$$
K_{40}^{2} \;=\; \left[\begin{array}{cccccccccccccccc}
\frac{-17\,U}{4\,t} & \frac{(8+8\,\mathbf{i}\,\sqrt{3})\,t^2+(-11-\mathbf{i}\,\sqrt{3})\,U^2}{24\,t^2} & \frac{-\left(\frac{\sqrt{3}}{2}\,U\right)}{2\,t} & \frac{3\,\mathbf{i}-\sqrt{3}}{6} & \frac{-((3\,\mathbf{i}+2\,\sqrt{3})\,U)}{4\,t} & \frac{-((9\,\mathbf{i}+5\,\sqrt{3})\,U^2)}{12\,\sqrt{2}\,t^2} & \frac{(-3\,\mathbf{i}+5\,\sqrt{3})\,U^2}{12\,\sqrt{2}\,t^2} & \frac{3\,U}{2\,\sqrt{2}\,t} & \frac{\mathbf{i}}{2}\,(\mathbf{i}+\sqrt{3}) & \frac{(2+\mathbf{i}\,\sqrt{3})\,U}{4\,t} & \frac{(-1+3\,\mathbf{i}\,\sqrt{3})\,U}{2\,\sqrt{2}\,t} & \frac{(-4-4\,\mathbf{i}\,\sqrt{3})\,t^2+(1-\mathbf{i}\,\sqrt{3})\,U^2}{6\,\sqrt{2}\,t^2} & \frac{\left(\frac{1}{2}+\frac{\mathbf{i}}{2}\right)\left((-6-3\,\mathbf{i})\,\sqrt{4-2\,\sqrt{3}}+(7+2\,\mathbf{i})\,(-3+\sqrt{3})\right)U}{\sqrt{3}\,(3-\sqrt{3})^{\frac{3}{2}}\,t} & \frac{(-3+9\,\mathbf{i}+(5-9\,\mathbf{i})\,\sqrt{3})\,U}{12\,\sqrt{3+\sqrt{3}}\,t} & \frac{(3\,\mathbf{i}-2\,\sqrt{3})\,U}{4\,t} & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U^2}{8\,t^2} \\
\frac{(8-8\,\mathbf{i}\,\sqrt{3})\,t^2+\mathbf{i}\,(11\,\mathbf{i}+\sqrt{3})\,U^2}{24\,t^2} & \frac{-31\,U}{12\,t} & 0 & \frac{-((3\,\mathbf{i}+2\,\sqrt{3})\,U)}{12\,t} & \mathbf{i}+\frac{1}{\sqrt{3}} & \frac{U}{\sqrt{6}\,t} & \frac{(9\,\mathbf{i}-11\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & 0 & \frac{3\,U}{4\,t} & -1-\mathbf{i}\,\sqrt{3} & \frac{(4-4\,\mathbf{i}\,\sqrt{3})\,t^2+(-1-\mathbf{i}\,\sqrt{3})\,U^2}{3\,\sqrt{2}\,t^2} & \frac{(-5-3\,\mathbf{i}\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & 0 & 0 & 0 & \frac{8\,(-3\,\mathbf{i}+\sqrt{3})\,t^2-(3\,\mathbf{i}+\sqrt{3})\,U^2}{24\,t^2} & \frac{-((2\,\mathbf{i}+\sqrt{3})\,U)}{4\,t} \\
\frac{-\left(\sqrt{\frac{3}{2}}\,U\right)}{2\,t} & 0 & \frac{-2\,U}{t} & \frac{\frac{\mathbf{i}}{4}\,(-5\,\mathbf{i}+\sqrt{3})\,U^2}{\sqrt{2}\,t^2} & \frac{\sqrt{2}\,U-\mathbf{i}\,\sqrt{6}\,U}{4\,t} & -1-\mathbf{i}\,\sqrt{3} & -2 & 0 & \frac{(3\,\mathbf{i}+\sqrt{3})\,U^2}{4\,\sqrt{2}\,t^2} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{-3\,U}{2\,\sqrt{2}\,t} & 0 \\
