

Assignment 2

D V K M Rishab
AI20MTECH14004

Download the python code, latex file and the pdf doc from

<https://github.com/Rishab9991/EE5609/tree/master/Assignments/Assignment2>

Using (3),

$$i.e A = \begin{pmatrix} \sin \alpha \\ -\cos \alpha \end{pmatrix} \quad (10)$$

$$A^T = \begin{pmatrix} \sin \alpha \\ \cos \alpha \end{pmatrix} \quad (11)$$

$$\Rightarrow A^T A = \begin{pmatrix} \sin \alpha \\ \cos \alpha \end{pmatrix} \begin{pmatrix} \sin \alpha \\ -\cos \alpha \end{pmatrix} \quad (12)$$

$$\Rightarrow A^T A = I \quad (13)$$

1) **Solution:**

$$A = \begin{pmatrix} \cos \alpha & \sin \alpha \\ -\sin \alpha & \cos \alpha \end{pmatrix} \quad (1)$$

$$\Rightarrow A^T = \begin{pmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{pmatrix} \quad (2)$$

$$\begin{pmatrix} a1 \\ a2 \end{pmatrix} = \begin{pmatrix} a1 & -a2 \\ a2 & a1 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad (3)$$

$$i.e A = \begin{pmatrix} \cos \alpha \\ -\sin \alpha \end{pmatrix} \quad (4)$$

$$A^T = \begin{pmatrix} \cos \alpha \\ \sin \alpha \end{pmatrix} \quad (5)$$

$$\Rightarrow A^T A = \begin{pmatrix} \cos \alpha \\ \sin \alpha \end{pmatrix} \begin{pmatrix} \cos \alpha \\ -\sin \alpha \end{pmatrix} \quad (6)$$

$$\Rightarrow A^T A = I \quad (7)$$

Hence Proved for both Problems 1 and 2.

2) **Solution:**

$$A = \begin{pmatrix} \sin \alpha & \cos \alpha \\ -\cos \alpha & \sin \alpha \end{pmatrix} \quad (8)$$

$$\Rightarrow A^T = \begin{pmatrix} \sin \alpha & -\cos \alpha \\ \cos \alpha & \sin \alpha \end{pmatrix} \quad (9)$$