Homework 1

1. Solve $\mathbf{Ax} = \mathbf{b}$ where

$$\mathbf{A} = \begin{bmatrix} 1 & 2 & -1 & 0 \\ 1/2 & 1 & 0 & 1 \\ 0 & 2 & -1/2 & 3/2 \\ 1 & -1 & 3/2 & 0 \end{bmatrix}, \text{ and } \mathbf{b} = \begin{bmatrix} 1/2 \\ 1 \\ 3/2 \\ 2 \end{bmatrix}.$$

   by using Gaussian Elimination Algorithm with Partial Pivoting.

   (a) By hand.

   (b) By coding.

2. Apply Cholesky Decomposition to

$$\mathbf{A} = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 13 & 21 & 29 \\ 3 & 21 & 70 & 95 \\ 4 & 29 & 95 & 229 \end{bmatrix}$$

   (a) By hand.

   (b) By coding.