\frac{-3\,\mathbf{i}-\sqrt{3}}{6} & \frac{(3\,\mathbf{i}-2\,\sqrt{3})\,U}{12\,t} & \frac{\frac{\mathbf{i}}{4}\,(5\,\mathbf{i}+\sqrt{3})\,U^2}{\sqrt{2}\,t^2} & \frac{-15\,U}{4\,t} & \frac{8\,t^2+(-1-3\,\mathbf{i}\,\sqrt{3})\,U^2}{8\,t^2} & \frac{3\,U}{2\,\sqrt{2}\,t} & \frac{3\,U}{2\,\sqrt{2}\,t} & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U^2}{4\,\sqrt{2}\,t^2} & \frac{\frac{3\,\mathbf{i}}{4}\,U}{t} & \frac{-(8\,\sqrt{3}\,t^2+(-3\,\mathbf{i}+\sqrt{3})\,U^2)}{8\,t^2} & \frac{-(\sqrt{2}\,(3\,\mathbf{i}+\sqrt{3}))}{3} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{3\,\sqrt{2}\,t} & 0 & 0 & \frac{-\mathbf{i}}{2}\,(-\mathbf{i}+\sqrt{3}) & \frac{-3\,\mathbf{i}}{4}\,(-2\,\mathbf{i}+\sqrt{3})\,U \\
\frac{(3\,\mathbf{i}-2\,\sqrt{3})\,U}{4\,t} & -\mathbf{i}+\frac{1}{\sqrt{3}} & \frac{\sqrt{2}\,U+\mathbf{i}\,\sqrt{6}\,U}{4\,t} & \frac{8\,t^2+(-1+3\,\mathbf{i}\,\sqrt{3})\,U^2}{8\,t^2} & \frac{-3\,U}{4\,t} & 0 & 0 & 0 & \frac{8\,\sqrt{3}\,t^2-(3\,\mathbf{i}+\sqrt{3})\,U^2}{8\,t^2} & \frac{-5\,\sqrt{3}\,U}{4\,t} & \frac{-((3\,\mathbf{i}+\sqrt{3})\,U)}{2\,\sqrt{2}\,t} & \frac{-(\sqrt{2}\,(-3\,\mathbf{i}+\sqrt{3}))}{3} & 0 & 0 & \frac{3\,U}{4\,t} & 0 \\
\frac{(9\,\mathbf{i}-5\,\sqrt{3})\,U^2}{12\,\sqrt{2}\,t^2} & \frac{U}{\sqrt{6}\,t} & -1+\mathbf{i}\,\sqrt{3} & \frac{3\,U}{2\,\sqrt{2}\,t} & 0 & \frac{-4\,U}{t} & \frac{U}{t} & 3\,\mathbf{i}-\sqrt{3} & \frac{-\left(\sqrt{\frac{3}{2}}\,U\right)}{2\,t} & 0 & -\left(\frac{U^2}{\sqrt{3}\,t^2}\right) & \frac{(9\,\mathbf{i}+7\,\sqrt{3})\,U}{6\,t} & \frac{(-2-6\,\mathbf{i})\,\sqrt{18-6\,\sqrt{3}}+(6+6\,\mathbf{i})\,\sqrt{6-2\,\sqrt{3}}}{6\,\sqrt{4-2\,\sqrt{3}}} & (1-\mathbf{i})\,(2-\mathbf{i}+\sqrt{3})\,\sqrt{\frac{2}{3+\sqrt{3}}} & \frac{\frac{\mathbf{i}}{4}\,(-\mathbf{i}+\sqrt{3})\,U^2}{\sqrt{2}\,t^2} & \frac{(5+\mathbf{i}\,\sqrt{3})\,U}{2\,\sqrt{2}\,t} \\
