Gaussian Elimination Solution

System of Linear Equations - Step-by-Step Solution

Input Matrix (Augmented Form)

1	2	3	1
2	1	3	2
3	2	1	0

Unique Solution Found

Solution:

x1 = 1/4

x2 = -3/4

x3 = 3/4

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Step-by-Step Solution

Step 1: Initial Matrix

$$\left[\begin{array}{cccc} 1 & 2 & 3 & 1 \\ 2 & 1 & 3 & 2 \\ 3 & 2 & 1 & 0 \end{array}\right]$$

Step 2: R1 ↔ R3

$$\left[\begin{array}{cccc} 3 & 2 & 1 & 0 \\ 2 & 1 & 3 & 2 \\ 1 & 2 & 3 & 1 \end{array}\right]$$

Step 3: R2 = R2 - (0.667)R1

$$\left[\begin{array}{cccc} 3 & 2 & 1 & 0 \\ 0 & -0.333 & 2.333 & 2 \\ 1 & 2 & 3 & 1 \end{array}\right]$$

Step 4: R3 = R3 - (0.333)R1

$$\left[\begin{array}{cccc} 3 & 2 & 1 & 0 \\ 0 & -0.333 & 2.333 & 2 \\ 0 & 1.333 & 2.667 & 1 \end{array}\right]$$

Step 5: R2 ↔ R3

$$\left[\begin{array}{cccc} 3 & 2 & 1 & 0 \\ 0 & 1.333 & 2.667 & 1 \\ 0 & -0.333 & 2.333 & 2 \end{array}\right]$$

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Step 6: R3 = R3 - (-0.250)R2

3	2	1	0
0	1.333	2.667	1
0	0	3	2.25

Final Matrix (Row Echelon Form)

3	2	1	0
0	1.333	2.667	1
0	0	3	2.25