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SECTION: 11
COURSE: MAT125

Ans to the ques no

$$x_1 + 2x_2 - 3x_3 + 4x_4 = 2$$
$$2x_1 + 5x_2 - 2x_3 + x_4 = 1$$
$$5x_1 + 12x_2 - 7x_3 + 6x_4 = 3.$$

The Augmented Matrix are:

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 2 & 5 & -2 & 1 & 1 \\ 5 & 12 & -7 & 6 & 3 \end{bmatrix}$$

Add -2 times to the 1st row to the second row:

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 5 & 12 & -7 & 6 & 3 \end{bmatrix}$$

Adding −5 times the 1st row to the third row:

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 0 & 2 & 8 & -14 & -7 \end{bmatrix}$$

Add −2 times the 2nd row to the third row:

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 0 & 0 & 0 & 0 & -1 \end{bmatrix}$$

Multiplying third row by −1:

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}.$$

Add 3 times to the 3rd row to the 2nd row:

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

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Add −2 times the 3rd row to the 1st row:

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 0 \\ 0 & 1 & 4 & -7 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

Add -2 times the 2nd row to the first row:

$$\begin{bmatrix} 1 & 0 & -11 & 18 & 0 \\ 0 & 1 & 4 & -7 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

Thus, this is gauss jordan elimination.

Ans no - 02.

$$A^2 + 2A + \text{tra}(A^T).$$

$$A = \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix}.$$

Here, $A^T = \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix}$

$\therefore \text{tra}(A^T) = 5 + 8 + (-4)$

$= 9.$

$\Rightarrow A^2 + 2A + 9$

$$\Rightarrow \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix} \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix}$$

$$+ 2 \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix}$$

$$= \begin{bmatrix} 75 & -89 & -13 \\ -89 & 117 & 1 \\ -13 & 1 & 21 \end{bmatrix} + 2 \begin{bmatrix} 10 & -14 & 2 \\ -14 & 16 & 4 \\ 2 & 4 & -8 \end{bmatrix}$$

$$+ \begin{bmatrix} 9 & 0 & 0 \\ 0 & 9 & 0 \\ 0 & 0 & 9 \end{bmatrix}$$

$$= \begin{bmatrix} 94 & -103 & -11 \\ -103 & 142 & 5 \\ -11 & 5 & 22 \end{bmatrix}$$

(Answer).