2)}$	Qh(8, E, 2, 1)	C_2
70	T_1	T1	1	0	$\mathbb{Q}_{8,0}^{(h,T_1,1)}$	Qh(8, T1, 1, 0)	$-\frac{\sqrt{715}S_1}{32} - \frac{\sqrt{273}S_3}{32} - \frac{\sqrt{35}S_5}{32} - \frac{S_7}{32}$
71	T_1	T1	1	1	$\mathbb{Q}_{8,1}^{(h,T_1,1)}$	Qh(8, T1, 1, 1)	$\frac{\sqrt{715}C_1}{32} - \frac{\sqrt{273}C_3}{32} + \frac{\sqrt{35}C_5}{32} - \frac{C_7}{32}$
72	T_1	T1	1	2	$\mathbb{Q}_{8,2}^{(h,T_1,1)}$	Qh(8, T1, 1, 2)	S_8
73	T_1	T1	2	0	$\mathbb{Q}_{8,0}^{(h,T_1,2)}$	Qh(8, T1, 2, 0)	$-\frac{\sqrt{77}S_1}{32} + \frac{5\sqrt{15}S_3}{32} - \frac{3\sqrt{13}S_5}{32} - \frac{\sqrt{455}S_7}{32}$
74	T_1	T1	2	1	$\mathbb{Q}_{8,1}^{(h,T_1,2)}$	Qh(8, T1, 2, 1)	$\frac{\sqrt{77}C_1}{32} + \frac{5\sqrt{15}C_3}{32} + \frac{3\sqrt{13}C_5}{32} - \frac{\sqrt{455}C_7}{32}$
75	T_1	T1	2	2	$\mathbb{Q}_{8,2}^{(h,T_1,2)}$	Qh(8, T1, 2, 2)	S_4
76	T_2	T2	1	0	$\mathbb{Q}_{8,0}^{(h,T_2,1)}$	Qh(8, T2, 1, 0)	$-\frac{\sqrt{858}S_1}{64} + \frac{\sqrt{910}S_3}{64} + \frac{7\sqrt{42}S_5}{64} + \frac{3\sqrt{30}S_7}{64}$
77	T_2	T2	1	1	$\mathbb{Q}_{8,1}^{(h,T_2,1)}$	Qh(8, T2, 1, 1)	$-\frac{\sqrt{858}C_1}{64} - \frac{\sqrt{910}C_3}{64} + \frac{7\sqrt{42}C_5}{64} - \frac{3\sqrt{30}C_7}{64}$
78	T_2	T2	1	2	$\mathbb{Q}_{8,2}^{(h,T_2,1)}$	Qh(8, T2, 1, 2)	S_6
79	T_2	T2	2	0	$\mathbb{Q}_{8,0}^{(h,T_2,2)}$	Qh(8, T2, 2, 0)	$-\frac{\sqrt{70}S_1}{64} + \frac{3\sqrt{66}S_3}{64} - \frac{\sqrt{1430}S_5}{64} + \frac{\sqrt{2002}S_7}{64}$
80	T_2	T2	2	1	$\mathbb{Q}_{8,1}^{(h,T_2,2)}$	Qh(8, T2, 2, 1)	$-\frac{\sqrt{70}C_1}{64} - \frac{3\sqrt{66}C_3}{64} - \frac{\sqrt{1430}C_5}{64} - \frac{\sqrt{2002}C_7}{64}$
81	T_2	T2	2	2	$\mathbb{Q}_{8,2}^{(h,T_2,2)}$	Qh(8, T2, 2, 2)	S_2

表 10　rank 9

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
82	A_1	A1	–	–	$\mathbb{Q}_9^{(h,A_1)}$	Qh(9, A1, ,)	$\frac{\sqrt{3}S_2}{4} - \frac{\sqrt{13}S_6}{4}$
83	A_2	A2	–	–	$\mathbb{Q}_9^{(h,A_2)}$	Qh(9, A2, ,)	$\frac{\sqrt{102}S_4}{12} - \frac{\sqrt{42}S_8}{12}$
