Subission of Classwork

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$$\begin{bmatrix} 1 & 2 & 3 \\ -1 & 1 & 2 \\ 2 & 1 & 3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 6 \\ 2 \\ 6 \end{bmatrix}$$

1 Gaussian Elimination

$$[A \mid b] = \begin{bmatrix} 1 & 2 & 3 & | & 6 \\ -1 & 1 & 2 & | & 2 \\ 2 & 1 & 3 & | & 6 \end{bmatrix} \xRightarrow{R_2+R_1} \begin{bmatrix} 1 & 2 & 3 & | & 6 \\ 0 & 3 & 5 & | & 8 \\ 2 & 1 & 3 & | & 6 \end{bmatrix} \xRightarrow{R_3-2R_1} \begin{bmatrix} 1 & 2 & 3 & | & 6 \\ 0 & 3 & 5 & | & 8 \\ 0 & -3 & -3 & | & -6 \end{bmatrix}$$

$$\xRightarrow{R_3+R_2} \begin{bmatrix} 1 & 2 & 3 & | & 6 \\ 0 & 3 & 5 & | & 8 \\ 0 & 0 & 2 & | & 2 \end{bmatrix} \implies$$

$$\begin{aligned} 3x_2 + 5x_3 &= 8 \\ 2x_3 &= 2 & 3x_2 + 5 &= 8 \\ x_3 &= 1 & 3x_2 &= 3 \\ & & x_2 &= 1 \end{aligned}$$

$$\begin{aligned} x_1 + 2x_2 + 3x_3 &= 6 \\ x_1 + 2 + 3 &= 6 \\ x_1 &= 1 \end{aligned}$$

2 Gauss Jordan Method

$$[A \mid b] = \begin{bmatrix} 1 & 2 & 3 & | & 6 \\ -1 & 1 & 2 & | & 2 \\ 2 & 1 & 3 & | & 6 \end{bmatrix} \xRightarrow{R_2+R_1} \begin{bmatrix} 1 & 2 & 3 & | & 6 \\ 0 & 3 & 5 & | & 8 \\ 2 & 1 & 3 & | & 6 \end{bmatrix} \xRightarrow{R_3-2R_1} \begin{bmatrix} 1 & 2 & 3 & | & 6 \\ 0 & 3 & 5 & | & 8 \\ 0 & -3 & -3 & | & -6 \end{bmatrix}$$

$$\xRightarrow{R_3+R_2} \begin{bmatrix} 1 & 2 & 3 & | & 6 \\ 0 & 3 & 5 & | & 8 \\ 0 & 0 & 2 & | & 2 \end{bmatrix} \xRightarrow{R_2-\frac{5}{2}R_3} \begin{bmatrix} 1 & 2 & 3 & | & 6 \\ 0 & 3 & 0 & | & 3 \\ 0 & 0 & 2 & | & 2 \end{bmatrix} \xRightarrow{R_1-\frac{3}{2}R_3} \begin{bmatrix} 1 & 2 & 0 & | & 3 \\ 0 & 3 & 0 & | & 3 \\ 0 & 0 & 2 & | & 2 \end{bmatrix}$$

$$\xRightarrow{R_1-\frac{2}{3}R_2} \begin{bmatrix} 1 & 0 & 0 & | & 1 \\ 0 & 3 & 0 & | & 3 \\ 0 & 0 & 2 & | & 2 \end{bmatrix} \implies \begin{bmatrix} 1 & 0 & 0 & | & 1 \\ 0 & 1 & 0 & | & 1 \\ 0 & 0 & 1 & | & 1 \end{bmatrix} \implies x_1 = 1, \ x_2 = 1, \ x_3 = 1$$