$$K_{52}^2 = \begin{bmatrix}
\frac{-59\,U}{12\,t} & \frac{-16\,\mathbf{i}\,(-\mathbf{i}+\sqrt{3})\,t^2+(\mathbf{i}\,13\mathbf{i}+\sqrt{3})\,U^2}{24\,t^2} & \sqrt{\frac{2}{3}}-\mathbf{i}\,\sqrt{2} & \frac{(-3\mathbf{i}+2\sqrt{3})\,U}{6\sqrt{2}\,t} & 0 & \frac{(3\mathbf{i}+\sqrt{3})\,U}{4\sqrt{2}\,t} & 0 & \frac{-((3\mathbf{i}+\sqrt{3})\,U)}{12\sqrt{2}\,t} & \frac{-(\sqrt{2}\,(-3\mathbf{i}+\sqrt{3}))}{3} & 0 & \frac{-((3\mathbf{i}+\sqrt{3})\,U)}{6\sqrt{2}\,t} & \frac{(6\mathbf{i}+5\sqrt{3})\,U}{3\sqrt{2}\,t} & \frac{(-1+9\,\mathbf{i}\sqrt{3})\,U}{6\sqrt{2}\,t} & \frac{(8+8\,\mathbf{i}\sqrt{3})\,t^2+\mathbf{i}\,(\mathbf{i}+\sqrt{3})\,U^2}{6\sqrt{2}\,t^2} & \frac{-(16\,(3\mathbf{i}+\sqrt{3})\,t^2+3\,(-3\mathbf{i}+\sqrt{3})\,U^2)}{24\,t^2} \\
\frac{16\,\mathbf{i}\,(\mathbf{i}+\sqrt{3})\,t^2+(-13-\mathbf{i}\,\sqrt{3})\,U^2}{24\,t^2} & \frac{-41\,U}{12\,t} & \frac{(-3\mathbf{i}+4\sqrt{3})\,U}{3\sqrt{2}\,t} & 0 & \frac{(3\mathbf{i}+2\sqrt{3})\,U}{6\sqrt{2}\,t} & -\left(\frac{3\mathbf{i}+\sqrt{3}}{\sqrt{2}}\right) & 0 & \frac{-3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & \frac{(-3\mathbf{i}+4\sqrt{3})\,U}{6\sqrt{2}\,t} & \frac{-((-3\mathbf{i}+\sqrt{3})\,U)}{12\,t} & \frac{(-9\mathbf{i}+5\sqrt{3})\,U^2}{12\sqrt{2}\,t^2} & \frac{-((3\mathbf{i}+5\sqrt{2})\,U^2)}{12\sqrt{2}\,t^2} & \frac{2\,\mathbf{i}\,(\mathbf{i}+\sqrt{3})\,t^2+(1+\mathbf{i}\,\sqrt{3})\,U^2}{3\sqrt{2}\,t^2} & \frac{(-1-9\,\mathbf{i}\sqrt{3})\,U}{6\sqrt{2}\,t} & \frac{(18\,\mathbf{i}-7\sqrt{3})\,U}{12\,t} & \frac{-(16\,(3\mathbf{i}+\sqrt{3})\,t^2+3\,(-3\mathbf{i}+\sqrt{3})\,U^2)}{24\,t^2} \\
\sqrt{\frac{2}{3}}+\mathbf{i}\,\sqrt{2} & \frac{(3\mathbf{i}+4\sqrt{3})\,U}{3\sqrt{2}\,t} & \frac{-3\,U}{2\,t} & \frac{(3-\mathbf{i}\sqrt{3})\,U^2}{4\,t^2} & 0 & -2 & \frac{\sqrt{2}\,U-\mathbf{i}\,\sqrt{6}\,U}{4\,t} & 1+\mathbf{i}\,\sqrt{3} & \frac{U}{t} & 0 & 0 & 0 & \frac{-2\,(3\mathbf{i}+\sqrt{3})}{3} & \frac{-((3\mathbf{i}+\sqrt{3})\,U)}{3\,t} & 0 & \frac{-(15\,\mathbf{i}+2\sqrt{3})\,U)}{12\,t} \\
