133^{rd} Eigenvector

$\boldsymbol{N_e = 4 \qquad s = 0 \qquad m_s = 0}$

Irred. Representation : $\boldsymbol{\Gamma_{4,3}}$

$$E_{133} = \frac{A_{13}}{3}$$

$$\begin{aligned}
|\Psi_{133}\rangle &= |4,0,0,\Gamma_{4,3}\rangle \\
&= C_{133,1}\left(|0202\rangle - |2020\rangle\right) \\
&+ C_{133,2}\left(|02du\rangle - |02ud\rangle + |0du2\rangle - |0ud2\rangle - |20du\rangle + |20ud\rangle - |2du0\rangle + |2ud0\rangle\right. \\
&\qquad \left. - |d02u\rangle + |d20u\rangle + |du02\rangle - |du20\rangle + |u02d\rangle - |u20d\rangle - |ud02\rangle + |ud20\rangle\right) \\
&+ C_{133,3}\left(|0d2u\rangle - |0u2d\rangle + |2d0u\rangle - |2u0d\rangle - |d0u2\rangle - |d2u0\rangle + |u0d2\rangle + |u2d0\rangle\right)
\end{aligned}$$

$$\begin{aligned}
C_{133-1} &= -\frac{J^2 - 2(U+10W)J - 8t^2 + U^2}{\sqrt{2}} \\
&+ \left(\frac{(30W - A_{13})\left(6(J-U-5W) + A_{13}\right)}{9\sqrt{2}}\right) \\
C_{133-2} &= \frac{t(J+U)}{3\sqrt{2}} \\
&+ \left(\frac{t\left(U - 2W + \left(\cos(\theta_2) - \sqrt{3}\sin(\theta_2)\right)\sqrt{A_2}\right)}{3\sqrt{2}}\right) \\
C_{133-3} &= -2\sqrt{2}t^2 \\
N_{133} &= \sqrt{2C_{133,1}^2 + 16C_{133,2}^2 + 8C_{133,3}^2}
\end{aligned}$$