$$K_{42}^2 = \begin{bmatrix}
\frac{-53\,U}{12\,t} & \frac{24\,(1-\mathbf{i}\,\sqrt{3})\,t^2+\mathbf{i}\,(11\,\mathbf{i}+\sqrt{3})\,U^2}{24\,t^2} & 0 & \frac{-\left(\sqrt{2}\,(3\,\mathbf{i}+\sqrt{3})\right)}{3} & \frac{6\,\mathbf{i}+\sqrt{3})\,U}{6\,\sqrt{2}\,t} & 0 & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{4\,\sqrt{2}\,t} & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{12\,\sqrt{2}\,t} & \sqrt{\frac{2}{3}}+\mathbf{i}\,\sqrt{2} & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{3\,t} & \frac{(-7+9\,\mathbf{i}\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{(1+\mathbf{i}\,\sqrt{3})\,U^2}{6\,\sqrt{2}\,t^2} & \frac{-\left((-18\,\mathbf{i}+\sqrt{3})\,U\right)}{12\,t} & \frac{-8\,(-3\,\mathbf{i}+\sqrt{3})\,t^2+3\,(3\,\mathbf{i}+\sqrt{3})\,U^2}{24\,t^2} \\
\frac{24\,(1+\mathbf{i}\,\sqrt{3})\,t^2+(-11-\mathbf{i}\,\sqrt{3})\,U^2}{24\,t^2} & \frac{-41\,U}{12\,t} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{12\,t} & \frac{(-3\,\mathbf{i}+2\,\sqrt{3})\,U}{3\,\sqrt{2}\,t} & 0 & \frac{-\left((3\,\mathbf{i}+4\,\sqrt{3})\,U\right)}{6\,\sqrt{2}\,t} & -\left(\frac{-3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}}\right) & \frac{3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & \frac{(-3\,\mathbf{i}+2\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U^2}{12\,t^2} & \frac{(-6-6\,\mathbf{i}\,\sqrt{3})\,t^2+\mathbf{i}\,(\mathbf{i}+\sqrt{3})\,U^2}{3\,\sqrt{2}\,t^2} & \frac{(-1+9\,\mathbf{i}\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{-\left((-3\,\mathbf{i}+\sqrt{3})\,U^2\right)}{24\,t^2} & \frac{(15\,\mathbf{i}-2\,\sqrt{3})\,U}{12\,t} \\
0 & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{12\,t} & \frac{-4\,U}{t} & \frac{(1+\mathbf{i}\,\sqrt{3})\,U}{\sqrt{2}\,t} & -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & \frac{(3-\mathbf{i}\,\sqrt{3})\,U}{2\,\sqrt{2}\,t} & 0 & 0 & 0 & 0 & 0 & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{3\,\sqrt{2}\,t} & 0 & \frac{\frac{3\,\mathbf{i}}{4}\,(\mathbf{i}+\sqrt{3})\,U}{t} \\
\frac{-\left(\sqrt{2}\,(-3\,\mathbf{i}+\sqrt{3})\right)}{3} & \frac{(3\,\mathbf{i}+2\,\sqrt{3})\,U}{3\,\sqrt{2}\,t} & \frac{(1-\mathbf{i}\,\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{-9\,U}{2\,t} & \frac{\frac{\mathbf{i}}{4}\,(\mathbf{i}+\sqrt{3})\,U^2}{t^2} & 0 & -2 & -1+\mathbf{i}\,\sqrt{3} & \frac{U}{t} & 0 & -2\,\mathbf{i}+\frac{2}{\sqrt{3}} & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{3\,t} & 0 & \frac{U}{\sqrt{2}\,t} \\
