120^{th} Eigenvector

$N_e = 4 \qquad s = 0 \qquad m_s = 0$

Irred. Representation : $\Gamma_{3,2}$

$$
\begin{aligned}
E_{120} &= -J + U + 10W + \left(\frac{\cos(\theta_1)}{\sqrt{3}} + \sin(\theta_1)\right)\sqrt{A_1} \\
|\Psi_{120}\rangle &= |4, 0, 0, \Gamma_{3,2}\rangle \\
&= C_{120,1}\left(|0022\rangle - |0220\rangle - |2002\rangle + |2200\rangle\right) \\
&+ C_{120,2}\left(|02du\rangle - |02ud\rangle - |0du2\rangle + |0ud2\rangle + |20du\rangle - |20ud\rangle - |2du0\rangle + |2ud0\rangle\right. \\
&\qquad \left. -|d02u\rangle - |d20u\rangle + |du02\rangle + |du20\rangle + |u02d\rangle + |u20d\rangle - |ud02\rangle - |ud20\rangle\right) \\
&+ C_{120,3}\left(|dduu\rangle + |duud\rangle + |uddu\rangle + |uudd\rangle\right) \\
&+ C_{120,4}\left(|dudu\rangle + |udud\rangle\right) \\
C_{120-1} &= t(J+U) \\
&+ \left(t(U-2W) + \left(\frac{t\cos(\theta_1)}{\sqrt{3}} + t\sin(\theta_1)\right)\sqrt{A_1}\right) \\
C_{120-2} &= \frac{1}{4}\left(-J^2 - 2UJ + 4WJ - U^2\right) \\
&+ \left((J+U-W)W + \frac{1}{12}\left(-\cos(2\theta_1) + \sqrt{3}\sin(2\theta_1) + 2\right)A_1\right) \\
C_{120-3} &= -t(J+U) \\
&+ \left(\left(\frac{t\cos(\theta_1)}{\sqrt{3}} + t\sin(\theta_1)\right)\sqrt{A_1} - t(U-2W)\right) \\
C_{120-4} &= 2t(J+U) \\
&+ \left(\frac{2}{3}t\left(3(U-2W) - \left(\sqrt{3}\cos(\theta_1) + 3\sin(\theta_1)\right)\sqrt{A_1}\right)\right) \\
N_{120} &= \sqrt{4C_{120,1}^2 + 16C_{120,2}^2 + 4C_{120,3}^2 + 2C_{120,4}^2}
\end{aligned}
$$