$$
\begin{aligned}
\Psi_{128} \quad = \quad & C_1\left(|02du\rangle + |02ud\rangle + |0du2\rangle + |0ud2\rangle + |20du\rangle + |20ud\rangle + |2du0\rangle + |2ud0\rangle - |d02u\rangle - |d20u\rangle + |du02\rangle + |du20\rangle - |u02d\rangle - |u20d\rangle + |ud02\rangle + |ud20\rangle\right) \\
& + C_2\left(-|0d2u\rangle - |0u2d\rangle + |2d0u\rangle + |2u0d\rangle + |d0u2\rangle - |d2u0\rangle + |u0d2\rangle - |u2d0\rangle\right) \\
& + C_3\left(-|dudu\rangle + |udud\rangle\right)
\end{aligned}
\tag{1}
$$

$$
C_1 \quad = \quad \frac{48\,2^{\frac{1}{3}}\,\left(1+i\,\sqrt{3}\right)\,t^2 + 2^{\frac{1}{3}}\,\left(1+i\,\sqrt{3}\right)\,U^2 + 2^{\frac{1}{3}}\,\left(1-i\,\sqrt{3}\right)\,\left(36\,t^2\,U - U^3 + 6\,\sqrt{6}\,\sqrt{-\left(t^2\,\left(512\,t^4 + 26\,t^2\,U^2 + U^4\right)\right)}\right)^{\frac{2}{3}} - 4\,U\,\left(72\,t^2\,U - 2\,U^3 + 12\,\sqrt{6}\,\sqrt{-512\,t^6 - 26\,t^4\,U^2 - t^2\,U^4}\right)^{\frac{1}{3}}}{48\,2^{\frac{5}{6}}\,t\,\left(36\,t^2\,U - U^3 + 6\,\sqrt{6}\,\sqrt{-\left(t^2\,\left(512\,t^4 + 26\,t^2\,U^2 + U^4\right)\right)}\right)^{\frac{1}{3}}}
\tag{2}
$$

$$
C_2 \quad = \quad \frac{192\,2^{\frac{2}{3}}\,\left(1-i\,\sqrt{3}\right)\,t^4 + 2^{\frac{1}{6}}\,\sqrt{-\left(t^2\,\left(512\,t^4 + 26\,t^2\,U^2 + U^4\right)\right)}\,\left(\left(-3\,i + \sqrt{3}\right)\,U + \left(3\,i + \sqrt{3}\right)\,\left(36\,t^2\,U - U^3 + 6\,\sqrt{6}\,\sqrt{-\left(t^2\,\left(512\,t^4 + 26\,t^2\,U^2 + U^4\right)\right)}\right)^{\frac{1}{3}}\right) + t^2\,\left(11\,2^{\frac{2}{3}}\,\left(1-i\,\sqrt{3}\right)\,U^2 + 7\,2^{\frac{2}{3}}\,\left(1+i\,\sqrt{3}\right)\,U\,\left(36\,t^2\,U - U^3 + 6\,\sqrt{6}\,\sqrt{-\left(t^2\,\left(512\,t^4 + 26\,t^2\,U^2 + U^4\right)\right)}\right)^{\frac{1}{3}} - 4\,\left(72\,t^2\,U - 2\,U^3 + 12\,\sqrt{6}\,\sqrt{-512\,t^6 - 26\,t^4\,U^2 - t^2\,U^4}\right)^{\frac{2}{3}}\right)}{48\,2^{\frac{1}{6}}\,t^2\,\left(36\,t^2\,U - U^3 + 6\,\sqrt{6}\,\sqrt{-\left(t^2\,\left(512\,t^4 + 26\,t^2\,U^2 + U^4\right)\right)}\right)^{\frac{2}{3}}}
\tag{3}
$$

$$
C_3 \quad = \quad -\left(\frac{1}{\sqrt{2}}\right)
\tag{4}
$$