Assignment 2

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Download all python codes from

https://github.com/YashasTadikamalla/EE3900/blob/main/Assignment2/codes

and latex-tikz codes from

https://github.com/YashasTadikamalla/EE3900/blob/main/Assignment2/Assignment2.tex

1 Problem (Matrices Q2.17(I))

If $\mathbf{A}^\top = \begin{pmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{pmatrix}$, then verify that, $(\mathbf{A}+\mathbf{B})^\top = \mathbf{A}^\top + \mathbf{B}^\top$

2 Solution

Given,

$$\mathbf{A}^\top = \begin{pmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{pmatrix} \tag{2.0.1}$$

$$\Rightarrow \mathbf{A} = \begin{pmatrix} 3 & -1 & 0 \\ 4 & 2 & 1 \end{pmatrix} \tag{2.0.2}$$

$$\mathbf{B} = \begin{pmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{pmatrix} \tag{2.0.3}$$

$$\Rightarrow \mathbf{B}^\top = \begin{pmatrix} -1 & 1 \\ 2 & 2 \\ 1 & 3 \end{pmatrix} \tag{2.0.4}$$

To verify: $(\mathbf{A}+\mathbf{B})^\top = \mathbf{A}^\top + \mathbf{B}^\top$
From (2.0.2), (2.0.3),

$$(\mathbf{A}+\mathbf{B}) = \begin{pmatrix} 2 & 1 & 1 \\ 5 & 4 & 4 \end{pmatrix} \tag{2.0.5}$$

$$\therefore LHS = (\mathbf{A}+\mathbf{B})^\top = \begin{pmatrix} 2 & 5 \\ 1 & 4 \\ 1 & 4 \end{pmatrix} \tag{2.0.6}$$

From (2.0.1), (2.0.4),

$$RHS = \mathbf{A}^\top + \mathbf{B}^\top = \begin{pmatrix} 2 & 5 \\ 1 & 4 \\ 1 & 4 \end{pmatrix} \tag{2.0.7}$$

$\therefore LHS = RHS$. Hence, verified.