

# 1.1.10.26

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## Question:

Find the unit vector in the direction of the sum of the vectors,  $a = 2\hat{i} + 2\hat{j} - 5\hat{k}$  and  $b = 2\hat{i} + \hat{j} + 3\hat{k}$

## Solution:

Variable	Description	Formula
$a$	A vector	$A = \begin{pmatrix} 2 \\ 2 \\ -5 \end{pmatrix}$
$b$	A vector	$B = \begin{pmatrix} 2 \\ 1 \\ 3 \end{pmatrix}$
$c$	Unit vector in the direction of $a + b$	$c = \frac{a+b}{\ a+b\ }$

TABLE 0

To calculate the  $c$ ,

$$a + b = \begin{pmatrix} 2 \\ 2 \\ -5 \end{pmatrix} + \begin{pmatrix} 2 \\ 1 \\ 3 \end{pmatrix} = \begin{pmatrix} 4 \\ 3 \\ -2 \end{pmatrix} \quad (0.1)$$

Calculating  $\|a + b\|$ ,

$$\|a + b\| = \sqrt{29} \quad (0.2)$$

$\therefore c$  is,

$$c = \frac{a + b}{\|a + b\|} = \frac{1}{\sqrt{29}} \begin{pmatrix} 4 \\ 3 \\ -2 \end{pmatrix} \quad (0.3)$$

Unit Vector C in the direction of  $A+B$

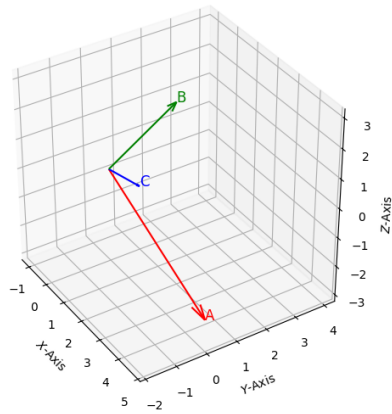


Fig. 0.1