\frac{(3\mathbf{i}+2\sqrt{3})\,U}{6\sqrt{2}\,t} & 0 & \frac{(3+\mathbf{i}\sqrt{3})\,U^2}{4\,t^2} & \frac{-3\,U}{t} & -2+2\,\mathbf{i}\,\sqrt{3} & \frac{(3-\mathbf{i}\sqrt{3})\,U}{4\,t} & 0 & \frac{(3-\mathbf{i}\sqrt{3})\,U}{4\,t} & 0 & 0 & \frac{U-\mathbf{i}\,\sqrt{3}\,U}{2\,t} & \frac{U-\mathbf{i}\,\sqrt{3}\,U}{2\,t} & \frac{(-3\mathbf{i}+\sqrt{3})\,U}{6\,t} & 0 & \frac{\frac{3\,\mathbf{i}}{2}\,\sqrt{\frac{2}{3}}\,U}{t} & 0 \\
0 & \frac{(-3\mathbf{i}+2\sqrt{3})\,U}{6\sqrt{2}\,t} & 0 & -2-2\,\mathbf{i}\,\sqrt{3} & \frac{-4\,U}{t} & \frac{(1+\mathbf{i}\sqrt{3})\,U^2}{4\,t^2} & \frac{(3+\mathbf{i}\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{U^2}{2\,t^2} & \frac{\frac{3\,\mathbf{i}}{2}\,\sqrt{3}\,U}{t} & 0 & 0 & 0 & 0 & 0 & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{6\,t} & 0 \\
\frac{(-3\mathbf{i}+\sqrt{3})\,U}{4\sqrt{2}\,t} & -\left(\frac{-3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}}\right) & -2 & \frac{(3+\mathbf{i}\sqrt{3})\,U}{4\,t} & \frac{(1-\mathbf{i}\sqrt{3})\,U^2}{4\,t^2} & \frac{-5\,U}{t} & -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & \frac{\mathbf{i}}{2}\,(4\mathbf{i}+\sqrt{3})\,U & \frac{-8\,t^2+(1+\mathbf{i}\,\sqrt{3})\,U^2}{4\,t^2} & \frac{U^2}{\sqrt{2}\,t^2} & \frac{U}{2\,t} & \frac{U}{2\,t} & 0 & 0 & \frac{3\,(1-\mathbf{i}\sqrt{3})\,U}{4\sqrt{2}\,t} & \frac{1-\mathbf{i}\,\sqrt{3}}{\sqrt{2}} \\
0 & 0 & \frac{\sqrt{2}\,U+\mathbf{i}\,\sqrt{6}\,U}{4\,t} & 0 & \frac{(3-\mathbf{i}\sqrt{3})\,U}{\sqrt{2}\,t} & -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & \frac{-4\,U}{t} & -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & 0 & 0 & -2\,\sqrt{2} & \mathbf{i}\,\sqrt{2}\,(\mathbf{i}+\sqrt{3}) & 0 & 0 & 0 & 0 \\
\frac{-((-3\mathbf{i}+\sqrt{3})\,U)}{12\sqrt{2}\,t} & \frac{3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & 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} & -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & \frac{-5\,U}{t} & \frac{(4-4\,\mathbf{i}\sqrt{3})\,t^2+(1+\mathbf{i}\,\sqrt{3})\,U^2}{4\,t^2} & \frac{(1+\mathbf{i}\,\sqrt{3})\,U^2}{2\sqrt{2}\,t^2} & \frac{U-\mathbf{i}\,\sqrt{3}\,U}{4\,t} & \frac{U-\mathbf{i}\,\sqrt{3}\,U}{4\,t} & \frac{-((-3\mathbf{i}+\sqrt{3})\,U)}{6\,t} & 0 & \frac{3\,(1-\mathbf{i}\sqrt{3})\,U}{4\sqrt{2}\,t} & \frac{-1-\mathbf{i}\,\sqrt{3}}{\sqrt{2}} \\
