$$K^2_{137} \;=\; \begin{bmatrix}
\frac{-59\,U}{12\,t} & \frac{16\,(1-\mathbf{i}\sqrt{3})\,t^2+(-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)}{12\sqrt{2}\,t} & 0 & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{4\sqrt{2}\,t} & \frac{-(\sqrt{2}\,(3\,\mathbf{i}+\sqrt{3}))}{3} & 0 & -\left(\frac{U}{\sqrt{6}\,t}\right) & \frac{(-9\,\mathbf{i}+11\sqrt{3})\,U}{6\sqrt{2}\,t} & \frac{(-1+9\,\mathbf{i}\sqrt{3})\,U}{6\sqrt{2}\,t} & \frac{-(8\,t^2+(1-\mathbf{i}\sqrt{3})\,U^2)}{3\sqrt{2}\,t^2} & \frac{(18\,\mathbf{i}-7\sqrt{3})\,U}{12\,t} & \frac{16\,(-3\,\mathbf{i}+\sqrt{3})\,t^2+(3\,\mathbf{i}+\sqrt{3})\,U^2}{24\,t^2} \\
\frac{16\,(1+\mathbf{i}\sqrt{3})\,t^2+\mathbf{i}\,(13\,\mathbf{i}+\sqrt{3})\,U^2}{24\,t^2} & \frac{-19\,U}{4\,t} & \frac{\mathbf{i}\,U}{\sqrt{2}\,t} & 0 & \frac{-((3\,\mathbf{i}+2\sqrt{3})\,U)}{6\sqrt{2}\,t} & \frac{-\mathbf{i}}{\sqrt{2}}+\frac{1}{\sqrt{6}} & 0 & \frac{-(3\,\mathbf{i}+\sqrt{3})}{3\sqrt{2}} & \frac{\mathbf{i}}{2}\frac{U}{\sqrt{2}\,t} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{4\,t} & \frac{-((9\,\mathbf{i}+\sqrt{3})\,U^2)}{12\sqrt{2}\,t^2} & \frac{-((3\,\mathbf{i}+7\sqrt{3})\,U^2)}{12\sqrt{2}\,t^2} & \frac{(4+4\,\mathbf{i}\sqrt{3})\,t^2+\mathbf{i}\,(\mathbf{i}+\sqrt{3})\,U^2}{6\sqrt{2}\,t^2} & \frac{(5-\mathbf{i}\sqrt{3})\,U}{2\sqrt{2}\,t} & \frac{-(8\,(3\,\mathbf{i}+\sqrt{3})\,t^2+(-3\,\mathbf{i}+\sqrt{3})\,U^2)}{8\,t^2} & \frac{-((3\,\mathbf{i}+2\sqrt{3})\,U)}{4\,t} \\
\sqrt{\frac{2}{3}}-\mathbf{i}\sqrt{2} & \frac{-\mathbf{i}\,U}{\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 & 2\,\mathbf{i}-\frac{2}{\sqrt{3}} & -\left(\frac{(\mathbf{i}+\sqrt{3})\,U}{t}\right) & 0 & \frac{U}{\sqrt{2}\,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{-3\,\mathbf{i}}{2}\frac{\sqrt{\frac{3}{2}}\,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 & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{6\,t} & 0 & \frac{U}{2\sqrt{2}\,t} \\
\frac{-((3\,\mathbf{i}+\sqrt{3})\,U)}{12\sqrt{2}\,t} & \frac{\mathbf{i}}{\sqrt{2}}+\frac{1}{\sqrt{6}} & -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{\frac{-\mathbf{i}}{2}\,(-4\,\mathbf{i}+\sqrt{3})\,U}{t} & \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} & \frac{-((3\,\mathbf{i}+\sqrt{3})\,U)}{6\,t} & 2\,\mathbf{i}-\frac{2}{\sqrt{3}} & \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 & -\sqrt{2}-\mathbf{i}\sqrt{6} & -2\sqrt{2} & 0 & 0 & 0 & 0 \\
\frac{(3\,\mathbf{i}+\sqrt{3})\,U}{4\sqrt{2}\,t} & \frac{\mathbf{i}}{\sqrt{2}}-\frac{1}{\sqrt{6}} & 1+\mathbf{i}\sqrt{3} & \frac{(3-\mathbf{i}\sqrt{3})\,U}{4\,t} & \frac{U^2}{2\,t^2} & \frac{\mathbf{i}}{2}\frac{(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} & 0 & \frac{-4}{\sqrt{3}} & \frac{3\,(1+\mathbf{i}\sqrt{3})\,U}{4\sqrt{2}\,t} & \frac{\mathbf{i}\,(\mathbf{i}+\sqrt{3})}{\sqrt{2}} \\
\frac{-(\sqrt{2}\,(-3\,\mathbf{i}+\sqrt{3}))}{3} & \frac{-\mathbf{i}}{\sqrt{2}}\frac{U}{t} & \frac{U}{t} & 0 & \frac{3}{2}\frac{\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{\frac{-3}{2}\mathbf{i}\,(-3\,\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & 0 & 0 & -2\,\mathbf{i}+\frac{2}{\sqrt{3}} & \frac{-((\mathbf{i}+\sqrt{3})\,U)}{2\,t} & 0 & \frac{U}{2\sqrt{2}\,t} \\