\frac{(3\,\mathbf{i}+5\,\sqrt{3})\,U^2}{12\,\sqrt{2}\,t^2} & \frac{-((9\,\mathbf{i}+11\,\sqrt{3})\,U)}{6\,\sqrt{2}\,t} & -2 & \frac{3\,U}{2\,\sqrt{2}\,t} & 0 & \frac{U}{t} & \frac{-4\,U}{t} & -2\,\sqrt{3} & \frac{-\left(\sqrt{\frac{3}{2}}\,U\right)}{2\,t} & 0 & \frac{-((-3\,\mathbf{i}+\sqrt{3})\,U^2)}{6\,t^2} & \frac{U}{\sqrt{3}\,t} & \frac{-4\,(-3+\sqrt{3})}{\sqrt{18-6\,\sqrt{3}}} & \frac{2\,(\sqrt{2}+\sqrt{6})}{\sqrt{3+\sqrt{3}}} & \frac{\frac{\mathbf{i}}{4}\,(3\,\mathbf{i}+\sqrt{3})\,U^2}{\sqrt{2}\,t^2} & \frac{(2+\mathbf{i}\,\sqrt{3})\,U}{\sqrt{2}\,t} \\
\frac{3\,U}{2\,\sqrt{2}\,t} & 0 & 0 & \frac{(3\,\mathbf{i}+\sqrt{3})\,U^2}{4\,\sqrt{2}\,t^2} & 0 & -3\,\mathbf{i}-\sqrt{3} & -2\,\sqrt{3} & \frac{-6\,U}{t} & \frac{\frac{\mathbf{i}}{4}\,(3\,\mathbf{i}+\sqrt{3})\,U^2}{\sqrt{2}\,t^2} & \frac{3\,(1-\mathbf{i}\,\sqrt{3})\,U}{2\,\sqrt{2}\,t} & 0 & 0 & 0 & 0 & \frac{3\,\sqrt{\frac{3}{2}}\,U}{2\,t} & 0 \\
\frac{-\mathbf{i}}{2}\,(-\mathbf{i}+\sqrt{3}) & \frac{3\,U}{4\,t} & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U^2}{4\,\sqrt{2}\,t^2} & \frac{-3\,\mathbf{i}\,U}{4\,t} & \frac{8\,\sqrt{3}\,t^2-(-3\,\mathbf{i}+\sqrt{3})\,U^2}{8\,t^2} & \frac{-\left(\sqrt{\frac{3}{2}}\,U\right)}{2\,t} & \frac{-\left(\sqrt{\frac{3}{2}}\,U\right)}{2\,t} & \frac{-\frac{1}{4}\,(-3\,\mathbf{i}+\sqrt{3})\,U^2}{\sqrt{2}\,t^2} & \frac{-15\,U}{4\,t} & \frac{-(24\,t^2+(3+\mathbf{i}\,\sqrt{3})\,U^2)}{8\,t^2} & -\sqrt{2}-\mathbf{i}\,\sqrt{6} & 0 & 0 & 0 & \frac{-3\,\mathbf{i}-\sqrt{3}}{2} & \frac{3\,\sqrt{3}\,U}{4\,t} \\
\frac{(2-\mathbf{i}\,\sqrt{3})\,U}{4\,t} & -1+\mathbf{i}\,\sqrt{3} & 0 & \frac{-(8\,\sqrt{3}\,t^2+(3\,\mathbf{i}+\sqrt{3})\,U^2)}{8\,t^2} & 0 & \frac{-\left(\sqrt{\frac{3}{2}}\,U\right)}{2\,t} & \frac{-\frac{1}{4}\,(-3\,\mathbf{i}+\sqrt{3})\,U^2}{\sqrt{2}\,t^2} & \frac{3\,(1+\mathbf{i}\,\sqrt{3})\,U}{2\,\sqrt{2}\,t} & \frac{-24\,t^2+\mathbf{i}\,(3\,\mathbf{i}+\sqrt{3})\,U^2}{8\,t^2} & \frac{-21\,U}{4\,t} & \frac{\sqrt{2}\,U+\mathbf{i}\,\sqrt{6}\,U}{4\,t} & \sqrt{2}-\mathbf{i}\,\sqrt{6} & 0 & 0 & 0 & \frac{-(\sqrt{3}\,U)}{4\,t} & 0 \\
