1.10.16

EE25BTECH11052 - Shriyansh Kalpesh Chawda

Question:
Find the unit vector in the direction of vector $\mathbf{a} = 2\hat{i} + 3\hat{j} + \hat{k}$.
Solution:
The unit vector in the direction of x is

$$\frac{\mathbf{x}}{\|\mathbf{x}\|} \tag{1.1.8.1}$$

Given the vector $\mathbf{a} = 2\hat{i} + 3\hat{j} + \hat{k}$. The magnitude of vector $\mathbf{a}$:

$$\|\mathbf{a}\| = \sqrt{2^2 + 3^2 + 1^2} = \sqrt{4 + 9 + 1} = \sqrt{14} \quad (1)$$

Then, the unit vector in the direction of $\mathbf{a}$ is found by dividing the vector by its magnitude:

$$\implies \frac{\mathbf{a}}{\|\mathbf{a}\|} = \frac{1}{\sqrt{14}} \begin{pmatrix} 2 \\ 3 \\ 1 \end{pmatrix}$$

Below is the figure for the following unit vector :

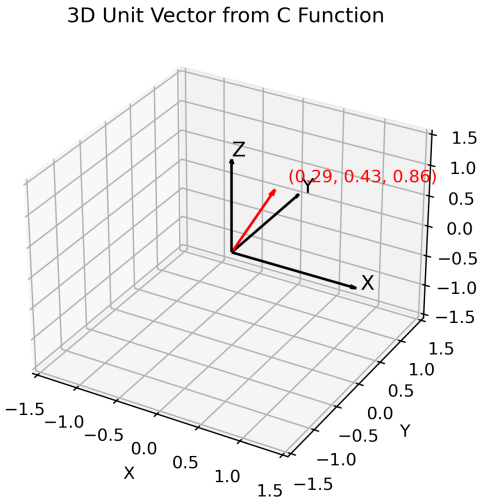

Fig. 0.1