

1. Use Gaussian elimination to find the inverse of matrix \mathbf{A} .

Check your answer by computing product $\mathbf{A}\mathbf{A}^{-1}$.

$$\mathbf{A} = \begin{bmatrix} 1 & 2 & 1 & 0 \\ -1 & -1 & 0 & 0 \\ 0 & 3 & 2 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix}$$

2. Find the eigenvalues and eigenvectors of the matrix \mathbf{A} using Jacobi diagonalization. Determine the eigenvalues from the characteristic equation and compare with the eigenvalues found by Jacobi method.

$$\mathbf{A} = \begin{bmatrix} 3 & \sqrt{3} \\ \sqrt{3} & 1 \end{bmatrix}$$