Assignment 2

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question(iv):
Show that $\mathbf{A}+\mathbf{A}'$ is symmetric matrix.if
$\mathbf{A}=\begin{pmatrix}2 & 4\\ 3 & 5\end{pmatrix}$
solution:
given,

$$\mathbf{A}=\begin{pmatrix}2 & 4\\ 3 & 5\end{pmatrix} \tag{1}$$

$$\implies \mathbf{A}'=\begin{pmatrix}2 & 3\\ 4 & 5\end{pmatrix} \tag{2}$$

$$\mathbf{A}+\mathbf{A}'=\begin{pmatrix}2 & 4\\ 3 & 5\end{pmatrix}+\begin{pmatrix}2 & 3\\ 4 & 5\end{pmatrix} \tag{3}$$

$$\implies \mathbf{A}+\mathbf{A}'=\begin{pmatrix}2+2 & 4+3\\ 3+4 & 5+5\end{pmatrix} \tag{4}$$

$$\implies \mathbf{A}+\mathbf{A}'=\begin{pmatrix}4 & 7\\ 7 & 10\end{pmatrix} \tag{5}$$

A matrix $\mathbf{R}$ is symmetric if

$$\mathbf{R}=\mathbf{R}' \tag{6}$$

let

$$\mathbf{A}+\mathbf{A}'=\mathbf{R} \tag{7}$$

Now,we have to find $\mathbf{R}'$

$$\mathbf{R}=\begin{pmatrix}4 & 7\\ 7 & 10\end{pmatrix} \tag{8}$$

$$\implies \mathbf{R}'=\begin{pmatrix}4 & 7\\ 7 & 10\end{pmatrix} \tag{9}$$

here

$$\mathbf{R}=\mathbf{R}' \tag{10}$$

So, $\mathbf{R}$ is symmetric matrix
$\therefore \mathbf{A}+\mathbf{A}'$ is symmetric matrix