\frac{(-1-3\,\mathbf{i}\,\sqrt{3})\,U}{2\,\sqrt{2}\,t} & \frac{(4+4\,\mathbf{i}\,\sqrt{3})\,t^2+\mathbf{i}\,(\mathbf{i}+\sqrt{3})\,U^2}{3\,\sqrt{2}\,t^2} & 0 & \frac{-((3\,\mathbf{i}+\sqrt{3})\,U)}{2\,\sqrt{2}\,t} & -\left(\frac{U^2}{\sqrt{3}\,t^2}\right) & \frac{-((3\,\mathbf{i}+\sqrt{3})\,U^2)}{6\,t^2} & 0 & \mathbf{i}\,\sqrt{2}\,(\mathbf{i}+\sqrt{3}) & \frac{\sqrt{2}\,U-\mathbf{i}\,\sqrt{6}\,U}{4\,t} & \frac{-5\,U}{2\,t} & \frac{-16\,\mathbf{i}\,(-\mathbf{i}+\sqrt{3})\,t^2+(-5-\mathbf{i}\,\sqrt{3})\,U^2}{12\,t^2} & -\left(\frac{(3+\sqrt{3})\,U}{\sqrt{6}\,(3-\sqrt{3})^{\frac{3}{2}}\,t}\right) & \frac{(-3+2\,\sqrt{3})\,U}{3\,\sqrt{2}\,(3+\sqrt{3})\,t} & \frac{-((-3\,\mathbf{i}+\sqrt{3})\,U)}{2\,\sqrt{2}\,t} & 0 \\
\frac{4\,\mathbf{i}\,(\mathbf{i}+\sqrt{3})\,t^2+(14+\mathbf{i}\,\sqrt{3})\,U^2}{6\,\sqrt{2}\,t^2} & \frac{(-5+3\,\mathbf{i}\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & 0 & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{3\,\sqrt{2}\,t} & \frac{-(\sqrt{2}\,(3\,\mathbf{i}+\sqrt{3}))}{3} & \frac{(-9\,\mathbf{i}+7\,\sqrt{3})\,U}{6\,t} & \frac{U}{\sqrt{3}\,t} & 0 & 0 & \sqrt{2}+\mathbf{i}\,\sqrt{6} & \frac{\frac{\mathbf{i}}{12}\,(16\,(\mathbf{i}+\sqrt{3})\,t^2+(5\,\mathbf{i}+\sqrt{3})\,U^2)}{t^2} & \frac{-13\,U}{6\,t} & 0 & 0 & \frac{-(4\,(-3\,\mathbf{i}+\sqrt{3})\,t^2+(3\,\mathbf{i}+\sqrt{3})\,U^2)}{6\,\sqrt{2}\,t^2} & \frac{(-\mathbf{i}+\sqrt{3})\,U}{2\,\sqrt{2}\,t} \\
\frac{\left(\frac{1}{2}+\frac{\mathbf{i}}{2}\right)\left((3+6\,\mathbf{i})\,\sqrt{4-2\,\sqrt{3}}-(2+7\,\mathbf{i})\,(-3+\sqrt{3})\right)U}{\sqrt{3}\,(3-\sqrt{3})^{\frac{3}{2}}\,t} & 0 & 0 & 0 & 0 & \frac{(-2+6\,\mathbf{i})\,\sqrt{18-6\,\sqrt{3}}+(6-6\,\mathbf{i})\,\sqrt{6-2\,\sqrt{3}}}{6\,\sqrt{4-2\,\sqrt{3}}} & \frac{-4\,(-3+\sqrt{3})}{\sqrt{18-6\,\sqrt{3}}} & 0 & 0 & 0 & -\left(\frac{\left(\sqrt{18-6\,\sqrt{3}}+2\,\sqrt{6-2\,\sqrt{3}}\right)U}{6\,\sqrt{4-2\,\sqrt{3}}\,t}\right) & 0 & \frac{-2\left(-9+2\,\sqrt{3}+12\,\sqrt{4-2\,\sqrt{3}}\right)U}{\sqrt{4-2\,\sqrt{3}}\,(-3+\sqrt{3})^2\,t} & -\left(\frac{\left(-3+\sqrt{3}-3\,\sqrt{4-2\,\sqrt{3}}\right)U}{6\,\sqrt{2}\,t}\right) & \frac{\left(\frac{1}{2}+\frac{\mathbf{i}}{2}\right)\sqrt{3}\left(-3+\sqrt{3}-(4-\mathbf{i})\,\sqrt{4-2\,\sqrt{3}}\right)U}{(3-\sqrt{3})^{\frac{3}{2}}\,t} & 0 \\
