Straight Lines

12^{th} Maths - Chapter 10

This is Problem-12 from Exercise 10.2

1. Find the direction cosines of the vector $\hat{i} + 2\hat{j} + 3\hat{k}$.

   Solution: Let

$$a = 1, b = 2, c = 3, \mathbf{A} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \tag{1}$$

   The magnitude of $\mathbf{A}$ is given by

$$\|\mathbf{A}\| = \mathbf{A}^\top \mathbf{A} \tag{2}$$

$$\|\mathbf{A}\| = \sqrt{14} \tag{3}$$

   The direction cosines are given by

$$\frac{a}{\|\mathbf{A}\|}, \frac{b}{\|\mathbf{A}\|}, \frac{c}{\|\mathbf{A}\|} \tag{4}$$

$$\implies \frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}} \tag{5}$$