$$K^2_{123} = \begin{bmatrix} \frac{-5\,U}{t} & -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & 0 & \frac{U}{\sqrt{2}\,t} \\ -\left(\frac{U^2}{\sqrt{2}\,t^2}\right) & \frac{-7\,U}{2\,t} & \frac{U}{\sqrt{2}\,t} & 0 \\ 0 & \frac{U}{\sqrt{2}\,t} & \frac{-4\,U}{t} & \frac{U^2}{\sqrt{2}\,t^2} \\ \frac{U}{\sqrt{2}\,t} & 0 & \frac{U^2}{\sqrt{2}\,t^2} & \frac{-11\,U}{2\,t} \end{bmatrix}$$