84	E	E	–	0	$\mathbb{Q}_{9,0}^{(h,E)}$	Qh(9, E, , 0)	$-\frac{\sqrt{13}S_2}{4} - \frac{\sqrt{3}S_6}{4}$
85	E	E	–	1	$\mathbb{Q}_{9,1}^{(h,E)}$	Qh(9, E, , 1)	$-\frac{\sqrt{42}S_4}{12} - \frac{\sqrt{102}S_8}{12}$
86	T_1	T1	1	0	$\mathbb{Q}_{9,0}^{(h,T_1,1)}$	Qh(9, T1, 1, 0)	$\frac{\sqrt{858}C_1}{64} + \frac{\sqrt{91}C_3}{32} - \frac{5\sqrt{15}C_5}{32} - \frac{21\sqrt{3}C_7}{64} - \frac{\sqrt{51}C_9}{64}$
87	T_1	T1	1	1	$\mathbb{Q}_{9,1}^{(h,T_1,1)}$	Qh(9, T1, 1, 1)	$-\frac{\sqrt{858}S_1}{64} + \frac{\sqrt{91}S_3}{32} + \frac{5\sqrt{15}S_5}{32} - \frac{21\sqrt{3}S_7}{64} + \frac{\sqrt{51}S_9}{64}$
88	T_1	T1	1	2	$\mathbb{Q}_{9,2}^{(h,T_1,1)}$	Qh(9, T1, 1, 2)	C_6
89	T_1	T1	2	0	$\mathbb{Q}_{9,0}^{(h,T_1,2)}$	Qh(9, T1, 2, 0)	$\frac{7\sqrt{22}C_1}{64} - \frac{3\sqrt{21}C_3}{32} + \frac{\sqrt{65}C_5}{32} + \frac{\sqrt{13}C_7}{64} - \frac{3\sqrt{221}C_9}{64}$
90	T_1	T1	2	1	$\mathbb{Q}_{9,1}^{(h,T_1,2)}$	Qh(9, T1, 2, 1)	$-\frac{7\sqrt{22}S_1}{64} - \frac{3\sqrt{21}S_3}{32} - \frac{\sqrt{65}S_5}{32} + \frac{\sqrt{13}S_7}{64} + \frac{3\sqrt{221}S_9}{64}$
91	T_1	T1	2	2	$\mathbb{Q}_{9,2}^{(h,T_1,2)}$	Qh(9, T1, 2, 2)	C_2
92	T_2	T2	1	0	$\mathbb{Q}_{9,0}^{(h,T_2,1)}$	Qh(9, T2, 1, 0)	$\frac{21\sqrt{5}C_1}{128} - \frac{\sqrt{2310}C_3}{128} + \frac{3\sqrt{286}C_5}{128} - \frac{3\sqrt{1430}C_7}{256} + \frac{\sqrt{24310}C_9}{256}$
93	T_2	T2	1	1	$\mathbb{Q}_{9,1}^{(h,T_2,1)}$	Qh(9, T2, 1, 1)	$\frac{21\sqrt{5}S_1}{128} + \frac{\sqrt{2310}S_3}{128} + \frac{3\sqrt{286}S_5}{128} + \frac{3\sqrt{1430}S_7}{256} + \frac{\sqrt{24310}S_9}{256}$
94	T_2	T2	1	2	$\mathbb{Q}_{9,2}^{(h,T_2,1)}$	Qh(9, T2, 1, 2)	C_0
95	T_2	T2	2	0	$\mathbb{Q}_{9,0}^{(h,T_2,2)}$	Qh(9, T2, 2, 0)	$\frac{\sqrt{2431}C_1}{128} + \frac{\sqrt{9282}C_3}{128} + \frac{5\sqrt{170}C_5}{128} + \frac{7\sqrt{34}C_7}{256} + \frac{3\sqrt{2}C_9}{256}$
96	T_2	T2	2	1	$\mathbb{Q}_{9,1}^{(h,T_2,2)}$	Qh(9, T2, 2, 1)	$\frac{\sqrt{2431}S_1}{128} - \frac{\sqrt{9282}S_3}{128} + \frac{5\sqrt{170}S_5}{128} - \frac{7\sqrt{34}S_7}{256} + \frac{3\sqrt{2}S_9}{256}$
