1.11.17

AI24BTECH11031 - Shivram S
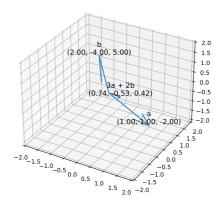
Question:

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

Solution:

$$3\mathbf{a} + 2\mathbf{b} = 3\begin{pmatrix} 1 \\ 1 \\ -2 \end{pmatrix} + 2\begin{pmatrix} 2 \\ -4 \\ 5 \end{pmatrix} = \begin{pmatrix} 7 \\ -5 \\ 4 \end{pmatrix}$$

The direction ratios are then obtained as:

$$\frac{3\mathbf{a} + 2\mathbf{b}}{\|3\mathbf{a} + 2\mathbf{b}\|} = \frac{1}{3\sqrt{10}}\begin{pmatrix} 7 \\ -5 \\ 4 \end{pmatrix}$$