$$
\begin{aligned}
\Psi_{201} &= C_1\left(|2ddu\rangle - i\,|ddu2\rangle - |du2d\rangle + i\,|u2dd\rangle\right) \\
&\quad + C_2\left(|2dud\rangle + i\,|d2du\rangle - i\,|dud2\rangle - |ud2d\rangle\right) \\
&\quad + C_3\left(|2udd\rangle + i\,|d2ud\rangle - |dd2u\rangle - i\,|udd2\rangle\right) \\
&\quad + C_4\left(-|0d22\rangle - i\,|20d2\rangle + |220d\rangle + i\,|d220\rangle\right) \\
&\quad + C_5\left(i\,|022d\rangle + |22d0\rangle - |d022\rangle\right) \\
&\quad + C_6\left(|2d02\rangle\right) \\
&\quad + C_7\left(|2d20\rangle\right) \\
&\quad + C_8\left(-i\,|02d2\rangle + |202d\rangle + i\,|d202\rangle\right)
\end{aligned}
$$

$$
C_1 = \frac{\sqrt{2}\,\left(\sqrt{64\,t^4+3\,t^2\,U^2}\,\left(U-\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)+2\,t^2\,\left(2\,U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\right)}{3\,t\,\left(-U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\,\left(4\,t+i\,\left(-U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\right)}
$$

$$
C_2 = \frac{3-\frac{2\,\left(\sqrt{64\,t^4+3\,t^2\,U^2}\,\left(U-\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)+2\,t^2\,\left(2\,U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\right)}{t\,\left(-U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\,\left(4\,t+i\,\left(-U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\right)}}{6\,\sqrt{2}}
$$

$$
C_3 = \frac{-3-\frac{2\,\left(\sqrt{64\,t^4+3\,t^2\,U^2}\,\left(U-\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)+2\,t^2\,\left(2\,U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\right)}{t\,\left(-U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\,\left(4\,t+i\,\left(-U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\right)}}{6\,\sqrt{2}}
$$

$$
C_4 = \frac{-2\,\sqrt{2}\,t\,\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}}{\left(U-\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\,\left(4\,i\,t+U-\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)}
$$

$$
C_5 = -\left(\frac{\sqrt{2}\,\left(8\,t^2-i\,t\,U+\sqrt{64\,t^4+3\,t^2\,U^2}\right)}{\left(-U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\,\left(-4\,i\,t-U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)}\right)
$$

$$
C_6 = \frac{\sqrt{2}\,\left(8\,i\,t^2+t\,U+i\,\sqrt{64\,t^4+3\,t^2\,U^2}\right)}{\left(U-\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\,\left(-4\,i\,t-U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)}
$$

$$
C_7 = \frac{\sqrt{2}\,\left(8\,i\,t^2+i\,\sqrt{64\,t^4+3\,t^2\,U^2}+t\,\left(U-2\,\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\right)}{\left(4\,i\,t+U-\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)\,\left(-U+\sqrt{32\,t^2+U^2+4\,\sqrt{64\,t^4+3\,t^2\,U^2}}\right)}
$$