

Assignment 9

R.OOHA

Download all python codes from

<https://github.com/ooharapolu/ASSIGNMNT9/Assignment9.py>

and latex-tikz codes from

<https://github.com/ooharapolu/ASSIGNMNT9/main.tex>

Calculating $\mathbf{AC} + \mathbf{BC}$

$$\mathbf{AC} + \mathbf{BC} = \begin{pmatrix} 9 \\ 12 \\ 30 \end{pmatrix} + \begin{pmatrix} 1 \\ 8 \\ -2 \end{pmatrix} \quad (2.0.7)$$

$$= \begin{pmatrix} 9+1 \\ 12+8 \\ 30-2 \end{pmatrix} = \begin{pmatrix} 10 \\ 20 \\ 28 \end{pmatrix} \quad (2.0.8)$$

Calculating $(\mathbf{A} + \mathbf{B})\mathbf{C}$
First Calculating $\mathbf{A} + \mathbf{B}$

$$\mathbf{A} + \mathbf{B} = \begin{pmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{pmatrix} + \begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{pmatrix} \quad (2.0.9)$$

$$= \begin{pmatrix} 0+0 & 6+1 & 7+1 \\ -6+1 & 0+0 & 8+2 \\ 7+1 & -8+2 & 0+0 \end{pmatrix} \quad (2.0.10)$$

$$= \begin{pmatrix} 0 & 7 & 8 \\ -5 & 0 & 10 \\ 8 & -6 & 0 \end{pmatrix} \quad (2.0.11)$$

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:

Calculating \mathbf{AC}

$$\mathbf{AC} = \begin{pmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{pmatrix} \begin{pmatrix} 2 \\ -2 \\ 3 \end{pmatrix} \quad (2.0.1)$$

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

$$= \begin{pmatrix} 0 - 12 + 21 \\ -12 + 0 + 24 \\ 14 + 16 + 0 \end{pmatrix} = \begin{pmatrix} 9 \\ 12 \\ 30 \end{pmatrix} \quad (2.0.3)$$

Calculating \mathbf{BC}

$$\mathbf{BC} = \begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{pmatrix} \begin{pmatrix} 2 \\ -2 \\ 3 \end{pmatrix} \quad (2.0.4)$$

$$= \begin{pmatrix} 0(2) + 1(-2) + 1(3) \\ 1(2) + 0(-2) + 2(3) \\ 1(2) + 2(-2) + 0(3) \end{pmatrix} \quad (2.0.5)$$

$$= \begin{pmatrix} 0 - 2 + 3 \\ 2 + 0 + 6 \\ 2 - 4 + 0 \end{pmatrix} = \begin{pmatrix} 1 \\ 8 \\ -2 \end{pmatrix} \quad (2.0.6)$$

Now calculating $(\mathbf{A} + \mathbf{B})\mathbf{C}$

$$(\mathbf{A} + \mathbf{B})\mathbf{C} = \begin{pmatrix} 0 & 7 & 8 \\ -5 & 0 & 10 \\ 8 & -6 & 0 \end{pmatrix} \begin{pmatrix} 2 \\ -2 \\ 3 \end{pmatrix} \quad (2.0.12)$$

$$= \begin{pmatrix} 0(2) + 7(-2) + 8(3) \\ -5(2) + 0(-2) + 10(3) \\ 8(2) + (-6)(-2) + 0(3) \end{pmatrix} \quad (2.0.13)$$

$$= \begin{pmatrix} 0 - 14 + 24 \\ -10 + 0 + 30 \\ 16 + 12 + 0 \end{pmatrix} = \begin{pmatrix} 10 \\ 20 \\ 28 \end{pmatrix} \quad (2.0.14)$$

$$= \mathbf{AC} + \mathbf{BC} \quad (2.0.15)$$

$\therefore \text{L.H.S} = \text{R.H.S}$
Hence proved.