

* symmetry operation

Table 1: Symmetry operations for 3d polar vector.

No.	tag	matrix (polar)	det	TR
1	$\{1 0\}$	$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$	1	1
2	$\{3^+_{001} 0\}$	$\begin{bmatrix} 0 & -1 & 0 & 0 \\ 1 & -1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$	1	1
3	$\{3^-_{001} 0\}$	$\begin{bmatrix} -1 & 1 & 0 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$	1	1
4	$\{-1 0\}$	$\begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$	-1	1
5	$\{-3^+_{001} 0\}$	$\begin{bmatrix} 0 & 1 & 0 & 0 \\ -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$	-1	1
6	$\{-3^-_{001} 0\}$	$\begin{bmatrix} 1 & -1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$	-1	1
7	$\{1 \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} 1 & 0 & 0 & \frac{2}{3} \\ 0 & 1 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{1}{3} \end{bmatrix}$	1	1
8	$\{3^+_{001} \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} 0 & -1 & 0 & \frac{2}{3} \\ 1 & -1 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{1}{3} \end{bmatrix}$	1	1
9	$\{3^-_{001} \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} -1 & 1 & 0 & \frac{2}{3} \\ -1 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{1}{3} \end{bmatrix}$	1	1
10	$\{-1 \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} -1 & 0 & 0 & \frac{2}{3} \\ 0 & -1 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{1}{3} \end{bmatrix}$	-1	1
11	$\{-3^+_{001} \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} 0 & 1 & 0 & \frac{2}{3} \\ -1 & 1 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{1}{3} \end{bmatrix}$	-1	1
12	$\{-3^-_{001} \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} 1 & -1 & 0 & \frac{2}{3} \\ 1 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{1}{3} \end{bmatrix}$	-1	1
13	$\{1 \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} 1 & 0 & 0 & \frac{1}{3} \\ 0 & 1 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{2}{3} \end{bmatrix}$	1	1

continued ...

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No.	tag	matrix (polar)	det	TR
14	$\{3_{001}^+ \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} 0 & -1 & 0 & \frac{1}{3} \\ 1 & -1 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{2}{3} \end{bmatrix}$	1	1
15	$\{3_{001}^- \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} -1 & 1 & 0 & \frac{1}{3} \\ -1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{2}{3} \end{bmatrix}$	1	1
16	$\{-1 \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} -1 & 0 & 0 & \frac{1}{3} \\ 0 & -1 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{2}{3} \end{bmatrix}$	-1	1
17	$\{-3_{001}^+ \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} 0 & 1 & 0 & \frac{1}{3} \\ -1 & 1 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{2}{3} \end{bmatrix}$	-1	1
18	$\{-3_{001}^- \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} 1 & -1 & 0 & \frac{1}{3} \\ 1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{2}{3} \end{bmatrix}$	-1	1
19	$\{1' 0\}$	$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$	1	-1
20	$\{3_{001}^+' 0\}$	$\begin{bmatrix} 0 & -1 & 0 & 0 \\ 1 & -1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$	1	-1
21	$\{3_{001}^-' 0\}$	$\begin{bmatrix} -1 & 1 & 0 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$	1	-1
22	$\{-1' 0\}$	$\begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$	-1	-1
23	$\{-3_{001}^+' 0\}$	$\begin{bmatrix} 0 & 1 & 0 & 0 \\ -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$	-1	-1
24	$\{-3_{001}^-' 0\}$	$\begin{bmatrix} 1 & -1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$	-1	-1
25	$\{1' \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} 1 & 0 & 0 & \frac{2}{3} \\ 0 & 1 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{1}{3} \end{bmatrix}$	1	-1
26	$\{3_{001}^+' \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} 0 & -1 & 0 & \frac{2}{3} \\ 1 & -1 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{1}{3} \end{bmatrix}$	1	-1
27	$\{3_{001}^-' \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} -1 & 1 & 0 & \frac{2}{3} \\ -1 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 1 & \frac{1}{3} \end{bmatrix}$	1	-1

continued ...

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No.	tag	matrix (polar)	det	TR
28	$\{-1' \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} -1 & 0 & 0 & \frac{2}{3} \\ 0 & -1 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{1}{3} \end{bmatrix}$	-1	-1
29	$\{-3_{001}^+ \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} 0 & 1 & 0 & \frac{2}{3} \\ -1 & 1 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{1}{3} \end{bmatrix}$	-1	-1
30	$\{-3_{001}^- \frac{2}{3}\frac{1}{3}\frac{1}{3}\}$	$\begin{bmatrix} 1 & -1 & 0 & \frac{2}{3} \\ 1 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & -1 & \frac{1}{3} \end{bmatrix}$	-1	-1
31	$\{1' \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} 1 & 0 & 0 & \frac{1}{3} \\ 0 & 1 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{2}{3} \end{bmatrix}$	1	-1
32	$\{3_{001}^+ \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} 0 & -1 & 0 & \frac{1}{3} \\ 1 & -1 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{2}{3} \end{bmatrix}$	1	-1
33	$\{3_{001}^- \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} -1 & 1 & 0 & \frac{1}{3} \\ -1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & \frac{2}{3} \end{bmatrix}$	1	-1
34	$\{-1' \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} -1 & 0 & 0 & \frac{1}{3} \\ 0 & -1 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{2}{3} \end{bmatrix}$	-1	-1
35	$\{-3_{001}^+ \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} 0 & 1 & 0 & \frac{1}{3} \\ -1 & 1 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{2}{3} \end{bmatrix}$	-1	-1
36	$\{-3_{001}^- \frac{1}{3}\frac{2}{3}\frac{2}{3}\}$	$\begin{bmatrix} 1 & -1 & 0 & \frac{1}{3} \\ 1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & -1 & \frac{2}{3} \end{bmatrix}$	-1	-1