128^{th} Eigenvector

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

Irred. Representation : $\boldsymbol{\Gamma_{4,2}}$

$$E_{128} = \frac{A_{14}}{3}$$

$$\begin{aligned}
|\Psi_{128}\rangle &= |4,0,0,\Gamma_{4,2}\rangle \\
&= C_{128,1}\left(|0220\rangle - |2002\rangle\right) \\
&+ C_{128,2}\left(|02du\rangle - |02ud\rangle + |0d2u\rangle - |0u2d\rangle - |20du\rangle + |20ud\rangle - |2d0u\rangle + |2u0d\rangle\right. \\
&\qquad \left. -|d0u2\rangle + |d2u0\rangle - |du02\rangle + |du20\rangle + |u0d2\rangle - |u2d0\rangle + |ud02\rangle - |ud20\rangle\right) \\
&+ C_{128,3}\left(|0du2\rangle - |0ud2\rangle + |2du0\rangle - |2ud0\rangle - |d02u\rangle - |d20u\rangle + |u02d\rangle + |u20d\rangle\right)
\end{aligned}$$

$$\begin{aligned}
C_{128-1} &= -\frac{J^2 - 2(U+10W)J - 8t^2 + U^2}{\sqrt{2}} \\
&+ \left(\frac{(30W - A_{14})\left(6(J-U-5W) + A_{14}\right)}{9\sqrt{2}}\right) \\
C_{128-2} &= \frac{t(J+U)}{3\sqrt{2}} \\
&+ \left(\frac{t\left(U - 2W + \left(\cos(\theta_2) + \sqrt{3}\sin(\theta_2)\right)\sqrt{A_2}\right)}{3\sqrt{2}}\right) \\
C_{128-3} &= -2\sqrt{2}t^2 \\
N_{128} &= \sqrt{2C_{128,1}^2 + 16C_{128,2}^2 + 8C_{128,3}^2}
\end{aligned}$$