

* symmetry operation

Table 1: Symmetry operations for 3d polar vector.

| No. | tag | matrix (polar) | det | TR |
|-----|-------------|--|-----|----|
| 1 | 1 | $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ | 1 | 1 |
| 2 | 2_{001} | $\begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ | 1 | 1 |
| 3 | 4_{001}^+ | $\begin{bmatrix} 0 & -1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ | 1 | 1 |
| 4 | 4_{001}^- | $\begin{bmatrix} 0 & 1 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ | 1 | 1 |
| 5 | m_{100} | $\begin{bmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ | -1 | 1 |
| 6 | m_{010} | $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ | -1 | 1 |
| 7 | m_{1-10} | $\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ | -1 | 1 |
| 8 | m_{110} | $\begin{bmatrix} 0 & -1 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ | -1 | 1 |
| 9 | $2_{100}'$ | $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ | 1 | -1 |
| 10 | $2_{010}'$ | $\begin{bmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ | 1 | -1 |
| 11 | $2_{1-10}'$ | $\begin{bmatrix} 0 & -1 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ | 1 | -1 |
| 12 | $2_{110}'$ | $\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ | 1 | -1 |
| 13 | $-1'$ | $\begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ | -1 | -1 |

continued ...

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| No. | tag | matrix (polar) | det | TR |
|-----|-----------------|---|-----|----|
| 14 | m_{001}' | $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ | -1 | -1 |
| 15 | $-4_{001}^{+'}$ | $\begin{bmatrix} 0 & 1 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ | -1 | -1 |
| 16 | $-4_{001}^{-'}$ | $\begin{bmatrix} 0 & -1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ | -1 | -1 |