

VECTORS

1 10th Maths - Chapter 10

This is Problem-3 from Exercise 10.3

1. Find the projection of the vector $\hat{i} - \hat{j}$ on the vector $\hat{i} + \hat{j}$

2 SOLUTION

Taken points are

$$\mathbf{A} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} \mathbf{B} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} \quad (1)$$

The formula of the projection vector :

$$\frac{A^\top \times B}{\|B\|^2} \times B \quad (2)$$

Find the projection vector:

$$A^\top \times B = (1, -1) \times \begin{pmatrix} 1 \\ 1 \end{pmatrix} \quad (3)$$

$$\|B\|^2 = (B^\top \times B) = (1, 1) \begin{pmatrix} 1 \\ 1 \end{pmatrix} = (1 \times 1) + (1 \times 1) = 2 \quad (4)$$

projection vector =

$$\frac{A^\top \times B}{\|B\|^2} \times B = \frac{0}{2} \times \begin{pmatrix} 1 \\ 1 \end{pmatrix} = (0, 0) \quad (5)$$

projection vector = (0,0)

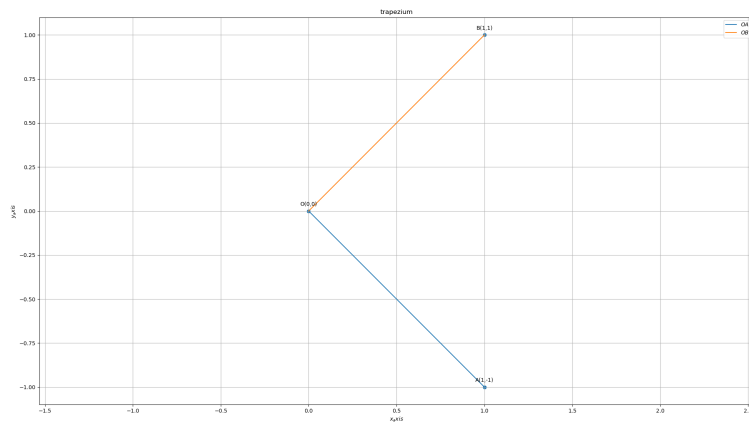


Figure 1