

Homework #3

① Solve the following systems by Gaussian Elimination.

$$\begin{aligned} \text{(a)} \quad x_1 + x_2 + 2x_3 &= 8 \\ -x_1 - 2x_2 + 3x_3 &= 1 \\ 3x_1 - 7x_2 + 4x_3 &= 10 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 2x_1 + 2x_2 + 2x_3 &= 0 \\ -2x_1 + 5x_2 + 2x_3 &= 1 \\ 8x_1 + x_2 + 4x_3 &= -1 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad x - y + 2z - w &= -1 \\ 2x + y - 2z - 2w &= -2 \\ -x + 2y - 4z + w &= 1 \\ 3x & \quad \quad \quad -3w = -3 \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad -2b + 3c &= 1 \\ 3a + 6b - 3c &= -2 \\ 6a + 6b + 3c &= 5 \end{aligned}$$

② Solve the following systems by Gaussian Elimination.

$$\begin{aligned} \text{(a)} \quad 2x_1 - 3x_2 &= -2 \\ 2x_1 + x_2 &= 1 \\ 3x_1 + 2x_2 &= 1 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 3x_1 + 2x_2 - x_3 &= -15 \\ 5x_1 + 3x_2 + 2x_3 &= 0 \\ 3x_1 + x_2 + 3x_3 &= 11 \\ -6x_1 - 4x_2 + 2x_3 &= 30 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad 4x_1 - 8x_2 &= 12 \\ 3x_1 - 6x_2 &= 9 \\ -2x_1 + 4x_2 &= -6 \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad 10y - 4z + w &= 1 \\ x + 4y - z + w &= 2 \\ 3x + 2y + z + 2w &= 5 \\ -2x - 8y + 2z - 2w &= -4 \\ x - 6y + 3z &= 1 \end{aligned}$$

③ Solve the following system by Gaussian elimination.

$$\begin{aligned} \text{(a)} \quad & 5x_1 - 2x_2 + 6x_3 = 0 \\ & -2x_1 + x_2 + 3x_3 = 1 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad & x_1 - 2x_2 + x_3 - 4x_4 = 1 \\ & x_1 + 3x_2 + 7x_3 + 2x_4 = 2 \\ & x_1 - 12x_2 - 11x_3 - 16x_4 = 5 \end{aligned}$$

④ Solve the following system by Gaussian elimination.

$$\begin{aligned} \text{(a)} \quad & 2x_1 + x_2 + 3x_3 = 0 \\ & x_1 + 2x_2 = 0 \\ & x_2 + x_3 = 0 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad & 3x_1 + x_2 + x_3 + x_4 = 0 \\ & 5x_1 - x_2 + x_3 - x_4 = 0 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad & 2x + 2y + 4z = 0 \\ & \quad \quad -y - 3z = 0 \\ & 2w + 3x + y + z = 0 \\ & -2w + x + 3y - 2z = 0 \end{aligned}$$