97	T_2	T2	2	2	$\mathbb{Q}_{9,2}^{(h,T_2,2)}$	Qh(9, T2, 2, 2)	C_8
98	T_2	T2	3	0	$\mathbb{Q}_{9,0}^{(h,T_2,3)}$	Qh(9, T2, 3, 0)	$\frac{\sqrt{1001}C_1}{64} - \frac{\sqrt{78}C_3}{64} - \frac{3\sqrt{70}C_5}{64} + \frac{23\sqrt{14}C_7}{128} + \frac{3\sqrt{238}C_9}{128}$
99	T_2	T2	3	1	$\mathbb{Q}_{9,1}^{(h,T_2,3)}$	Qh(9, T2, 3, 1)	$\frac{\sqrt{1001}S_1}{64} + \frac{\sqrt{78}S_3}{64} - \frac{3\sqrt{70}S_5}{64} - \frac{23\sqrt{14}S_7}{128} + \frac{3\sqrt{238}S_9}{128}$
100	T_2	T2	3	2	$\mathbb{Q}_{9,2}^{(h,T_2,3)}$	Qh(9, T2, 3, 2)	C_4

表 11　rank 10

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
101	A_1	A1	–	–	$\mathbb{Q}_{10}^{(h,A_1)}$	Qh(10, A1, ,)	$\frac{\sqrt{390}C_0}{48} - \frac{\sqrt{22}C_4}{8} - \frac{\sqrt{1122}C_8}{48}$
102	A_2	A2	–	–	$\mathbb{Q}_{10}^{(h,A_2)}$	Qh(10, A2, ,)	$-\frac{\sqrt{85}C_{10}}{16} + \frac{\sqrt{1482}C_2}{48} + \frac{\sqrt{57}C_6}{48}$
103	E	E	1	0	$\mathbb{Q}_{10,0}^{(h,E,1)}$	Qh(10, E, 1, 0)	$\frac{11\sqrt{420189}C_0}{8988} + \frac{\sqrt{827645}C_4}{1498} - \frac{\sqrt{146055}C_8}{8988}$
104	E	E	1	1	$\mathbb{Q}_{10,1}^{(h,E,1)}$	Qh(10, E, 1, 1)	$\frac{\sqrt{370006}C_{10}}{749} + \frac{\sqrt{190995}C_2}{749}$
105	E	E	2	0	$\mathbb{Q}_{10,0}^{(h,E,2)}$	Qh(10, E, 2, 0)	$\frac{3\sqrt{3213210}C_0}{11984} - \frac{83\sqrt{1498}C_4}{5992} + \frac{31\sqrt{76398}C_8}{11984}$
106	E	E	2	1	$\mathbb{Q}_{10,1}^{(h,E,2)}$	Qh(10, E, 2, 1)	$\frac{\sqrt{1209635}C_{10}}{11984} - \frac{19\sqrt{58422}C_2}{35952} + \frac{\sqrt{2247}C_6}{48}$
107	T_1	T1	1	0	$\mathbb{Q}_{10,0}^{(h,T_1,1)}$	Qh(10, T1, 1, 0)	$\frac{\sqrt{221}S_1}{32} - \frac{\sqrt{102}S_3}{32} - \frac{\sqrt{510}S_5}{32} - \frac{11\sqrt{6}S_7}{64} - \frac{\sqrt{38}S_9}{64}$
108	T_1	T1	1	1	$\mathbb{Q}_{10,1}^{(h,T_1,1)}$	Qh(10, T1, 1, 1)	$-\frac{\sqrt{221}C_1}{32} - \frac{\sqrt{102}C_3}{32} + \frac{\sqrt{510}C_5}{32} - \frac{11\sqrt{6}C_7}{64} + \frac{\sqrt{38}C_9}{64}$
