$$K^1_{109} = \begin{bmatrix}
\frac{-\mathbf{i}}{2}\sqrt{3} & \frac{-3\,\mathbf{i}}{4}\left(-3\,\mathbf{i}+\sqrt{3}\right) & 0 & 0 & \frac{\mathbf{i}\,\frac{3}{2}\sqrt{3}\,U}{t} & \frac{\frac{-\mathbf{i}}{2}\left(-3\,\mathbf{i}+\sqrt{3}\right)U}{\sqrt{2}\,t} & 0 & \frac{-3-\mathbf{i}\sqrt{3}}{\sqrt{2}} & \frac{\frac{3}{2}\mathbf{i}\,U}{t} & \frac{-3\left(\mathbf{i}+\sqrt{3}\right)U}{2\sqrt{2}\,t} & \frac{\sqrt{3}}{2} & \frac{-3\left(\mathbf{i}+\sqrt{3}\right)}{4} & 0 & 0 \\
\frac{3\left(3-\mathbf{i}\sqrt{3}\right)}{4} & \frac{-\mathbf{i}}{2}\sqrt{3} & \frac{\left(3+\mathbf{i}\sqrt{3}\right)U}{4\,t} & \frac{3+\mathbf{i}\sqrt{3}}{\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\,\mathbf{i}+\sqrt{3}}{4} & \frac{-3\,\mathbf{i}}{2} & \frac{\left(-3\,\mathbf{i}+\sqrt{3}\right)U}{4\,t} & 0 \\
0 & \frac{\mathbf{i}}{4}\left(3\,\mathbf{i}+\sqrt{3}\right)\frac{U}{t} & \frac{-\mathbf{i}}{2}\sqrt{3} & \frac{\left(3-\mathbf{i}\sqrt{3}\right)U}{2\sqrt{2}\,t} & \frac{3}{2} & 0 & \frac{\mathbf{i}\left(3\,\mathbf{i}+\sqrt{3}\right)}{\sqrt{2}} & 0 & \frac{-\sqrt{3}}{2} & -\sqrt{6} & 0 & \frac{-\left(\left(3\,\mathbf{i}+\sqrt{3}\right)U\right)}{4\,t} & \frac{-\sqrt{3}}{2} & \frac{-\left(\left(3\,\mathbf{i}+\sqrt{3}\right)U\right)}{2\sqrt{2}\,t} \\
0 & \frac{\mathbf{i}\left(3\,\mathbf{i}+\sqrt{3}\right)}{\sqrt{2}} & \frac{\frac{-\mathbf{i}}{2}\left(-3\,\mathbf{i}+\sqrt{3}\right)U}{\sqrt{2}\,t} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{-3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & 0 & \frac{\left(-3\,\mathbf{i}+\sqrt{3}\right)U}{2\sqrt{2}\,t} & 0 \\
\frac{\mathbf{i}}{2}\frac{\sqrt{3}\,U}{t} & 0 & -\left(\frac{3}{2}\right) & 0 & \frac{-\mathbf{i}}{2}\sqrt{3} & \frac{3+\mathbf{i}\sqrt{3}}{2\sqrt{2}} & 0 & 0 & \frac{3\,\mathbf{i}}{2} & \frac{3\left(\mathbf{i}+\sqrt{3}\right)}{2\sqrt{2}} & \frac{\sqrt{3}\,U}{2\,t} & 0 & \frac{3\,\mathbf{i}}{2}+\sqrt{3} & 0 \\
\frac{\left(3-\mathbf{i}\sqrt{3}\right)U}{2\sqrt{2}\,t} & 0 & 0 & 0 & \frac{\mathbf{i}}{2}\frac{\left(3\,\mathbf{i}+\sqrt{3}\right)}{\sqrt{2}} & 0 & 0 & 0 & \frac{-3\left(-\mathbf{i}+\sqrt{3}\right)}{2\sqrt{2}} & 0 & \frac{\left(3\,\mathbf{i}+\sqrt{3}\right)U}{2\sqrt{2}\,t} & 0 & 0 & 0 \\
0 & 0 & \frac{3+\mathbf{i}\sqrt{3}}{\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{-3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & 0 \\
