Submission 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

$$[A \mid b] = \left[\begin{array}{ccc|c} 1 & 2 & 3 & 6 \\ -1 & 1 & 2 & 2 \\ 2 & 1 & 3 & 6 \end{array}\right] \overset{R_2+R_1}{\Longrightarrow} \left[\begin{array}{ccc|c} 1 & 2 & 3 & 6 \\ 0 & 3 & 5 & 8 \\ 2 & 1 & 3 & 6 \end{array}\right] \overset{R_3-2R_1}{\Longrightarrow} \left[\begin{array}{ccc|c} 1 & 2 & 3 & 6 \\ 0 & 3 & 5 & 8 \\ 0 & -3 & -3 & -6 \end{array}\right]$$

$$\overset{R_3+R_2}{\Longrightarrow} \left[\begin{array}{ccc|c} 1 & 2 & 3 & 6 \\ 0 & 3 & 5 & 8 \\ 0 & 0 & 2 & 2 \end{array}\right] \implies$$

$$\begin{aligned} 2x_3 &= 2 \\ x_3 &= 1 \end{aligned} \qquad \begin{aligned} 3x_2 + 5x_3 &= 8 \\ 3x_2 + 5 &= 8 \\ 3x_2 &= 3 \\ x_2 &= 1 \end{aligned} \qquad \begin{aligned} x_1 + 2x_2 + 3x_3 &= 6 \\ x_1 + 2 + 3 &= 6 \\ x_1 &= 1 \end{aligned}$$

2 Gauss Jordan Method

$$[A \mid b] = \left[\begin{array}{ccc|c} 1 & 2 & 3 & 6 \\ -1 & 1 & 2 & 2 \\ 2 & 1 & 3 & 6 \end{array}\right] \overset{R_2+R_1}{\Longrightarrow} \left[\begin{array}{ccc|c} 1 & 2 & 3 & 6 \\ 0 & 3 & 5 & 8 \\ 2 & 1 & 3 & 6 \end{array}\right] \overset{R_3-2R_1}{\Longrightarrow} \left[\begin{array}{ccc|c} 1 & 2 & 3 & 6 \\ 0 & 3 & 5 & 8 \\ 0 & -3 & -3 & -6 \end{array}\right]$$

$$\overset{R_3+R_2}{\Longrightarrow} \left[\begin{array}{ccc|c} 1 & 2 & 3 & 6 \\ 0 & 3 & 5 & 8 \\ 0 & 0 & 2 & 2 \end{array}\right] \overset{R_2-\frac{5}{2}R_3}{\Longrightarrow} \left[\begin{array}{ccc|c} 1 & 2 & 3 & 6 \\ 0 & 3 & 0 & 3 \\ 0 & 0 & 2 & 2 \end{array}\right] \overset{R_1-\frac{3}{2}R_3}{\Longrightarrow} \left[\begin{array}{ccc|c} 1 & 2 & 0 & 3 \\ 0 & 3 & 0 & 3 \\ 0 & 0 & 2 & 2 \end{array}\right]$$

$$\overset{R_1-\frac{2}{3}R_2}{\Longrightarrow} \left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 3 & 0 & 3 \\ 0 & 0 & 2 & 2 \end{array}\right] \implies \left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \end{array}\right] \implies x_1 = 1,\ x_2 = 1,\ x_3 = 1$$