\frac{-(\sqrt{2}\,(3\mathbf{i}+\sqrt{3}))}{3} & \frac{(3\mathbf{i}+4\sqrt{3})\,U}{6\sqrt{2}\,t} & \frac{U}{t} & 0 & \frac{\frac{-3}{2}\,\mathbf{i}\,\sqrt{3}\,U}{t} & \frac{-8\,t^2+(1-\mathbf{i}\,\sqrt{3})\,U^2}{4\,t^2} & 0 & \frac{(4+4\,\mathbf{i}\sqrt{3})\,t^2+(1-\mathbf{i}\,\sqrt{3})\,U^2}{4\,t^2} & \frac{-5\,U}{t} & \frac{3\,\mathbf{i}}{2}\,(3\mathbf{i}+\sqrt{3})\,U & 0 & 0 & 2\,\mathbf{i}+\frac{2}{\sqrt{3}} & \frac{-((3\mathbf{i}+\sqrt{3})\,U)}{6\,t} & 0 & \frac{U}{2\sqrt{2}\,t} \\
0 & \frac{-((3\mathbf{i}+\sqrt{3})\,U)}{12\,t} & 0 & 0 & 0 & \frac{U^2}{\sqrt{2}\,t^2} & 0 & \frac{(1-\mathbf{i}\sqrt{3})\,U^2}{2\sqrt{2}\,t^2} & \frac{\frac{-3}{2}\,\mathbf{i}\,(-3\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{-6\,U}{t} & \sqrt{2}+\mathbf{i}\,\sqrt{6} & -2\,\sqrt{2} & 0 & \frac{-((-3\mathbf{i}+\sqrt{3})\,U)}{3\sqrt{2}\,t} & \frac{3\,(U+\mathbf{i}\,\sqrt{3}\,U)}{4\,t} \\
\frac{-((-3\mathbf{i}+\sqrt{3})\,U)}{6\sqrt{2}\,t} & \frac{(9\mathbf{i}+5\sqrt{3})\,U^2}{12\sqrt{2}\,t^2} & 0 & \frac{U+\mathbf{i}\,\sqrt{3}\,U}{2\,t} & 0 & \frac{U}{2\,t} & -2\,\sqrt{2} & \frac{U+\mathbf{i}\,\sqrt{3}\,U}{4\,t} & 0 & \sqrt{2}-\mathbf{i}\,\sqrt{6} & \frac{-4\,U}{t} & \frac{U}{t} & \frac{(3\mathbf{i}-4\sqrt{3})\,U}{3\,t} & \frac{U^2}{\sqrt{3}\,t^2} & \frac{(1-\mathbf{i}\,\sqrt{3})\,U^2}{4\sqrt{2}\,t^2} \\
\frac{(-6\mathbf{i}+5\sqrt{3})\,U}{3\sqrt{2}\,t} & \frac{(3\mathbf{i}-5\sqrt{3})\,U^2}{12\sqrt{2}\,t^2} & 0 & \frac{U+\mathbf{i}\,\sqrt{3}\,U}{2\,t} & 0 & \frac{U}{2\,t} & -\sqrt{2}-\mathbf{i}\,\sqrt{6} & \frac{U+\mathbf{i}\,\sqrt{3}\,U}{4\,t} & 0 & -2\,\sqrt{2} & \frac{U}{t} & \frac{-4\,U}{t} & \frac{-((-3\mathbf{i}+\sqrt{3})\,U)}{6\,t} & \frac{(3\mathbf{i}+\sqrt{3})\,U^2}{6\,t^2} & \frac{\mathbf{i}}{2}\,(5\mathbf{i}+\sqrt{3})\,U \\
