$$K^1_{45} \;=\; \begin{bmatrix}
\frac{\frac{-\mathbf{i}}{2}}{\sqrt{3}} & \frac{\frac{-\mathbf{i}}{12}\,(-13\,\mathbf{i}+\sqrt{3})\,U}{t} & -\sqrt{\frac{3}{2}} & 0 & \frac{-\mathbf{i}}{2} & \frac{-((-9\,\mathbf{i}+\sqrt{3})\,U)}{6\,\sqrt{2}\,t} & \frac{(3\,\mathbf{i}-7\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{3}{\sqrt{2}} & 0 & \frac{-\mathbf{i}}{2}\,\sqrt{3} & \frac{1}{\sqrt{2}}+\frac{\mathbf{i}}{\sqrt{6}} & \frac{\frac{-\mathbf{i}}{3}\,(-\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{(3+\mathbf{i})\,\sqrt{18-6\,\sqrt{3}}-(3-\mathbf{i})\,\sqrt{6-2\,\sqrt{3}}}{2\,\sqrt{2}\,(-3+\sqrt{3})} & \frac{3+\mathbf{i}+(3-\mathbf{i})\,\sqrt{3}}{2\,\sqrt{3+\sqrt{3}}} & \mathbf{i}-\frac{1}{2\,\sqrt{3}} & \frac{-((3\,\mathbf{i}+\sqrt{3})\,U)}{4\,t} \\
\frac{(13-\mathbf{i}\,\sqrt{3})\,U}{12\,t} & \frac{\mathbf{i}}{\frac{2}{\sqrt{3}}} & 0 & \frac{-\mathbf{i}}{2}-\frac{2}{\sqrt{3}} & 0 & \frac{-(3\,\mathbf{i}+\sqrt{3})}{3\,\sqrt{2}} & \sqrt{\frac{2}{3}} & 0 & \frac{3}{2} & 0 & \frac{\frac{\mathbf{i}}{4}\,\sqrt{2}\,(\mathbf{i}+\sqrt{3})\,U}{t} & \frac{1}{\sqrt{2}}-\frac{\mathbf{i}}{\sqrt{6}} & 0 & 0 & \frac{-((-3\,\mathbf{i}+\sqrt{3})\,U)}{12\,t} & \frac{\mathbf{i}}{2}+\frac{1}{\sqrt{3}} \\
\sqrt{\frac{3}{2}} & 0 & 0 & \frac{\frac{-\mathbf{i}}{2}\,(-3\,\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{3-\mathbf{i}\,\sqrt{3}}{\sqrt{2}} & 0 & 0 & 0 & \frac{-((-3\,\mathbf{i}+\sqrt{3})\,U)}{2\,\sqrt{2}\,t} & 0 & 0 & 0 & 0 & 0 & -\left(\frac{1}{\sqrt{2}}\right) & 0 \\
0 & \frac{-\mathbf{i}}{2}+\frac{2}{\sqrt{3}} & \frac{(3-\mathbf{i}\,\sqrt{3})\,U}{2\,\sqrt{2}\,t} & \frac{\mathbf{i}}{2}\,\sqrt{3} & \frac{\frac{\mathbf{i}}{4}\,(3\,\mathbf{i}+\sqrt{3})\,U}{t} & \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{2\,\sqrt{2}\,t} & \frac{-\sqrt{3}}{2} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{4\,t} & 0 & \sqrt{\frac{2}{3}}-\mathbf{i}\,\sqrt{2} & 0 & 0 & 0 & \frac{-\mathbf{i}}{2}\,\sqrt{3} \\
\frac{-\mathbf{i}}{2} & 0 & \frac{-3-\mathbf{i}\,\sqrt{3}}{\sqrt{2}} & \frac{(3+\mathbf{i}\,\sqrt{3})\,U}{4\,t} & \frac{\mathbf{i}}{2}\,\sqrt{3} & 0 & 0 & 0 & \frac{-((-3\,\mathbf{i}+\sqrt{3})\,U)}{4\,t} & \frac{-3\,\mathbf{i}}{2} & \frac{\mathbf{i}+\sqrt{3}}{\sqrt{2}} & 0 & 0 & 0 & -\left(\frac{1}{2}\right) & 0 \\
