$$
\begin{aligned}
\Psi_{231} &= C_1\left(-|22du\rangle + |22ud\rangle + i\,|2du2\rangle - i\,|2ud2\rangle - i\,|d22u\rangle + |du22\rangle + i\,|u22d\rangle - |ud22\rangle\right) \\
&\quad + C_2\left(i\,|0222\rangle - |2022\rangle - i\,|2202\rangle + |2220\rangle\right)
\end{aligned}
$$

$$
C_1 = \frac{\left(\frac{1}{16} - \frac{i}{16}\right)\left(U - \sqrt{16\,t^2 + U^2}\right)}{t\sqrt{2 + \frac{U\left(U - \sqrt{16\,t^2+U^2}\right)}{8\,t^2}}}
$$

$$
C_2 = \frac{\frac{i}{2}}{\sqrt{2 + \frac{U\left(U - \sqrt{16\,t^2+U^2}\right)}{8\,t^2}}}
$$