1.11.15

EE24BTECH11021 - Eshan Ray

Question:

Write the direction ratios of the vector $3a+2b$ where $a = \vec{i} + \vec{j} - 2\vec{k}$ and $b = 2\vec{i} - 4\vec{j} + 5\vec{k}$

Solution:

Variable	Description	Direction ratios
a	first vector	$\begin{pmatrix} 1 \\ 1 \\ -2 \end{pmatrix}$
b	second vector	$\begin{pmatrix} 2 \\ -4 \\ 5 \end{pmatrix}$
D	direction ratios of $3\mathbf{a} + 2\mathbf{b}$	–

TABLE 0: Input parameters

$$D = \begin{pmatrix} 3 & 2 \end{pmatrix} \begin{pmatrix} a \\ b \end{pmatrix} \tag{1}$$

$$\implies D = \begin{pmatrix} 3 & 2 \end{pmatrix} \begin{pmatrix} \begin{pmatrix} 1 \\ 1 \\ -2 \end{pmatrix} \\ \begin{pmatrix} 2 \\ -4 \\ 5 \end{pmatrix} \end{pmatrix} \tag{2}$$

$$\implies D = \begin{pmatrix} 3 \\ 3 \\ -6 \end{pmatrix} + \begin{pmatrix} 4 \\ -8 \\ 10 \end{pmatrix} \tag{3}$$

$$\implies D = \begin{pmatrix} 7 \\ -5 \\ 4 \end{pmatrix} \tag{4}$$

The direction ratios of the vector $3a + 2b$ are $\begin{pmatrix} 7 \\ -5 \\ 4 \end{pmatrix}$

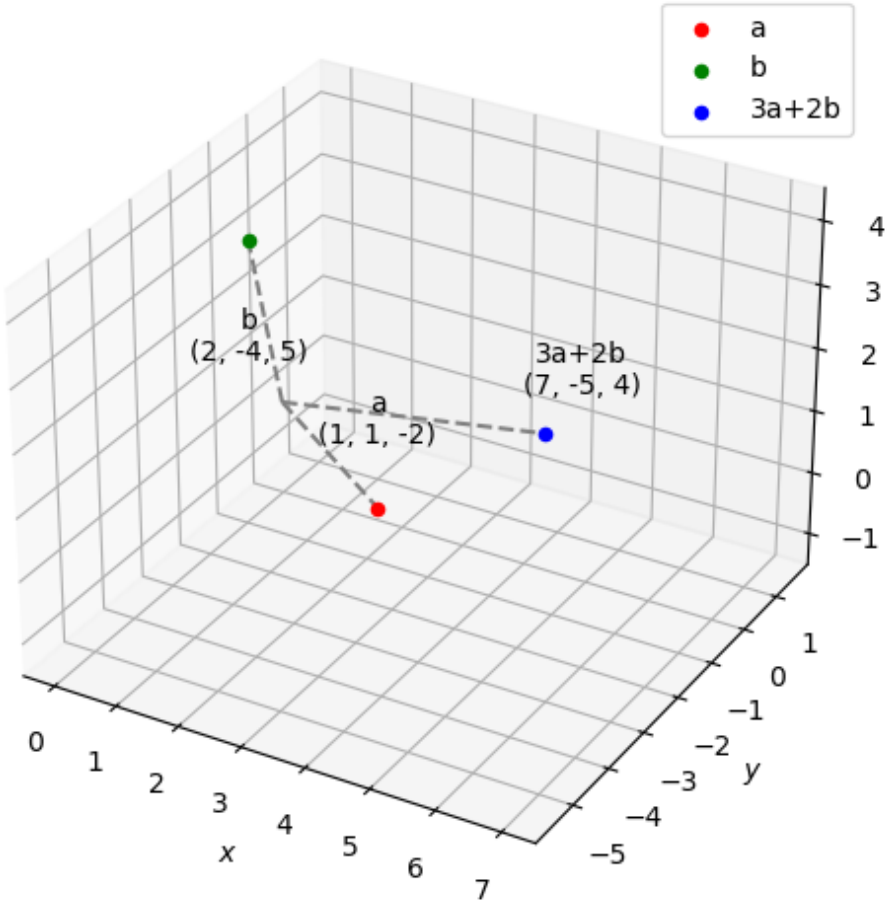

Fig. 0: Direction ratios of $3a + 2b$