Question-1-1.10-27

EE24BTECH11038 - MALAKALA BALA SUBRAHMANYA ARAVIND

Question:
Write the direction ratios of the vector $\vec{a} = \hat{i} + \hat{j} - \hat{k}$ and hence calculate its direction cosines
Solution:

Variable	Description	Formula
a	A vector	$A = \begin{pmatrix} 1 \\ 1 \\ -1 \end{pmatrix}$

TABLE 0

$$\vec{a} = \begin{pmatrix} 1 \\ 1 \\ -1 \end{pmatrix} \tag{0.1}$$

The direction ratios are 1,1,-1

$$\|a\| = \sqrt{(a^T a)} \tag{0.2}$$

$$\|a\| = \sqrt{3} \tag{0.3}$$

$$a_{\text{normalized}} = \frac{1}{\sqrt{3}} \begin{pmatrix} 1 \\ 1 \\ -1 \end{pmatrix} \tag{0.4}$$

The direction cosines are $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}$

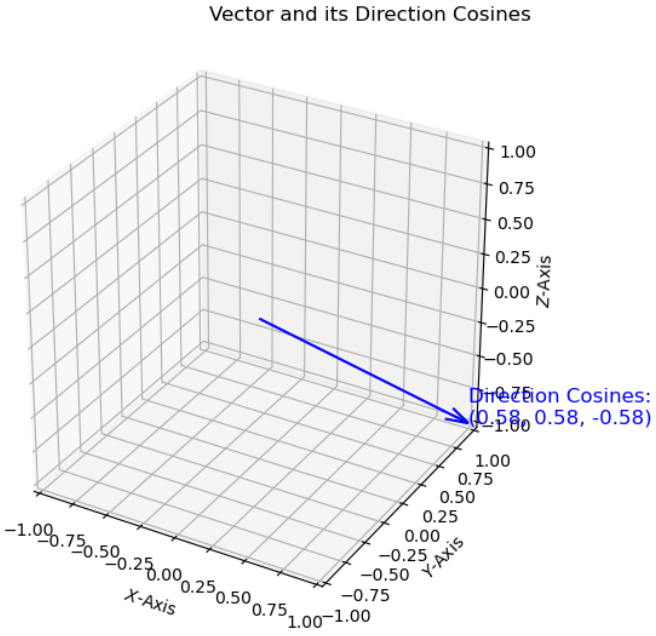
Vector and its Direction Cosines
Direction Cosines:
(0.58, 0.58, -0.58)
X-Axis
Y-Axis
Z-Axis
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75
1.00

Fig. 0.1