Assignment 1

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Download all python codes from

https://github.com/sachinkarumanchi/EE3900/blob/main/assignment2.pdf

and latex codes from

https://github.com/sachinkarumanchi/EE3900/blob/main/assignment2.tex

PROBLEM(MATRICES-2.22(2)

Express the following Matrix as a sum of a symmetric and a skew symmetric matrix:

$$\begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix}$$

SOLUTION

Let A be the given matrix

$$\mathbf{A} = \begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix} \tag{0.0.1}$$

$$\mathbf{A}^T = \begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix} \tag{0.0.2}$$

$$\implies \mathbf{A} = \mathbf{A}^T \tag{0.0.3}$$

Since, $\mathbf{A}$ is a symmetric matrix the skew symmetric matrix would be 0

$\therefore \mathbf{A} = \mathbf{B} + \mathbf{C}$

$$\begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix} = \begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix} + \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix} \tag{0.0.4}$$

Here, $\mathbf{B}$ is the symmetric matrix and $\mathbf{C}$ is the skew symmetric matrix.