\frac{(9\,\mathbf{i}+\sqrt{3})\,U}{6\,\sqrt{2}\,t} & \frac{-\mathbf{i}}{\sqrt{2}}+\frac{1}{\sqrt{6}} & 0 & -\left(\frac{1}{\sqrt{2}}\right) & 0 & 0 & 0 & 0 & -\sqrt{\frac{3}{2}} & 0 & \frac{-2\,U}{\sqrt{3}\,t} & \mathbf{i}-\frac{1}{\sqrt{3}} & 0 & 0 & \frac{\frac{-\mathbf{i}}{2}\,(-3\,\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & \sqrt{2} \\
\frac{(3\,\mathbf{i}+7\,\sqrt{3})\,U}{6\,\sqrt{2}\,t} & -\sqrt{\frac{2}{3}} & 0 & -\left(\frac{1}{\sqrt{2}}\right) & 0 & 0 & 0 & 0 & -\sqrt{\frac{3}{2}} & 0 & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{3\,t} & \frac{2}{\sqrt{3}} & 0 & 0 & \frac{\frac{\mathbf{i}}{2}\,(\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{\mathbf{i}\,(\mathbf{i}+\sqrt{3})}{\sqrt{2}} \\
\frac{-3}{\sqrt{2}} & 0 & 0 & \frac{-((-3\,\mathbf{i}+\sqrt{3})\,U)}{2\,\sqrt{2}\,t} & 0 & 0 & 0 & 0 & \frac{\frac{\mathbf{i}}{2}\,(5\,\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{\mathbf{i}\,(3\,\mathbf{i}+\sqrt{3})}{\sqrt{2}} & 0 & 0 & 0 & 0 & \sqrt{\frac{3}{2}} & 0 \\
0 & -\left(\frac{3}{2}\right) & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{2\,\sqrt{2}\,t} & \frac{\frac{\sqrt{3}}{2}}{2} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{4\,t} & \sqrt{\frac{3}{2}} & \sqrt{\frac{3}{2}} & \frac{(5+\mathbf{i}\,\sqrt{3})\,U}{2\,\sqrt{2}\,t} & \frac{\mathbf{i}}{2}\,\sqrt{3} & \frac{(-1+3\,\mathbf{i}\,\sqrt{3})\,U}{4\,t} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{2} \\
\frac{-\mathbf{i}}{2}\,\sqrt{3} & 0 & 0 & \frac{-((-3\,\mathbf{i}+\sqrt{3})\,U)}{4\,t} & \frac{-3\,\mathbf{i}}{2} & 0 & 0 & \frac{3+\mathbf{i}\,\sqrt{3}}{\sqrt{2}} & \frac{U+3\,\mathbf{i}\,\sqrt{3}\,U}{4\,t} & \frac{-\mathbf{i}}{2}\,\sqrt{3} & \frac{3+\mathbf{i}\,\sqrt{3}}{\sqrt{2}} & 0 & 0 & 0 & \frac{-\sqrt{3}}{2} & 0 \\
-\left(\frac{1}{\sqrt{2}}\right)+\frac{\mathbf{i}}{\sqrt{6}} & \frac{\sqrt{2}\,(1+\mathbf{i}\,\sqrt{3})\,U}{3\,t} & 0 & 0 & -\left(\frac{-\mathbf{i}+\sqrt{3}}{\sqrt{2}}\right) & \frac{2\,U}{\sqrt{3}\,t} & \frac{-((-3\,\mathbf{i}+\sqrt{3})\,U)}{3\,t} & 0 & 0 & \frac{\mathbf{i}\,(3\,\mathbf{i}+\sqrt{3})}{\sqrt{2}} & \frac{-\mathbf{i}}{\sqrt{3}} & \frac{\frac{-\mathbf{i}}{6}\,(-7\,\mathbf{i}+\sqrt{3})\,U}{t} & \frac{\mathbf{i}\,\sqrt{6}\,(-5+3\,\sqrt{3})}{(3-\sqrt{3})^{\frac{3}{2}}} & -\mathbf{i}\,(2+\sqrt{3})\,\sqrt{\frac{2}{3+\sqrt{3}}} & \frac{\mathbf{i}}{\sqrt{2}}+\frac{1}{\sqrt{6}} & 0 \\
