

1.10.16

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# Question

The unit vector in the direction of  $\mathbf{x}$  is

# Solution

The unit vector in the direction of  $\mathbf{x}$  is

$$\frac{\mathbf{x}}{\|\mathbf{x}\|} \quad (1.1.8.1)$$

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:

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

### 3D Unit Vector from C Function

