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:

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

TABLE I: Given Vector

The unit vector is given by :-

$$\frac{\mathbf{A}}{\|\mathbf{A}\|} \tag{1}$$

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

$$= \sqrt{\begin{pmatrix} 1 & 1 & 2 \end{pmatrix}\begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}} \tag{3}$$

$$= \sqrt{6} \tag{4}$$

$\therefore$ the unit vector in the direction of $\mathbf{A}$ is

$$\frac{\mathbf{A}}{\|\mathbf{A}\|} = \sqrt{6}\begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}$$