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 $|\mathbf{a} + \mathbf{b} + \mathbf{c}|$ is equal to

SOLUTION

Variable name	Description	Fo
A	$\begin{pmatrix} 2 \\ 3 \\ -4 \end{pmatrix}$	
B	$\begin{pmatrix} 3 \\ -4 \\ -5 \end{pmatrix}$	
C	$\begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix}$	
D	Distance of the point from the origin.	$\left\|\mathbf{D}\begin{pmatrix} a \\ b \\ c \end{pmatrix}\right\| = \sqrt{a^2+b^2+c^2} = ?\ (\|D\|\ ist$

TABLE 0: Variables Used

Let

$$\mathbf{A} = \begin{pmatrix} 2 \\ 3 \\ -4 \end{pmatrix} \tag{0.1}$$

$$\mathbf{B} = \begin{pmatrix} 3 \\ -4 \\ -5 \end{pmatrix} \tag{0.2}$$

$$\mathbf{C} = \begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix} \tag{0.3}$$

$$\implies \mathbf{A} + \mathbf{B} + \mathbf{C} = \begin{pmatrix} 8 \\ 1 \\ -12 \end{pmatrix} \tag{0.4}$$

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

$$\implies |\mathbf{a} + \mathbf{b} + \mathbf{c}| = \sqrt{209} \tag{0.6}$$

$$\tag{0.7}$$

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

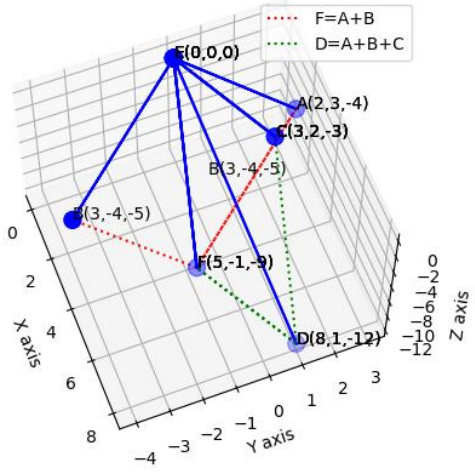

Fig. 0.1: A plot of the points given with the origin