\frac{(-6\,\mathbf{i}+\sqrt{3})\,U}{6\,\sqrt{2}\,t} & 0 & -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & \frac{\frac{-\mathbf{i}}{4}\,(-\mathbf{i}+\sqrt{3})\,U^2}{t^2} & \frac{-3\,U}{t} & 0 & \frac{(3+\mathbf{i}\,\sqrt{3})\,U}{4\,t} & \frac{(3+\mathbf{i}\,\sqrt{3})\,U}{4\,t} & 0 & \frac{(1+\mathbf{i}\,\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{-\left((3\,\mathbf{i}+\sqrt{3})\,U\right)}{6\,t} & 0 & \frac{3\,U}{2\,\sqrt{2}\,t} & 0 \\
0 & \frac{(3\,\mathbf{i}-4\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{(3+\mathbf{i}\,\sqrt{3})\,U}{2\,\sqrt{2}\,t} & 0 & 0 & \frac{-4\,U}{t} & \frac{\frac{\mathbf{i}}{4}\,(\mathbf{i}+\sqrt{3})\,U^2}{t^2} & \frac{U^2}{2\,t^2} & \frac{\frac{-3\,\mathbf{i}}{2}\,\sqrt{3}\,U}{t} & 0 & 0 & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{6\,t} & 0 & \frac{-U}{2\,\sqrt{2}\,t} \\
\frac{(3\,\mathbf{i}+\sqrt{3})\,U}{4\,\sqrt{2}\,t} & -\left(\frac{3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}}\right) & 0 & -2 & \frac{(3-\mathbf{i}\,\sqrt{3})\,U}{4\,t} & \frac{\frac{-\mathbf{i}}{4}\,(-\mathbf{i}+\sqrt{3})\,U^2}{t^2} & \frac{-5\,U}{t} & \frac{\frac{-\mathbf{i}}{2}\,(-4\,\mathbf{i}+\sqrt{3})\,U}{t} & \frac{8\,t^2+\mathbf{i}\,(\mathbf{i}+\sqrt{3})\,U^2}{4\,t^2} & \frac{U}{\sqrt{2}\,t} & 0 & 0 & \frac{3\,(1+\mathbf{i}\,\sqrt{3})\,U}{4\,\sqrt{2}\,t} & \frac{1+\mathbf{i}\,\sqrt{3}}{\sqrt{2}} \\
\frac{(3\,\mathbf{i}+\sqrt{3})\,U}{12\,\sqrt{2}\,t} & \frac{-3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & 0 & -1-\mathbf{i}\,\sqrt{3} & \frac{(3-\mathbf{i}\,\sqrt{3})\,U}{4\,t} & \frac{U^2}{2\,t^2} & \frac{\frac{\mathbf{i}}{2}\,(4\,\mathbf{i}+\sqrt{3})\,U}{t} & \frac{-5\,U}{t} & \frac{(4+4\,\mathbf{i}\,\sqrt{3})\,t^2+(1-\mathbf{i}\,\sqrt{3})\,U^2}{4\,t^2} & \frac{\sqrt{2}\,U+\mathbf{i}\,\sqrt{6}\,U}{4\,t} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{6\,t} & 0 & \frac{\frac{-3\,\mathbf{i}}{4}\,(-\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{\mathbf{i}\,(\mathbf{i}+\sqrt{3})}{\sqrt{2}} \\
\sqrt{\frac{2}{3}}-\mathbf{i}\,\sqrt{2} & \frac{(3\,\mathbf{i}+2\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & 0 & \frac{U}{t} & 0 & \frac{\frac{3\,\mathbf{i}}{2}\,\sqrt{3}\,U}{t} & \frac{8\,t^2+(-1-\mathbf{i}\,\sqrt{3})\,U^2}{4\,t^2} & \frac{(4-4\,\mathbf{i}\,\sqrt{3})\,t^2+(1+\mathbf{i}\,\sqrt{3})\,U^2}{4\,t^2} & \frac{-5\,U}{t} & 0 & 2\,\mathbf{i}-\frac{2}{\sqrt{3}} & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{6\,t} & 0 & \frac{U}{2\,\sqrt{2}\,t} \\
\frac{(3\,\mathbf{i}+\sqrt{3})\,U}{3\,t} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U^2}{12\,t^2} & 0 & 0 & \frac{(1-\mathbf{i}\,\sqrt{3})\,U}{\sqrt{2}\,t} & 0 & \frac{U}{\sqrt{2}\,t} & \frac{\sqrt{2}\,U-\mathbf{i}\,\sqrt{6}\,U}{4\,t} & 0 & \frac{-5\,U}{t} & \frac{(-3\,\mathbf{i}+5\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{-\left((3\,\mathbf{i}+\sqrt{3})\,U^2\right)}{6\,\sqrt{2}\,t^2} & \frac{\mathbf{i}}{2}\,(\mathbf{i}+\sqrt{3})\,U & \frac{(1+\mathbf{i}\,\sqrt{3})\,U^2}{4\,t^2} \\
