Assignment 2

AVVARU BHARAT

Download all python codes from

https://github.com/Bharat437/Matrix_Theory/tree/master/Assignment2/Codes

and latex-tikz codes from

https://github.com/Bharat437/Matrix_Theory/tree/master/Assignment2

1 Question

simplify

$$\cos\theta\begin{pmatrix}\cos\theta & \sin\theta\\ -\sin\theta & \cos\theta\end{pmatrix}+\sin\theta\begin{pmatrix}\sin\theta & -\cos\theta\\ \cos\theta & \sin\theta\end{pmatrix}$$

2 Explanation

$$\cos\theta\begin{pmatrix}\cos\theta & \sin\theta\\ -\sin\theta & \cos\theta\end{pmatrix}+\sin\theta\begin{pmatrix}\sin\theta & -\cos\theta\\ \cos\theta & \sin\theta\end{pmatrix} \tag{2.0.1}$$

$$\implies \begin{pmatrix}\cos^2\theta & \cos\theta\sin\theta\\ -\cos\theta\sin\theta & \cos^2\theta\end{pmatrix} \tag{2.0.2}$$
$$+\begin{pmatrix}\sin^2\theta & -\sin\theta\cos\theta\\ \sin\theta\cos\theta & \sin^2\theta\end{pmatrix}$$

$$\implies \begin{pmatrix}\cos^2\theta+\sin^2\theta & \cos\theta\sin\theta-\sin\theta\cos\theta\\ -\cos\theta\sin\theta+\sin\theta\cos\theta & \cos^2\theta+\sin^2\theta\end{pmatrix} \tag{2.0.3}$$

$$\implies \begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}=\mathbf{I} \tag{2.0.4}$$

Hence it is simplified.