AI1110 Assignment 1

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1 Question 3 (a)

Question:

Simplify

$$\sin A \begin{bmatrix} \sin A & -\cos A \\ \cos A & \sin A \end{bmatrix} + \cos A \begin{bmatrix} \cos A & \sin A \\ -\sin A & \cos A \end{bmatrix}$$

Solution:

Performing scalar multiplication we get

$$\begin{bmatrix} \sin^2 A & -\sin A \cos A \\ \sin A \cos A & \sin^2 A \end{bmatrix} + \begin{bmatrix} \cos^2 A & \cos A \sin A \\ -\cos A \sin A & \cos^2 A \end{bmatrix}$$

Adding the matrices

$$\begin{bmatrix} \sin^2 A + \cos^2 A & -\sin A \cos A + \cos A \sin A \\ \sin A \cos A - \cos A \sin A & \sin^2 A + \cos^2 A \end{bmatrix}$$

Simplifying the expressions we get

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$