LIST 8. Systems of Linear Equations

1. For which $p \in R$ this linear equations system is Cramer's system:

$$\begin{cases} 2px + 4y - pz = 4 \\ 2x + y + pz = 1 \\ (4+2p)x + 6y + pz = 3 \end{cases}.$$

2. Using Cramer's rule solve linear equations systems below:

a. $\begin{cases} x + 2y + 3z = 1 \\ 2x + 3y + z = 3 \\ 3x + y + 2z = 2 \end{cases}$, b. $\begin{cases} 3x + 7y + 2z + 4t = 0 \\ 2y + z = 0 \\ x + 4y + z = 1 \\ 5x + 3y + 2z = 0 \end{cases}$.

3. Finding the inverse matrix solve linear equations systems below:

$$\begin{cases} x + y + z = 5 \\ 2x + 2y + z = 3 \\ 3x + 2y + z = 1 \end{cases}.$$

4. Find the greatest dimension of no zero minor using Gauss elimination:

a) $\begin{bmatrix} 2 & 3 & -1 & 1 \\ 4 & 2 & 0 & 5 \\ 0 & 4 & -2 & -3 \end{bmatrix}$; b) $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & -2 \\ 4 & 5 & 4 \\ 1 & 3 & 4 \end{bmatrix}$; c) $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & 16 \end{bmatrix}$.

5. Using Gauss elimination solve linear equations systems below:

a) $\begin{cases} x + y + z = 1 \\ x + 2y + 3z = 1 \\ 2x + 3y + 4z = 2 \\ 3x + 2y + z = 3 \end{cases}$; b) $\begin{cases} 2x - y = 3 \\ x + y = 4 \\ 4x + 8y = 11 \\ x + 4y = 10 \end{cases}$; c) $\begin{cases} x - 3y + 2z = 7 \\ x - t = 2 \\ -x - 3y + 2z + 2t = 3 \end{cases}$;

d) $\begin{cases} x - y + 2z - t = 1 \\ 2x - 3y - z + t = -1 \\ x + 7y - t = 4 \end{cases}$; e) $\begin{cases} x - 2y + z = 4 \\ x + y + z = 1 \\ 2x - 3y + 5z = 10 \\ 5x - 6y + 8z = 19 \end{cases}$; f) $\begin{cases} x + 2y + z + t = 7 \\ 2x - y - z + 4t = 2 \\ 5x + 5y + 2z + 7t = 1 \end{cases}$.