Matrix Algebra

1. Practice problems

Problem 1.1. *Show that the system of equations*

$$\begin{aligned} 3x + 4y + 5z &= \alpha \\ 4x + 5y + 6z &= \beta \\ 5x + 6y + 7z &= \gamma \end{aligned}$$

is consistent only when α, β, γ are in A.P.

Problem 1.2. *Test the consistency and solve the system of equations by Gauss elimination method.*

$$\begin{aligned} 2x + y + 4z &= 12 \\ 4x + 11y - z &= 33 \\ 8x - 3y + 2z &= 20 \end{aligned}$$

Ans: $x = 3, y = 2, z = 1$

Problem 1.3. *Test the consistency and solve the system of equations by Gauss elimination method.*

$$\begin{aligned} 5x + y + z + w &= 4 \\ x + 7y + z + w &= 12 \\ x + y + 6z + w &= -5 \\ x + y + z + 4w &= -6 \end{aligned}$$

Ans: $x = 1, y = 2, z = -1, w = -2$

Problem 1.4. *Test the consistency and solve the system of equations by Gauss elimination method.*

$$\begin{aligned} x - y - 3z + w &= 0 \\ -2x + y + 5z &= -4 \\ 4x - 2y - 10z + w &= 5 \end{aligned}$$

Ans: $x = 1 + 2k, y = -2 - k, z = k, w = -3$ **where k is any real number.**