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Homework - 1

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1) A + F

$$\begin{bmatrix} 3 & 1 & 5 \\ 6 & 2 & 0 \end{bmatrix}_{2\times3} + \begin{bmatrix} 2 & 1 & 3 \\ 5 & 7 & -2 \end{bmatrix}_{2\times3}$$

$$\Rightarrow \begin{bmatrix} 5 & 2 & 8 \\ 11 & 9 & -2 \end{bmatrix}_{2\times3}$$

2) E - D

$$\begin{bmatrix} 3 & -2 \\ 1 & 4 \end{bmatrix}_{2\times2} - \begin{bmatrix} 5 & 2 \\ 3 & 1 \end{bmatrix}_{2\times2} = \begin{bmatrix} -2 & -4 \\ -2 & 3 \end{bmatrix}_{2\times2}$$

3) C + B

$$\begin{bmatrix} 2 & 4 \\ 3 & 6 \\ -1 & 2 \end{bmatrix}_{3\times2} + \begin{bmatrix} 6 \\ 4 \\ -1 \end{bmatrix}_{3\times1} \Rightarrow$$

We cannot perform the addition operation on these matrices as the dimensions do not match

4) C(D)

$$\begin{bmatrix} 2 & 4 \\ 3 & 6 \\ -1 & 2 \end{bmatrix}_{3\times2} \times \begin{bmatrix} 5 & 2 \\ 3 & 1 \end{bmatrix}_{2\times2} = \begin{bmatrix} 2\cdot5+4\cdot3 & 2\cdot2+4\cdot1 \\ 3\cdot5+6\cdot3 & 3\cdot2+6\cdot1 \\ -1\cdot5+2\cdot3 & -1\cdot2+2\cdot1 \end{bmatrix}$$

$$\begin{bmatrix} 10+12 & 4+4 \\ 15+18 & 6+6 \\ -5+6 & -2+2 \end{bmatrix} \Rightarrow \begin{bmatrix} 22 & 8 \\ 33 & 12 \\ 1 & 0 \end{bmatrix}_{3\times2}$$

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5) A(F)

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

$2\times3$ $\quad$ $2\times3$

NOT EQUAL

$\Rightarrow$ We cannot perform matrix Multiplication operation on these matrices. As the number of columns of matrix A does not match no. of rows of matrix F.

c) $C^T$

$$\begin{bmatrix} 2 & 4 \\ 3 & 6 \\ -1 & 2 \end{bmatrix}_{3\times2} \xrightarrow{\text{transform}} \begin{bmatrix} 2 & 3 & -1 \\ 4 & 6 & 2 \end{bmatrix}_{2\times3}$$

no. of rows become no of colums & vicevesa

7) $F^T(E)$ $\quad$ value of $F^T$; $F^T \Rightarrow \begin{bmatrix} 2 & 5 \\ 1 & 7 \\ 3 & -2 \end{bmatrix}$

Now, $F^T(E)$

$$\begin{bmatrix} 2 & 5 \\ 1 & 7 \\ 3 & -2 \end{bmatrix}_{3\times2} * \begin{bmatrix} 3 & -2 \\ 1 & 4 \end{bmatrix}_{2\times2} \Rightarrow \begin{bmatrix} 2\times3+5\times1 & 2\cdot-2+5\times4 \\ 1*3+7\times1 & 1\cdot-2+7*4 \\ 3\times3+-2\times1 & 3\cdot-2+-2\times4 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 6+5 & 4+20 \\ 3+7 & -2+28 \\ 9+(-2) & -6+(-8) \end{bmatrix} \Rightarrow \begin{bmatrix} 11 & 24 \\ 10 & 26 \\ 7 & -14 \end{bmatrix}_{3\times2}$$