109	T_1	T1	1	2	$\mathbb{Q}_{10,2}^{(h,T_1,1)}$	Qh(10, T1, 1, 2)	S_8
110	T_1	T1	2	0	$\mathbb{Q}_{10,0}^{(h,T_1,2)}$	Qh(10, T1, 2, 0)	$\frac{\sqrt{39}S_1}{32} - \frac{11\sqrt{2}S_3}{32} + \frac{5\sqrt{10}S_5}{32} - \frac{\sqrt{34}S_7}{64} - \frac{\sqrt{1938}S_9}{64}$
111	T_1	T1	2	1	$\mathbb{Q}_{10,1}^{(h,T_1,2)}$	Qh(10, T1, 2, 1)	$-\frac{\sqrt{39}C_1}{32} - \frac{11\sqrt{2}C_3}{32} - \frac{5\sqrt{10}C_5}{32} - \frac{\sqrt{34}C_7}{64} + \frac{\sqrt{1938}C_9}{64}$
112	T_1	T1	2	2	$\mathbb{Q}_{10,2}^{(h,T_1,2)}$	Qh(10, T1, 2, 2)	S_4
113	T_2	T2	1	0	$\mathbb{Q}_{10,0}^{(h,T_2,1)}$	Qh(10, T2, 1, 0)	$\frac{\sqrt{41990}S_1}{256} + \frac{\sqrt{4845}S_3}{128} + \frac{\sqrt{969}S_5}{128} + \frac{\sqrt{285}S_7}{256} + \frac{\sqrt{5}S_9}{256}$
114	T_2	T2	1	1	$\mathbb{Q}_{10,1}^{(h,T_2,1)}$	Qh(10, T2, 1, 1)	$\frac{\sqrt{41990}C_1}{256} - \frac{\sqrt{4845}C_3}{128} + \frac{\sqrt{969}C_5}{128} - \frac{\sqrt{285}C_7}{256} + \frac{\sqrt{5}C_9}{256}$
115	T_2	T2	1	2	$\mathbb{Q}_{10,2}^{(h,T_2,1)}$	Qh(10, T2, 1, 2)	S_{10}
116	T_2	T2	2	0	$\mathbb{Q}_{10,0}^{(h,T_2,2)}$	Qh(10, T2, 2, 0)	$\frac{9\sqrt{78}S_1}{256} - \frac{69S_3}{128} - \frac{\sqrt{5}S_5}{128} + \frac{43\sqrt{17}S_7}{256} + \frac{3\sqrt{969}S_9}{256}$
117	T_2	T2	2	1	$\mathbb{Q}_{10,1}^{(h,T_2,2)}$	Qh(10, T2, 2, 1)	$\frac{9\sqrt{78}C_1}{256} + \frac{69C_3}{128} - \frac{\sqrt{5}C_5}{128} - \frac{43\sqrt{17}C_7}{256} + \frac{3\sqrt{969}C_9}{256}$
118	T_2	T2	2	2	$\mathbb{Q}_{10,2}^{(h,T_2,2)}$	Qh(10, T2, 2, 2)	S_6
119	T_2	T2	3	0	$\mathbb{Q}_{10,0}^{(h,T_2,3)}$	Qh(10, T2, 3, 0)	$\frac{7\sqrt{3}S_1}{128} - \frac{7\sqrt{26}S_3}{128} + \frac{5\sqrt{130}S_5}{128} - \frac{7\sqrt{442}S_7}{256} + \frac{\sqrt{25194}S_9}{256}$
120	T_2	T2	3	1	$\mathbb{Q}_{10,1}^{(h,T_2,3)}$	Qh(10, T2, 3, 1)	$\frac{7\sqrt{3}C_1}{128} + \frac{7\sqrt{26}C_3}{128} + \frac{5\sqrt{130}C_5}{128} + \frac{7\sqrt{442}C_7}{256} + \frac{\sqrt{25194}C_9}{256}$
121	T_2	T2	3	2	$\mathbb{Q}_{10,2}^{(h,T_2,3)}$	Qh(10, T2, 3, 2)	S_2

