Assignment 2

Tanay Yadav - AI20BTECH11026

Download the python codes from:

https://github.com/tanayyadav28/EE3900–Assignments/blob/main/Assignment_1/code/Assignment_2.py

Download the latex-tikz codes from:

https://github.com/tanayyadav28/EE3900–Assignments/blob/main/Assignment_1/Assignment_2.tex

1 Problem

[Matrices Q2; Q47]

If $A = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$, then find AB, BA.
Show that $AB \neq BA$.

2 Solution

Let $P = AB$ and $Q = BA$,
Performing respective matrix multiplications,

$$P = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \times \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \tag{2.0.1}$$

$$P = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} \tag{2.0.2}$$

Similarly,

$$Q = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \times \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \tag{2.0.3}$$

$$Q = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} \tag{2.0.4}$$

Hence,

$$P \neq Q \tag{2.0.5}$$

$$\therefore AB \neq BA \tag{2.0.6}$$