5.5.29

AI25BTECH11012 - GARIGE UNNATHI

Question:

If the inverse of the matrix $\begin{pmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{pmatrix}$ is the matrix $\begin{pmatrix} 1 & 3 & 3 \\ 1 & \lambda & 3 \\ 1 & 3 & 4 \end{pmatrix}$, then find the value

of λ .

Solution:

Let :

$$\mathbf{A} = \begin{pmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{pmatrix}$$

since we know that $\mathbf{AA}^{-1} = \mathbf{I}$

$$\begin{pmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{pmatrix}\begin{pmatrix} 1 & 3 & 3 \\ 1 & \lambda & 3 \\ 1 & 3 & 4 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \tag{0.1}$$

we can find λ just by comparing the element a_{22} :

$$a_{22} = -3 + \lambda + 0 = 1 \tag{0.2}$$

$$\lambda = 4 \tag{0.3}$$