表 12　rank 11

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
122	A_1	A1	–	–	$\mathbb{Q}_{11}^{(h,A_1)}$	Qh(11, A1, ,)	$\frac{\sqrt{798}S_{10}}{48}+\frac{\sqrt{255}S_2}{24}+\frac{3\sqrt{6}S_6}{16}$
123	E	E	1	0	$\mathbb{Q}_{11,0}^{(h,E,1)}$	Qh(11, E, 1, 0)	$-\frac{\sqrt{210}S_{10}}{96}+\frac{\sqrt{969}S_2}{48}-\frac{\sqrt{570}S_6}{32}$
124	E	E	1	1	$\mathbb{Q}_{11,1}^{(h,E,1)}$	Qh(11, E, 1, 1)	$-S_8$
125	E	E	2	0	$\mathbb{Q}_{11,0}^{(h,E,2)}$	Qh(11, E, 2, 0)	$-\frac{\sqrt{646}S_{10}}{32}+\frac{\sqrt{35}S_2}{16}+\frac{\sqrt{238}S_6}{32}$
126	E	E	2	1	$\mathbb{Q}_{11,1}^{(h,E,2)}$	Qh(11, E, 2, 1)	$-S_4$
127	T_1	T1	1	0	$\mathbb{Q}_{11,0}^{(h,T_1,1)}$	Qh(11, T1, 1, 0)	$-\frac{\sqrt{29393}C_1}{512}-\frac{\sqrt{22}C_{11}}{1024}-\frac{9\sqrt{1615}C_3}{512}-\frac{5\sqrt{13566}C_5}{1024}-\frac{7\sqrt{1330}C_7}{1024}-\frac{9\sqrt{42}C_9}{1024}$
128	T_1	T1	1	1	$\mathbb{Q}_{11,1}^{(h,T_1,1)}$	Qh(11, T1, 1, 1)	$\frac{\sqrt{29393}S_1}{512}-\frac{\sqrt{22}S_{11}}{1024}-\frac{9\sqrt{1615}S_3}{512}+\frac{5\sqrt{13566}S_5}{1024}-\frac{7\sqrt{1330}S_7}{1024}+\frac{9\sqrt{42}S_9}{1024}$
129	T_1	T1	1	2	$\mathbb{Q}_{11,2}^{(h,T_1,1)}$	Qh(11, T1, 1, 2)	C_{10}
130	T_1	T1	2	0	$\mathbb{Q}_{11,0}^{(h,T_1,2)}$	Qh(11, T1, 2, 0)	$-\frac{15\sqrt{221}C_1}{512}-\frac{3\sqrt{2926}C_{11}}{1024}-\frac{\sqrt{595}C_3}{512}+\frac{53\sqrt{102}C_5}{1024}-\frac{105\sqrt{10}C_7}{1024}-\frac{61\sqrt{114}C_9}{1024}$
131	T_1	T1	2	1	$\mathbb{Q}_{11,1}^{(h,T_1,2)}$	Qh(11, T1, 2, 1)	$\frac{15\sqrt{221}S_1}{512}-\frac{3\sqrt{2926}S_{11}}{1024}-\frac{\sqrt{595}S_3}{512}-\frac{53\sqrt{102}S_5}{1024}-\frac{105\sqrt{10}S_7}{1024}+\frac{61\sqrt{114}S_9}{1024}$
132	T_1	T1	2	2	$\mathbb{Q}_{11,2}^{(h,T_1,2)}$	Qh(11, T1, 2, 2)	C_6
133	T_1	T1	3	0	$\mathbb{Q}_{11,0}^{(h,T_1,3)}$	Qh(11, T1, 3, 0)	$-\frac{21\sqrt{130}C_1}{512}-\frac{\sqrt{124355}C_{11}}{512}+\frac{57\sqrt{14}C_3}{512}-\frac{41\sqrt{15}C_5}{512}+\frac{17\sqrt{17}C_7}{512}+\frac{\sqrt{4845}C_9}{512}$
