Assignment 9

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1 QUESTION No.2.62

If $\mathbf{A}=\begin{pmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{pmatrix}, \mathbf{B}=\begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{pmatrix}, \mathbf{C}=\begin{pmatrix} 2 \\ -2 \\ 3 \end{pmatrix}$, Calculate $\mathbf{AC}, \mathbf{BC}$ and $(\mathbf{A} + \mathbf{B})\mathbf{C} = \mathbf{AC} + \mathbf{BC}$.

2 SOLUTION:

Here we need to calculate both R.H.S and L.H.S of $(\mathbf{A} + \mathbf{B})\mathbf{C} = \mathbf{AC} + \mathbf{BC}$ (distributive) property.

L.H.S$=(\mathbf{A} + \mathbf{B})\mathbf{C}$

$$= \left(\begin{pmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{pmatrix} + \begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{pmatrix} \right) \begin{pmatrix} 2 \\ -2 \\ 3 \end{pmatrix} \quad (2.0.1)$$

$$= \begin{pmatrix} 0 & 7 & 8 \\ -5 & 0 & 10 \\ 8 & -6 & 0 \end{pmatrix} \begin{pmatrix} 2 \\ -2 \\ 3 \end{pmatrix} \quad (2.0.2)$$

$$= \begin{pmatrix} 10 \\ 20 \\ 28 \end{pmatrix} \quad (2.0.3)$$

R.H.S=AC+BC

$$= \begin{pmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{pmatrix} \begin{pmatrix} 2 \\ -2 \\ 3 \end{pmatrix} + \begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{pmatrix} \begin{pmatrix} 2 \\ -2 \\ 3 \end{pmatrix} \quad (2.0.4)$$

$$= \begin{pmatrix} 9 \\ 12 \\ 30 \end{pmatrix} + \begin{pmatrix} 1 \\ 8 \\ -2 \end{pmatrix} \quad (2.0.5)$$

$$= \begin{pmatrix} 10 \\ 20 \\ 28 \end{pmatrix} \quad (2.0.6)$$

Hence the property is verified.