

1-1.10-8

EE24BTECH11036 - Krishna Patil

Question:

Find the unit vector in the direction of the vector $\mathbf{A} = \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}$. **Solution:** The unit vector is given by :-

$$\frac{\mathbf{A}}{\|\mathbf{A}\|} \quad (1)$$

$$\|\mathbf{A}\| = \sqrt{(\mathbf{A})^T(\mathbf{A})} \quad (2)$$

$$= \sqrt{\begin{pmatrix} 1 & 1 & 2 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}} \quad (3)$$

$$= \sqrt{6} \quad (4)$$

$$\therefore \frac{\mathbf{A}}{\|\mathbf{A}\|} = \frac{1}{\sqrt{6}} \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix} \quad (5)$$

$$(6)$$

Vector	Description
A	$\begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}$

TABLE I: Given Vector