\frac{\sqrt{2}\,U-\mathbf{i}\,\sqrt{6}\,U}{6\,t} & -\left(\frac{1}{\sqrt{2}}\right)-\frac{\mathbf{i}}{\sqrt{6}} & 0 & \frac{-(\sqrt{2}\,(3\,\mathbf{i}+\sqrt{3}))}{3} & 0 & \mathbf{i}+\frac{1}{\sqrt{3}} & \frac{-2}{\sqrt{3}} & 0 & 0 & 0 & \frac{(7-\mathbf{i}\,\sqrt{3})\,U}{6\,t} & \frac{\mathbf{i}}{\sqrt{3}} & 0 & 0 & \frac{-((-3\,\mathbf{i}+\sqrt{3})\,U)}{3\,\sqrt{2}\,t} & \frac{-\mathbf{i}}{\sqrt{2}}+\frac{1}{\sqrt{6}} \\
\frac{(-3+\mathbf{i})\,\sqrt{18-6\,\sqrt{3}}+(3+\mathbf{i})\,\sqrt{6-2\,\sqrt{3}}}{2\,\sqrt{2}\,(-3+\sqrt{3})} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\mathbf{i}\,\sqrt{6}\,(-5+3\,\sqrt{3})}{(3-\sqrt{3})^{\frac{3}{2}}} & 0 & 0 & 0 & \frac{\left(-\left(\frac{1}{2}\right)+\frac{\mathbf{i}}{2}\right)\,\sqrt{3}\,\left(-3+\sqrt{3}+3\,\mathbf{i}\,\sqrt{4-2\,\sqrt{3}}\right)}{(3-\sqrt{3})^{\frac{3}{2}}} & 0 \\
\frac{-3+\mathbf{i}-(3+\mathbf{i})\,\sqrt{3}}{2\,\sqrt{3+\sqrt{3}}} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\mathbf{i}\,(2+\sqrt{3})\,\sqrt{\frac{2}{3+\sqrt{3}}} & 0 & 0 & 0 & \frac{\left(\frac{1}{2}+\frac{\mathbf{i}}{2}\right)\,(-3\,\mathbf{i}+\sqrt{3})}{\sqrt{3+\sqrt{3}}} & 0 \\
\frac{6\,\mathbf{i}+\sqrt{3}}{6} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{12\,t} & \frac{1}{\sqrt{2}} & 0 & \frac{1}{2} & \frac{(3-\mathbf{i}\,\sqrt{3})\,U}{2\,\sqrt{2}\,t} & \frac{\sqrt{2}\,U+\mathbf{i}\,\sqrt{6}\,U}{4\,t} & -\sqrt{\frac{3}{2}} & 0 & \frac{\sqrt{3}}{2} & \frac{\mathbf{i}}{\sqrt{2}}-\frac{1}{\sqrt{6}} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{3\,\sqrt{2}\,t} & \frac{\left(\frac{1}{2}+\frac{\mathbf{i}}{2}\right)\,\sqrt{3}\,\left(-3+\sqrt{3}-3\,\mathbf{i}\,\sqrt{4-2\,\sqrt{3}}\right)}{(3-\sqrt{3})^{\frac{3}{2}}} & \frac{\left(-\left(\frac{1}{2}\right)+\frac{\mathbf{i}}{2}\right)\,(3\,\mathbf{i}+\sqrt{3})}{\sqrt{3+\sqrt{3}}} & \frac{\mathbf{i}}{2}\,\sqrt{3} & \frac{\frac{-\mathbf{i}}{4}\,(-5\,\mathbf{i}+\sqrt{3})\,U}{t} \\
\frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{4\,t} & \frac{\mathbf{i}}{2}-\frac{1}{\sqrt{3}} & 0 & \frac{-\mathbf{i}}{2}\,\sqrt{3} & 0 & -\sqrt{2} & \frac{1+\mathbf{i}\,\sqrt{3}}{\sqrt{2}} & 0 & \frac{-\sqrt{3}}{2} & 0 & 0 & \frac{-(3\,\mathbf{i}+\sqrt{3})}{3\,\sqrt{2}} & 0 & 0 & \frac{(5-\mathbf{i}\,\sqrt{3})\,U}{4\,t} & \frac{\mathbf{i}}{2}\,\sqrt{3}
\end{bmatrix}$$