QUESTION

If $\mathbf{a} = \mathbf{i} + \mathbf{j}$ and $\mathbf{b} = \mathbf{i} + \mathbf{j} + \mathbf{k}$ find the component of \mathbf{b} in the direction of \mathbf{a} .

ANSWER

The component of
$$\mathbf{b}$$
 in direction of $\mathbf{a} = \mathbf{b}.\hat{\mathbf{a}}$

$$= (1,1,1).\frac{(1,1,0)}{\sqrt{2}} = \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} + 0 = \frac{2}{\sqrt{2}} = \sqrt{2}$$