$$K_{90}^2 = \begin{bmatrix} \frac{-15\,U}{2\,t} & \frac{\frac{-\mathbf{i}}{4}\left(-\mathbf{i}+\sqrt{3}\right)\left(8\,t^2+U^2\right)}{t^2} \\ \frac{\frac{\mathbf{i}}{4}\left(\mathbf{i}+\sqrt{3}\right)\left(8\,t^2+U^2\right)}{t^2} & \frac{-15\,U}{2\,t} \end{bmatrix}$$