\frac{(-7-9\,\mathbf{i}\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{6\,\mathbf{i}\,(\mathbf{i}+\sqrt{3})\,t^2+(-1-\mathbf{i}\,\sqrt{3})\,U^2}{3\,\sqrt{2}\,t^2} & 0 & 2\,\mathbf{i}+\frac{2}{\sqrt{3}} & \frac{-\left((-3\,\mathbf{i}+\sqrt{3})\,U\right)}{6\,t} & 0 & 0 & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{6\,t} & \frac{-2\,(3\,\mathbf{i}+\sqrt{3})}{3} & \frac{(3\,\mathbf{i}+5\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{-23\,U}{6\,t} & \frac{\mathbf{i}}{12}\,(5\,\mathbf{i}+\sqrt{3})\,U^2 & \frac{(9\,\mathbf{i}+\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \sqrt{\frac{2}{3}}-\mathbf{i}\,\sqrt{2} \\
\frac{(1-\mathbf{i}\,\sqrt{3})\,U^2}{6\,\sqrt{2}\,t^2} & \frac{(-1-9\,\mathbf{i}\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{3\,\sqrt{2}\,t} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{3\,t} & 0 & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{6\,t} & 0 & 0 & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{6\,t} & \frac{-\left((-3\,\mathbf{i}+\sqrt{3})\,U^2\right)}{6\,\sqrt{2}\,t^2} & \frac{\frac{-\mathbf{i}}{12}\,(-5\,\mathbf{i}+\sqrt{3})\,U^2}{t^2} & \frac{-29\,U}{6\,t} & \frac{-\left((-3\,\mathbf{i}+\sqrt{3})\,U^2\right)}{6\,\sqrt{2}\,t^2} & \frac{(3\,\mathbf{i}+5\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} \\
\frac{-\left((18\,\mathbf{i}+\sqrt{3})\,U\right)}{12\,t} & \frac{-\left((3\,\mathbf{i}+\sqrt{3})\,U^2\right)}{24\,t^2} & 0 & 0 & \frac{3\,U}{2\,\sqrt{2}\,t} & 0 & \frac{3\,(1-\mathbf{i}\,\sqrt{3})\,U}{4\,\sqrt{2}\,t} & \frac{\frac{3\,\mathbf{i}}{4}\,(\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & 0 & \frac{-\left(U+\mathbf{i}\,\sqrt{3}\,U\right)}{2\,t} & \frac{(-9\,\mathbf{i}+\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{-\left((3\,\mathbf{i}+\sqrt{3})\,U^2\right)}{6\,\sqrt{2}\,t^2} & \frac{-21\,U}{4\,t} & \frac{\mathbf{i}}{8}\,(3\,\mathbf{i}+\sqrt{3})\,U^2 \\
\frac{-8\,(3\,\mathbf{i}+\sqrt{3})\,t^2+3\,(-3\,\mathbf{i}+\sqrt{3})\,U^2}{24\,t^2} & \frac{-\left((15\,\mathbf{i}+2\,\sqrt{3})\,U\right)}{12\,t} & \frac{\frac{-3\,\mathbf{i}}{4}\,(-\mathbf{i}+\sqrt{3})\,U}{t} & \frac{U}{\sqrt{2}\,t} & 0 & \frac{-U}{2\,\sqrt{2}\,t} & \frac{1-\mathbf{i}\,\sqrt{3}}{\sqrt{2}} & \frac{-1-\mathbf{i}\,\sqrt{3}}{\sqrt{2}} & \frac{U}{2\,\sqrt{2}\,t} & \frac{(1-\mathbf{i}\,\sqrt{3})\,U^2}{4\,t^2} & \sqrt{\frac{2}{3}}+\mathbf{i}\,\sqrt{2} & \frac{(-3\,\mathbf{i}+5\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{\frac{-\mathbf{i}}{8}\,(-3\,\mathbf{i}+\sqrt{3})\,U^2}{t^2} & \frac{-23\,U}{4\,t}
\end{bmatrix}$$