\frac{(-1-9\,\mathbf{i}\sqrt{3})\,U}{6\sqrt{2}\,t} & \frac{(-2-2\,\mathbf{i}\sqrt{3})\,t^2+(1-\mathbf{i}\sqrt{3})\,U^2}{3\sqrt{2}\,t^2} & 2\,\mathbf{i}-\frac{2}{\sqrt{3}} & \frac{(3\mathbf{i}+\sqrt{3})\,U}{6\,t} & 0 & 0 & 0 & \frac{-((3\mathbf{i}+\sqrt{3})\,U)}{6\,t} & -2\,\mathbf{i}+\frac{2}{\sqrt{3}} & 0 & \frac{-((3\mathbf{i}+4\sqrt{3})\,U)}{3\,t} & \frac{-((3\mathbf{i}+\sqrt{3})\,U)}{6\,t} & \frac{-29\,U}{6\,t} & \frac{(8+8\,\mathbf{i}\sqrt{3})\,t^2+\mathbf{i}\,(7\mathbf{i}+\sqrt{3})\,U^2}{12\,t^2} & \frac{(3\mathbf{i}+\sqrt{3})\,U^2}{6\,t^2} & \frac{(3+\mathbf{i}\sqrt{3})\,U^2}{4\sqrt{2}\,t^2} \\
\frac{(8-8\,\mathbf{i}\sqrt{3})\,t^2+(-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\,t} & 0 & \frac{(-3\mathbf{i}+\sqrt{3})\,U}{6\,t} & 0 & 0 & 0 & \frac{-((-3\mathbf{i}+\sqrt{3})\,U)}{6\,t} & \frac{-((-3\mathbf{i}+\sqrt{3})\,U)}{3\sqrt{2}\,t} & \frac{U^2}{\sqrt{3}\,t^2} & \frac{(-3\mathbf{i}+\sqrt{3})\,U^2}{6\,t^2} & \frac{(8-8\,\mathbf{i}\sqrt{3})\,t^2+(-7-\mathbf{i}\sqrt{3})\,U^2}{12\,t^2} & \frac{-29\,U}{6\,t} & \frac{8\,(-3\mathbf{i}+\sqrt{3})\,t^2+(3\mathbf{i}+\sqrt{3})\,U^2}{6\sqrt{2}\,t^2} & \frac{-(\sqrt{2}\,(3\mathbf{i}+\sqrt{3}))}{3} \\
\frac{-((18\,\mathbf{i}+7\sqrt{3})\,U)}{12\,t} & \frac{8\,(3\mathbf{i}+\sqrt{3})\,t^2+(-3\mathbf{i}+\sqrt{3})\,U^2}{24\,t^2} & 0 & \frac{-3\,\mathbf{i}}{2}\,\sqrt{\frac{2}{3}}\,U & 0 & \frac{3\,(1+\mathbf{i}\sqrt{3})\,U}{4\sqrt{2}\,t} & 0 & \frac{3\,(1+\mathbf{i}\sqrt{3})\,U}{4\sqrt{2}\,t} & 0 & \frac{-(2-\mathbf{i}\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{-\mathbf{i}}{2}\,(-5\mathbf{i}+\sqrt{3})\,U & \frac{(-9\mathbf{i}+7\sqrt{3})\,U}{6\sqrt{2}\,t} & \frac{8\,(3\mathbf{i}+\sqrt{3})\,t^2+(-3\mathbf{i}+\sqrt{3})\,U^2}{6\sqrt{2}\,t^2} & \frac{-27\,U}{4\,t} & \frac{(8+8\,\mathbf{i}\sqrt{3})\,t^2+\mathbf{i}\,(5\mathbf{i}+\sqrt{3})\,U^2}{8\,t^2} \\
\frac{-(16\,(-3\mathbf{i}+\sqrt{3})\,t^2+3\,(3\mathbf{i}+\sqrt{3})\,U^2)}{24\,t^2} & \frac{(15\mathbf{i}-2\sqrt{3})\,U}{12\,t} & \frac{U}{\sqrt{2}\,t} & 0 & \frac{U}{2\sqrt{2}\,t} & \frac{1+\mathbf{i}\,\sqrt{3}}{\sqrt{2}} & 0 & \frac{\mathbf{i}\,(1+\sqrt{3})}{\sqrt{2}} & \frac{U}{2\sqrt{2}\,t} & \frac{3\,(U-\mathbf{i}\sqrt{3}\,U)}{4\,t} & \frac{(1+\mathbf{i}\sqrt{3})\,U^2}{4\sqrt{2}\,t^2} & \frac{(3-\mathbf{i}\sqrt{3})\,U^2}{4\sqrt{2}\,t^2} & \frac{-(\sqrt{2}\,(-3\mathbf{i}+\sqrt{3}))}{3} & \frac{(3\mathbf{i}+5\sqrt{3})\,U}{6\sqrt{2}\,t} & \frac{-23\,U}{4\,t} &
\end{bmatrix}$$