

# ASSIGNMENT 2

RONGALA ARUN SIDDARDHA  
AI20BTECH110019

Download all python codes from

[https://github.com/ArunSiddardha/EE3900/blob/main/Assignment\\_2/code/Assignment\\_2.py](https://github.com/ArunSiddardha/EE3900/blob/main/Assignment_2/code/Assignment_2.py)

and latex-tikz codes from

[https://github.com/ArunSiddardha/EE3900/blob/main/Assignment\\_2/Assignment\\_2.tex](https://github.com/ArunSiddardha/EE3900/blob/main/Assignment_2/Assignment_2.tex)

## 1 MATRICES 2.46

Let  $A = \begin{pmatrix} 1 & -2 & 3 \\ -4 & 2 & 5 \end{pmatrix}$ ,  $B = \begin{pmatrix} 2 & 3 \\ 4 & 5 \\ 2 & 1 \end{pmatrix}$ . Find AB and BA.

Show that  $AB = BA$

## 2 SOLUTION

$$AB = \begin{pmatrix} 1 & -2 & 3 \\ -4 & 2 & 5 \end{pmatrix} \begin{pmatrix} 2 & 3 \\ 4 & 5 \\ 2 & 1 \end{pmatrix}$$

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

$$= \begin{pmatrix} 0 & -4 \\ 10 & 3 \end{pmatrix}$$

$$BA = \begin{pmatrix} 2 & 3 \\ 4 & 5 \\ 2 & 1 \end{pmatrix} \begin{pmatrix} 1 & -2 & 3 \\ -4 & 2 & 5 \end{pmatrix}$$

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

$$= \begin{pmatrix} -10 & 2 & 21 \\ -16 & 2 & 37 \\ -2 & -2 & 11 \end{pmatrix}$$

here we can clearly see that  $AB = BA$ .

**Hence showed**