0 & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U}{4\,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{3\mathbf{i}}{2}\frac{(3\,\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{-6\,U}{t} & -2\sqrt{2} & \sqrt{2}-\mathbf{i}\sqrt{6} & 0 & 0 & 0 & \frac{3\,(U-\mathbf{i}\sqrt{3}\,U)}{4\,t} \\
-\left(\frac{U}{\sqrt{6}\,t}\right) & \frac{-((-9\,\mathbf{i}+\sqrt{3})\,U^2)}{12\sqrt{2}\,t^2} & 0 & \frac{U-\mathbf{i}\sqrt{3}\,U}{2\,t} & 0 & \frac{U}{2\,t} & \mathbf{i}\sqrt{2}\;(\mathbf{i}+\sqrt{3}) & \frac{U-\mathbf{i}\sqrt{3}\,U}{4\,t} & 0 & -2\sqrt{2} & \frac{-4\,U}{t} & \frac{U}{t} & \frac{-((9\,\mathbf{i}+7\sqrt{3})\,U)}{6\,t} & \frac{(3\,\mathbf{i}+\sqrt{3})\,U^2}{6\,t^2} & \frac{-\mathbf{i}}{2}\frac{(-5\,\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{(3-\mathbf{i}\sqrt{3})\,U^2}{4\sqrt{2}\,t^2} \\
\frac{(9\,\mathbf{i}+11\sqrt{3})\,U}{6\sqrt{2}\,t} & \frac{(3\,\mathbf{i}-7\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{U}{t} & \frac{-4\,U}{t} & -\left(\frac{U}{\sqrt{3}\,t}\right) & -\left(\frac{U^2}{\sqrt{3}\,t^2}\right) & \frac{(-2-\mathbf{i}\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{(1+\mathbf{i}\sqrt{3})\,U^2}{4\sqrt{2}\,t^2} \\
\frac{(-1-9\,\mathbf{i}\sqrt{3})\,U}{6\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{-2\,(3\,\mathbf{i}+\sqrt{3})}{3} & \frac{-((3\,\mathbf{i}+\sqrt{3})\,U)}{6\,t} & 0 & \frac{-((-3\,\mathbf{i}+\sqrt{3})\,U)}{6\,t} & 0 & 0 & 2\,\mathbf{i}+\frac{2}{\sqrt{3}} & 0 & \frac{(9\,\mathbf{i}-7\sqrt{3})\,U}{6\,t} & -\left(\frac{U}{\sqrt{3}\,t}\right) & \frac{-29\,U}{6\,t} & \frac{-(8\,t^2+U^2+2\,\mathbf{i}\sqrt{3}\,U^2)}{6\,t^2} & \frac{(9\,\mathbf{i}+7\sqrt{3})\,U}{6\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{-(8\,t^2+(1+\mathbf{i}\sqrt{3})\,U^2)}{3\sqrt{2}\,t^2} & \frac{(5+\mathbf{i}\sqrt{3})\,U}{2\sqrt{2}\,t} & -\left(\frac{(-\mathbf{i}+\sqrt{3})\,U}{t}\right) & 0 & \frac{(3\,\mathbf{i}+\sqrt{3})\,U}{6\,t} & \frac{-2\,(3\,\mathbf{i}+\sqrt{3})}{3} & 0 & \frac{-4}{\sqrt{3}} & \frac{-((-\mathbf{i}+\sqrt{3})\,U)}{2\,t} & 0 & \frac{(-3\,\mathbf{i}+\sqrt{3})\,U^2}{6\,t^2} & -\left(\frac{U^2}{\sqrt{3}\,t^2}\right) & \frac{-(8\,t^2+U^2-2\,\mathbf{i}\sqrt{3}\,U^2)}{6\,t^2} & \frac{-7\,U}{2\,t} & 0 & \frac{-((3\,\mathbf{i}+\sqrt{3})\,U)}{2\sqrt{2}\,t} \\
\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)}{8\,t^2} & 0 & \frac{3\mathbf{i}}{2}\frac{\sqrt{\frac{3}{2}}\,U}{t} & 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 & 0 & \frac{\mathbf{i}}{2}\frac{(5\,\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{\mathbf{i}\,(2\,\mathbf{i}+\sqrt{3})\,U}{\sqrt{2}\,t} & \frac{(-9\,\mathbf{i}+7\sqrt{3})\,U}{6\sqrt{2}\,t} & 0 & \frac{-27\,U}{4\,t} & \frac{(8-8\,\mathbf{i}\sqrt{3})\,t^2+(-5-\mathbf{i}\sqrt{3})\,U^2}{8\,t^2} \\
\frac{16\,(3\,\mathbf{i}+\sqrt{3})\,t^2+(-3\,\mathbf{i}+\sqrt{3})\,U^2}{24\,t^2} & \frac{(3\,\mathbf{i}-2\sqrt{3})\,U}{4\,t} & \frac{U}{\sqrt{2}\,t} & 0 & \frac{U}{2\sqrt{2}\,t} & \frac{1-\mathbf{i}\sqrt{3}}{\sqrt{2}} & 0 & \frac{-1-\mathbf{i}\sqrt{3}}{\sqrt{2}} & \frac{U}{2\sqrt{2}\,t} & \frac{3\,(U+\mathbf{i}\sqrt{3}\,U)}{4\,t} & \frac{(3+\mathbf{i}\sqrt{3})\,U^2}{4\sqrt{2}\,t^2} & \frac{(1-\mathbf{i}\sqrt{3})\,U^2}{4\sqrt{2}\,t^2} & \frac{4\,(3\,\mathbf{i}+\sqrt{3})\,t^2+(-3\,\mathbf{i}+\sqrt{3})\,U^2}{6\sqrt{2}\,t^2} & \frac{-((-3\,\mathbf{i}+\sqrt{3})\,U)}{2\sqrt{2}\,t} & \frac{(8+8\,\mathbf{i}\sqrt{3})\,t^2+\mathbf{i}\,(5\,\mathbf{i}+\sqrt{3})\,U^2}{8\,t^2} & \frac{-23\,U}{4\,t}
\end{bmatrix}$$