51^{st} Eigenvector

$$\boldsymbol{N_e \ = \ 3 \qquad s = \frac{1}{2} \qquad m_s = -\frac{1}{2}}$$

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

$$E_{51} \ = \ \frac{1}{3}\left(-J + 3t + 2U + 14W - 2\cos(\theta_4)\sqrt{A_5}\right)$$

$$\begin{aligned}
|\Psi_{51}\rangle \ &= \ |3, \frac{1}{2}, -\frac{1}{2}, \Gamma_{4,2}\rangle \\
&= \ C_{51,1}\left(|002d\rangle - |00d2\rangle + |020d\rangle - |0d02\rangle - |20d0\rangle - |2d00\rangle + |d020\rangle + |d200\rangle\right) \\
&+ \ C_{51,2}\left(|02d0\rangle + |0d20\rangle - |200d\rangle - |d002\rangle\right) \\
&+ \ C_{51,3}\left(|0dud\rangle - |0udd\rangle + |d0du\rangle + |dd0u\rangle + |ddu0\rangle - |dud0\rangle - |u0dd\rangle - |ud0d\rangle\right)
\end{aligned}$$

$$\begin{aligned}
C_{51-1} \ &= \ -\frac{t\left(J - 4t + U - 2W + 2\cos(\theta_4)\sqrt{A_5}\right)}{2\sqrt{2}} \\
C_{51-2} \ &= \ \frac{t\left(J + 12t + U - 2W + 2\cos(\theta_4)\sqrt{A_5}\right)}{3\sqrt{2}} \\
C_{51-3} \ &= \ \frac{15t^2 + 5Ut + U^2 - J(t + 2U + 8W)}{6\sqrt{2}} \\
&+ \left(\frac{-A_{19}^2 + 6W(-4J + 13t + 10U + 32W) - 6(t + 2U + 8W)\cos(\theta_4)\sqrt{A_5}}{18\sqrt{2}}\right) \\
N_{51} \ &= \ 2\sqrt{2C_{51,1}^2 + C_{51,2}^2 + 2C_{51,3}^2}
\end{aligned}$$