Question-1-1.9-9

EE24BTECH11038 - MALAKALA BALA SUBRAHMANYA ARAVIND

Question:
Find the distance between the points $\mathbf{A}\left(-\frac{7}{3},5\right)$ and $\mathbf{B}\left(\frac{2}{3},5\right)$

Solution:

point	Coordinates
A	$\left(-\frac{7}{3},5\right)$
B	$\left(\frac{2}{3},5\right)$

variables used

To calculate the distance AB,

$$\mathbf{A}-\mathbf{B}=\begin{pmatrix}-7/3\\5\end{pmatrix}-\begin{pmatrix}2/3\\5\end{pmatrix}=\begin{pmatrix}3\\0\end{pmatrix} \tag{0.1}$$

$$\|\mathbf{A}-\mathbf{B}\|^2=(\mathbf{A}-\mathbf{B})^\top(\mathbf{A}-\mathbf{B}) \tag{0.2}$$

$$(\mathbf{A}-\mathbf{B})^\top(\mathbf{A}-\mathbf{B})=\begin{pmatrix}3&0\end{pmatrix}\begin{pmatrix}3\\0\end{pmatrix}=9 \tag{0.3}$$

Thus the distance AB is,

$$\|\mathbf{A}-\mathbf{B}\|=\sqrt{9}=3 \tag{0.4}$$

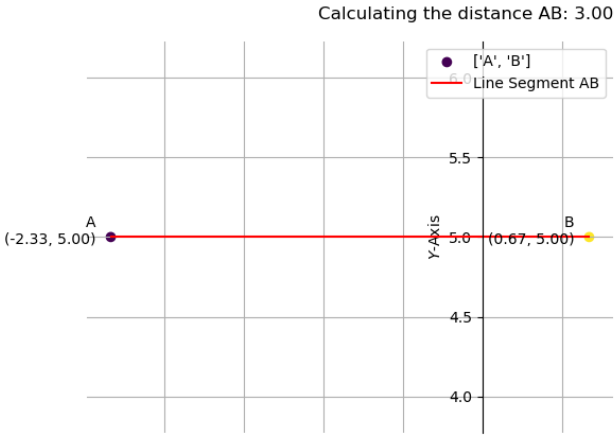
Calculating the distance AB: 3.00
['A', 'B']
Line Segment AB
5.5
A
(-2.33, 5.00)
Y-Axis
5.0
B
(0.67, 5.00)
4.5
4.0

Fig. 0.1