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 $\mathbf{AB}$: $m = \mathbf{B} - \mathbf{A}$

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

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

$$\|\mathbf{AB}\|^2 = \begin{pmatrix}5-3\end{pmatrix}\begin{pmatrix}5\\-3\end{pmatrix} \tag{2}$$

$$\|\mathbf{AB}\|^2 = \begin{pmatrix}5^2 + (-3)^2\end{pmatrix} \tag{3}$$

$$\|\mathbf{AB}\|^2 = \begin{pmatrix}25 + 9\end{pmatrix} \tag{4}$$

$$\|\mathbf{AB}\|^2 = \begin{pmatrix}34\end{pmatrix} \tag{5}$$

$$\|\mathbf{AB}\| = \sqrt{34} \tag{6}$$

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