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Assignment-2

EE224BTECH11044 - Muthyala Koushik

I. Vector Arithmetic(CBSE)

Question: AOBC is a rectangle whose three vertices are vertices $\mathbf{A}(0,3)$, $\mathbf{O}(0,0)$ and $\mathbf{B}(5,0)$. The length of its diagonal is

Solution: Direction vector of AB : m = B - A

$$\mathbf{AB} = \begin{pmatrix} 5 \\ 0 \end{pmatrix} - \begin{pmatrix} 0 \\ 3 \end{pmatrix} = \begin{pmatrix} 5 \\ -3 \end{pmatrix} \tag{1}$$

length of $\mathbf{AB}(\text{Diagonal}): ||\mathbf{m}||^2 = mm^t$

$$\|\mathbf{A}\mathbf{B}\|^2 = \left(5 - 3\right) \begin{pmatrix} 5 \\ -3 \end{pmatrix} \tag{2}$$

$$\|\mathbf{A}\mathbf{B}\|^2 = 5^2 + (-3)^2 \tag{3}$$

$$\|\mathbf{A}\mathbf{B}\|^2 = 25 + 9\tag{4}$$

$$\|\mathbf{A}\mathbf{B}\|^2 = 34\tag{5}$$

$$\|\mathbf{A}\mathbf{B}\| = \sqrt{34} \tag{6}$$

so, length of diagonal= $\sqrt{34}$.

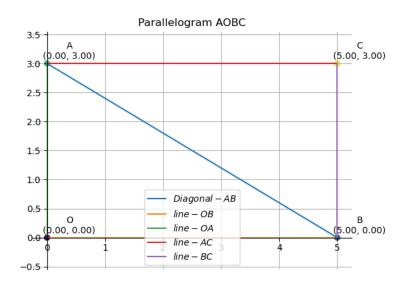


Fig. 1: The plot of the rectangle AOBC