

Name: Farhan Sehlab Sudeep

ID: 1921350025 (MAT: 125.11)

①

$$x_1 + 2x_2 - 3x_3 + 4x_4 = 2$$

$$3x_1 + 5x_2 - 2x_3 + x_4 = 1$$

$$5x_1 + 12x_2 - 7x_3 + 6x_4 = 3$$

Augmented matrix  $\Rightarrow$

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

$$R_2 = -3r_1 + r_2$$

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & -1 & 7 & 11 & 5 \\ 5 & 12 & -7 & 6 & 3 \end{bmatrix}$$

$$R_3 = -5r_1 + r_3$$

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & -1 & 7 & 11 & 5 \\ 0 & 2 & 8 & -14 & -7 \end{bmatrix}$$



$$R_2 = -r_2$$

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & -7 & -11 & -5 \\ 0 & 2 & 8 & -14 & -7 \end{bmatrix}$$

$$R_2 = -r_3 + r_2$$

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 0 & -15 & 3 & 3 \\ 0 & 2 & 8 & -14 & -7 \end{bmatrix}$$

$$R_{10} =$$

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

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

$$= \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix} \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix} + 2A + \text{tra}(A^T)$$

$$= \begin{bmatrix} 25+49+1 & -35-56+2 & 5-14-4 \\ -35-56+2 & 49+64+4 & -7+16-8 \\ 5-14-4 & -7+16-8 & 1+4+16 \end{bmatrix} + 2A + \text{tra}(A^T)$$

$$\begin{bmatrix} 75 & -89 & -13 \\ -89 & 117 & 1 \\ -13 & 1 & 21 \end{bmatrix} + 2 \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix} + \text{tra}(A^T)$$

$$\begin{bmatrix} 75 & -89 & -13 \\ -89 & 117 & 1 \\ -13 & 1 & 21 \end{bmatrix} + \begin{bmatrix} 10 & -14 & 2 \\ -14 & 16 & 4 \\ 2 & 4 & -8 \end{bmatrix} + \text{tra}(A^T)$$

$$= \begin{bmatrix} 85 & -103 & -11 \\ -103 & 133 & 5 \\ -11 & 5 & 13 \end{bmatrix} + \text{tra}(A^T)$$

Now,

$$A^T = \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -9 \end{bmatrix}$$

$$\therefore \text{tra}(A^T) = 5 + 8 - 9 \\ = 9$$

$$\therefore \begin{bmatrix} 85 & -103 & -11 \\ -103 & 133 & 5 \\ -11 & 5 & 13 \end{bmatrix} + 9$$

Here, the ~~comp~~ solution is undefine. Because it ~~has not~~ does not have same matrices.