

Cholesky Decomposition

$$B = \begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix} \quad A = B'B = \begin{bmatrix} 3 & 2 \\ -1 & 4 \end{bmatrix} \begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix}$$

$$A = \begin{bmatrix} 13 & 5 \\ 5 & 17 \end{bmatrix}$$

$$A = \begin{bmatrix} r_{11} & 0 \\ r_{12} & r_{22} \end{bmatrix} \begin{bmatrix} r_{11} & r_{12} \\ 0 & r_{22} \end{bmatrix} = \begin{bmatrix} r_{11}^2 & r_{11}r_{12} \\ r_{11}r_{12} & r_{12}^2 + r_{22}^2 \end{bmatrix}$$

$R^T \qquad R$

$$17 = \left(\frac{5}{\sqrt{13}}\right)^2 + r_{22}^2, \quad r_{22}^2 = \frac{17(13)}{13} - \frac{25}{13} = \frac{196}{13}$$

$$A = \begin{bmatrix} \sqrt{13} & 0 \\ \frac{5}{\sqrt{13}} & \sqrt{\frac{196}{13}} \end{bmatrix} \begin{bmatrix} \sqrt{13} & \frac{5}{\sqrt{13}} \\ 0 & \sqrt{\frac{196}{13}} \end{bmatrix} = \begin{bmatrix} 13 & 5 \\ 5 & \frac{25}{13} + \frac{196}{13} \end{bmatrix}$$

$R^T \qquad R$

$$A = \begin{bmatrix} 13 & 5 \\ 5 & 17 \end{bmatrix}$$