134	T_1	T1	3	1	$\mathbb{Q}_{11,1}^{(h,T_1,3)}$	Qh(11, T1, 3, 1)	$\frac{21\sqrt{130}S_1}{512}-\frac{\sqrt{124355}S_{11}}{512}+\frac{57\sqrt{14}S_3}{512}+\frac{41\sqrt{15}S_5}{512}+\frac{17\sqrt{17}S_7}{512}-\frac{\sqrt{4845}S_9}{512}$
135	T_1	T1	3	2	$\mathbb{Q}_{11,2}^{(h,T_1,3)}$	Qh(11, T1, 3, 2)	C_2
136	T_2	T2	1	0	$\mathbb{Q}_{11,0}^{(h,T_2,1)}$	Qh(11, T2, 1, 0)	$-\frac{21\sqrt{66}C_1}{512}+\frac{\sqrt{88179}C_{11}}{512}+\frac{\sqrt{30030}C_3}{512}-\frac{15\sqrt{143}C_5}{512}+\frac{\sqrt{36465}C_7}{512}-\frac{\sqrt{46189}C_9}{512}$
137	T_2	T2	1	1	$\mathbb{Q}_{11,1}^{(h,T_2,1)}$	Qh(11, T2, 1, 1)	$-\frac{21\sqrt{66}S_1}{512}-\frac{\sqrt{88179}S_{11}}{512}-\frac{\sqrt{30030}S_3}{512}-\frac{15\sqrt{143}S_5}{512}-\frac{\sqrt{36465}S_7}{512}-\frac{\sqrt{46189}S_9}{512}$
138	T_2	T2	1	2	$\mathbb{Q}_{11,2}^{(h,T_2,1)}$	Qh(11, T2, 1, 2)	C_0
139	T_2	T2	2	0	$\mathbb{Q}_{11,0}^{(h,T_2,2)}$	Qh(11, T2, 2, 0)	$-\frac{\sqrt{41990}C_1}{512}+\frac{\sqrt{385}C_{11}}{512}-\frac{3\sqrt{4522}C_3}{512}+\frac{3\sqrt{4845}C_5}{512}+\frac{77\sqrt{19}C_7}{512}+\frac{39\sqrt{15}C_9}{512}$
140	T_2	T2	2	1	$\mathbb{Q}_{11,1}^{(h,T_2,2)}$	Qh(11, T2, 2, 1)	$-\frac{\sqrt{41990}S_1}{512}-\frac{\sqrt{385}S_{11}}{512}+\frac{3\sqrt{4522}S_3}{512}+\frac{3\sqrt{4845}S_5}{512}-\frac{77\sqrt{19}S_7}{512}+\frac{39\sqrt{15}S_9}{512}$
141	T_2	T2	2	2	$\mathbb{Q}_{11,2}^{(h,T_2,2)}$	Qh(11, T2, 2, 2)	C_8
142	T_2	T2	3	0	$\mathbb{Q}_{11,0}^{(h,T_2,3)}$	Qh(11, T2, 3, 0)	$-\frac{5\sqrt{546}C_1}{256}+\frac{\sqrt{10659}C_{11}}{256}+\frac{11\sqrt{30}C_3}{256}+\frac{13\sqrt{7}C_5}{256}-\frac{3\sqrt{1785}C_7}{256}+\frac{3\sqrt{2261}C_9}{256}$
143	T_2	T2	3	1	$\mathbb{Q}_{11,1}^{(h,T_2,3)}$	Qh(11, T2, 3, 1)	$-\frac{5\sqrt{546}S_1}{256}-\frac{\sqrt{10659}S_{11}}{256}-\frac{11\sqrt{30}S_3}{256}+\frac{13\sqrt{7}S_5}{256}+\frac{3\sqrt{1785}S_7}{256}+\frac{3\sqrt{2261}S_9}{256}$
144	T_2	T2	3	2	$\mathbb{Q}_{11,2}^{(h,T_2,3)}$	Qh(11, T2, 3, 2)	C_4