

1.9.15

EE24BTECH11012 - Bhavanisankar G S

QUESTION

If **a**, **b**, **c** are position vectors of the points **A** $\begin{pmatrix} 2 \\ 3 \\ -4 \end{pmatrix}$, **B** $\begin{pmatrix} 3 \\ -4 \\ -5 \end{pmatrix}$, and **C** $\begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix}$ respectively,

then **|a + b + c|** is equal to

SOLUTION

Variable name	Description	Formula
<i>A</i>	$\begin{pmatrix} 2 \\ 3 \\ -4 \end{pmatrix}$	
<i>B</i>	$\begin{pmatrix} 3 \\ -4 \\ -5 \end{pmatrix}$	
<i>C</i>	$\begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix}$	
<i>D</i>	$A + B + C$	$\left \mathbf{D} \begin{pmatrix} a \\ b \\ c \end{pmatrix} \right = \sqrt{a^2 + b^2 + c^2} = ?$ (<i> D is the distance of the point D from the origin</i>)

TABLE 0: Variables Used

Let

$$\mathbf{A} = \begin{pmatrix} 2 \\ 3 \\ -4 \end{pmatrix} \quad (0.1)$$

$$\mathbf{B} = \begin{pmatrix} 3 \\ -4 \\ -5 \end{pmatrix} \quad (0.2)$$

$$\mathbf{C} = \begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix} \quad (0.3)$$

$$\Rightarrow \mathbf{A} + \mathbf{B} + \mathbf{C} = \begin{pmatrix} 8 \\ 1 \\ -12 \end{pmatrix} \quad (0.4)$$

$$\left| \begin{pmatrix} a \\ b \\ c \end{pmatrix} \right| = \sqrt{a^2 + b^2 + c^2} \quad (0.5)$$

$$\Rightarrow |\mathbf{a} + \mathbf{b} + \mathbf{c}| = \sqrt{209} \quad (0.6)$$

$$(0.7)$$

Hence, the answer to the given question is $\sqrt{209}$.

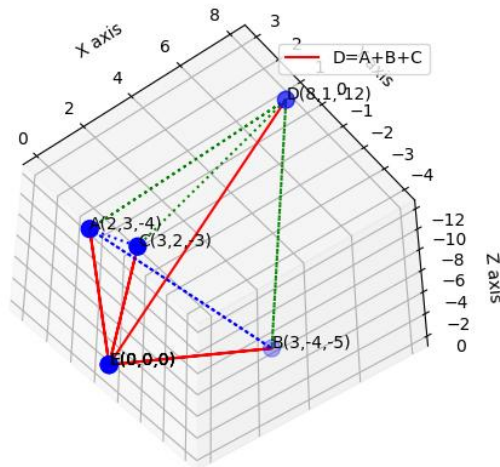


Fig. 0.1: A plot of the points given with the origin