

For Gaussian Elimination on $\mathbf{b}=\mathbf{Ax}$ where \mathbf{b} & \mathbf{x} is in \mathbb{R}^N & \mathbf{A} is in $\mathbb{R}^{N \times N}$

1. write pseudo codes for

a) forward elimination

$$\begin{cases} A_{nm} \leftarrow A_{nm} - (A_{nk} / A_{kk}) A_{km} & (k+1 \leq n \leq N; k \leq m \leq N) \\ b_n \leftarrow b_n - (A_{nk} / A_{kk}) b_k \end{cases}$$

b) backward elimination

$$x_N = b_N / A_{NN}$$

$$x_n = (b_n - \sum_{k=n+1}^N A_{n,k} x_k) / A_{n,n}$$

c) Gaussian elimination

2. Write a general matlab code for Gaussian Elimination

3. Verify your “matlab code” against MATLAB operation $\mathbf{x}=\mathbf{A} \setminus \mathbf{b}$ for

$$\begin{cases} 6x_1 - 2x_2 + 2x_3 + 4x_4 = 16 \\ 12x_1 - 8x_2 + 6x_3 + 10x_4 = 26 \\ 3x_1 - 13x_2 + 9x_3 + 3x_4 = -19 \\ -6x_1 + 4x_2 + x_3 - 18x_4 = -34 \end{cases}$$