\frac{3-\mathbf{i}\sqrt{3}}{\sqrt{2}} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}} & 0 & 0 & 0 \\
\frac{\frac{3}{2}\mathbf{i}\,U}{t} & 0 & \frac{\sqrt{3}}{2} & 0 & \frac{3\,\mathbf{i}}{2} & \frac{3\left(\mathbf{i}+\sqrt{3}\right)}{2\sqrt{2}} & 0 & 0 & \frac{\mathbf{i}}{2}\sqrt{3} & \frac{\frac{-\mathbf{i}}{2}\left(-3\,\mathbf{i}+\sqrt{3}\right)}{\sqrt{2}} & \frac{-U}{2\,t} & 0 & -1-\frac{\mathbf{i}}{2}\sqrt{3} & 0 \\
\frac{3\left(-\mathbf{i}+\sqrt{3}\right)U}{2\sqrt{2}\,t} & 0 & \sqrt{6} & 0 & \frac{-3\left(-\mathbf{i}+\sqrt{3}\right)}{2\sqrt{2}} & 0 & 0 & 0 & \frac{3-\mathbf{i}\sqrt{3}}{2\sqrt{2}} & 0 & \frac{\frac{-\mathbf{i}}{2}\left(-\mathbf{i}+\sqrt{3}\right)U}{\sqrt{2}\,t} & 0 & \sqrt{2} & 0 \\
\frac{-\sqrt{3}}{2} & \frac{3\,\mathbf{i}-\sqrt{3}}{4} & 0 & -\left(\frac{3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}}\right) & \frac{-\left(\sqrt{3}\,U\right)}{2\,t} & \frac{-\left(\left(-3\,\mathbf{i}+\sqrt{3}\right)U\right)}{2\sqrt{2}\,t} & 0 & -\left(\frac{-3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}}\right) & \frac{U}{2\,t} & \frac{\sqrt{2}\,U-\mathbf{i}\sqrt{6}\,U}{4\,t} & \frac{-\mathbf{i}}{2}\sqrt{3} & \frac{\mathbf{i}}{4}\left(\mathbf{i}+\sqrt{3}\right) & 0 & \frac{1+\mathbf{i}\sqrt{3}}{\sqrt{2}} \\
\frac{3\left(-\mathbf{i}+\sqrt{3}\right)}{4} & \frac{-3\,\mathbf{i}}{2} & \frac{\left(-3\,\mathbf{i}+\sqrt{3}\right)U}{4\,t} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1+\mathbf{i}\sqrt{3}}{4} & \frac{\mathbf{i}}{2}\sqrt{3} & \frac{U+3\,\mathbf{i}\sqrt{3}\,U}{4\,t} & \frac{-3-\mathbf{i}\sqrt{3}}{\sqrt{2}} \\
0 & \frac{-\left(\left(3\,\mathbf{i}+\sqrt{3}\right)U\right)}{4\,t} & \frac{\sqrt{3}}{2} & \frac{-\left(\left(3\,\mathbf{i}+\sqrt{3}\right)U\right)}{2\sqrt{2}\,t} & \frac{3\,\mathbf{i}}{2}-\sqrt{3} & 0 & -\left(\frac{3\,\mathbf{i}+\sqrt{3}}{\sqrt{2}}\right) & 0 & 1-\frac{\mathbf{i}}{2}\sqrt{3} & -\sqrt{2} & 0 & \frac{\left(-1+3\,\mathbf{i}\sqrt{3}\right)U}{4\,t} & \frac{-\mathbf{i}}{2}\sqrt{3} & \frac{\left(5+\mathbf{i}\sqrt{3}\right)U}{2\sqrt{2}\,t} \\
0 & 0 & \frac{\left(-3\,\mathbf{i}+\sqrt{3}\right)U}{2\sqrt{2}\,t} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\mathbf{i}\left(\mathbf{i}+\sqrt{3}\right)}{\sqrt{2}} & \frac{3-\mathbf{i}\sqrt{3}}{\sqrt{2}} & \frac{\frac{\mathbf{i}}{2}\left(5\,\mathbf{i}+\sqrt{3}\right)U}{\sqrt{2}\,t} & 0
\end{bmatrix}$$