Assignment 2

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Download all python codes from

https://github.com/Adarsh541/EE3900/blob/main/Assignment2/codes/Assignment2.py

Download latex-tikz codes from

https://github.com/Adarsh541/EE3900/blob/main/Assignment2/Assignment2.tex

1 Problem(Matrices Q2.7)

If, $\mathbf{A} = \begin{pmatrix} 1 & 2 & -3 \\ 5 & 0 & 2 \\ 1 & -1 & 1 \end{pmatrix}$, $\mathbf{B} = \begin{pmatrix} 3 & -1 & 2 \\ 4 & 2 & 5 \\ 2 & 0 & 3 \end{pmatrix}$ and $\mathbf{C} = \begin{pmatrix} 4 & 1 & 2 \\ 0 & 3 & 2 \\ 1 & -2 & 3 \end{pmatrix}$, then compute $(\mathbf{A}+\mathbf{B})$ and $(\mathbf{B}-\mathbf{C})$. Also, verify that $\mathbf{A}+(\mathbf{B}-\mathbf{C}) = (\mathbf{A}+\mathbf{B})-\mathbf{C}$

2 Solution

$$\mathbf{A}+\mathbf{B} = \begin{pmatrix} 1 & 2 & -3 \\ 5 & 0 & 2 \\ 1 & -1 & 1 \end{pmatrix} + \begin{pmatrix} 3 & -1 & 2 \\ 4 & 2 & 5 \\ 2 & 0 & 3 \end{pmatrix} \tag{2.0.1}$$

$$= \begin{pmatrix} 1+3 & 2+(-1) & -3+2 \\ 5+4 & 0+2 & 2+5 \\ 1+2 & -1+0 & 1+3 \end{pmatrix} \tag{2.0.2}$$

$$= \begin{pmatrix} 4 & 1 & -1 \\ 9 & 2 & 7 \\ 3 & -1 & 4 \end{pmatrix} \tag{2.0.3}$$

$$\mathbf{B}-\mathbf{C} = \begin{pmatrix} 3 & -1 & 2 \\ 4 & 2 & 5 \\ 2 & 0 & 3 \end{pmatrix} - \begin{pmatrix} 4 & 1 & 2 \\ 0 & 3 & 2 \\ 1 & -2 & 3 \end{pmatrix} \tag{2.0.4}$$

$$= \begin{pmatrix} 3-4 & -1-1 & 2-2 \\ 4-0 & 2-3 & 5-2 \\ 2-1 & 0-(-2) & 3-3 \end{pmatrix} \tag{2.0.5}$$

$$= \begin{pmatrix} -1 & -2 & 0 \\ 4 & -1 & 3 \\ 1 & 2 & 0 \end{pmatrix} \tag{2.0.6}$$

$$\mathbf{A}+(\mathbf{B}-\mathbf{C}) = \begin{pmatrix} 1 & 2 & -3 \\ 5 & 0 & 2 \\ 1 & -1 & 1 \end{pmatrix} + \begin{pmatrix} -1 & -2 & 0 \\ 4 & -1 & 3 \\ 1 & 2 & 0 \end{pmatrix} \tag{2.0.7}$$

$$= \begin{pmatrix} 1+(-1) & 2+(-2) & -3+0 \\ 5+4 & 0+(-1) & 2+3 \\ 1+1 & -1+2 & 1+0 \end{pmatrix} \tag{2.0.8}$$

$$= \begin{pmatrix} 0 & 0 & -3 \\ 9 & -1 & 5 \\ 2 & 1 & 1 \end{pmatrix} \tag{2.0.9}$$

$$(\mathbf{A}+\mathbf{B})-\mathbf{C} = \begin{pmatrix} 4 & 1 & -1 \\ 9 & 2 & 7 \\ 3 & -1 & 4 \end{pmatrix} - \begin{pmatrix} 4 & 1 & 2 \\ 0 & 3 & 2 \\ 1 & -2 & 3 \end{pmatrix} \tag{2.0.10}$$

$$= \begin{pmatrix} 4-4 & 1-1 & -1-2 \\ 9-0 & 2-3 & 7-2 \\ 3-1 & -1-(-2) & 4-3 \end{pmatrix} \tag{2.0.11}$$

$$= \begin{pmatrix} 0 & 0 & -3 \\ 9 & -1 & 5 \\ 2 & 1 & 1 \end{pmatrix} \tag{2.0.12}$$

(2.0.9) is same as (2.0.12)