\frac{(-3-9\,\mathbf{i}+(5+9\,\mathbf{i})\,\sqrt{3})\,U}{12\,\sqrt{3+\sqrt{3}}\,t} & 0 & 0 & 0 & 0 & (1+\mathbf{i})\,(2+\mathbf{i}+\sqrt{3})\,\sqrt{\frac{2}{3+\sqrt{3}}} & \frac{2\,(\sqrt{2}+\sqrt{6})}{\sqrt{3+\sqrt{3}}} & 0 & 0 & 0 & \frac{(-3+2\,\sqrt{3})\,U}{3\,\sqrt{2}\,(3+\sqrt{3})\,t} & 0 & -\left(\frac{\left(-3+\sqrt{3}-3\,\sqrt{4-2\,\sqrt{3}}\right)U}{6\,\sqrt{2}\,t}\right) & \frac{-7\,U}{(3+\sqrt{3})\,t} & \frac{\left(-\left(\frac{1}{4}\right)+\frac{\mathbf{i}}{4}\right)(-4-\mathbf{i}+\sqrt{3})\,U}{\sqrt{3+\sqrt{3}}\,t} & 0 \\
\frac{-((3\,\mathbf{i}+2\,\sqrt{3})\,U)}{4\,t} & \frac{8\,(3\,\mathbf{i}+\sqrt{3})\,t^2-(-3\,\mathbf{i}+\sqrt{3})\,U^2}{24\,t^2} & \frac{-3\,U}{2\,\sqrt{2}\,t} & \frac{\mathbf{i}}{2}\,(\mathbf{i}+\sqrt{3}) & \frac{3\,U}{4\,t} & \frac{\mathbf{i}}{2}\,(\mathbf{i}+\sqrt{3})\,U^2 & \frac{-\mathbf{i}}{4}\,(-3\,\mathbf{i}+\sqrt{3})\,U^2 & \frac{3\,\sqrt{\frac{3}{2}}\,U}{2\,t} & \frac{3\,\mathbf{i}-\sqrt{3}}{2} & \frac{-(\sqrt{3}\,U)}{4\,t} & \frac{-((3\,\mathbf{i}+\sqrt{3})\,U)}{2\,\sqrt{2}\,t} & \frac{-(4\,(3\,\mathbf{i}+\sqrt{3})\,t^2+(-3\,\mathbf{i}+\sqrt{3})\,U^2)}{6\,\sqrt{2}\,t^2} & \frac{\left(\frac{1}{4}-\frac{\mathbf{i}}{4}\right)\sqrt{3}\left(-3+\sqrt{3}-(4+\mathbf{i})\,\sqrt{4-2\,\sqrt{3}}\right)U}{(3-\sqrt{3})^{\frac{3}{2}}\,t} & \frac{\left(-\left(\frac{1}{4}\right)-\frac{\mathbf{i}}{4}\right)(-4+\mathbf{i}\,\sqrt{3})\,U}{\sqrt{3+\sqrt{3}}\,t} & \frac{-21\,U}{4\,t} & \frac{-\mathbf{i}}{2}\,(-3\,\mathbf{i}+\sqrt{3})\,U^2}{t^2} \\
\frac{(3\,\mathbf{i}+\sqrt{3})\,U^2}{8\,t^2} & \frac{-((-2\,\mathbf{i}+\sqrt{3})\,U)}{4\,t} & 0 & \frac{3\,\mathbf{i}}{4}\,(2\,\mathbf{i}+\sqrt{3})\,U & 0 & \frac{(5-\mathbf{i}\,\sqrt{3})\,U}{2\,\sqrt{2}\,t} & \frac{(2-\mathbf{i}\,\sqrt{3})\,U}{\sqrt{2}\,t} & 0 & \frac{3\,\sqrt{3}\,U}{4\,t} & 0 & 0 & \frac{(\mathbf{i}+\sqrt{3})\,U}{2\,\sqrt{2}\,t} & 0 & 0 & \frac{\mathbf{i}}{2}\,(3\,\mathbf{i}+\sqrt{3})\,U^2}{t^2} & \frac{-15\,U}{4\,t}
\end{array}\right]
$$