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:

Variable	Description	Formula
A	A Point to be plotted	$A = \begin{pmatrix} -7/3 \\ 5 \end{pmatrix}$
B	A Point to be plotted	$B = \begin{pmatrix} 2/3 \\ 5 \end{pmatrix}$

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,

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

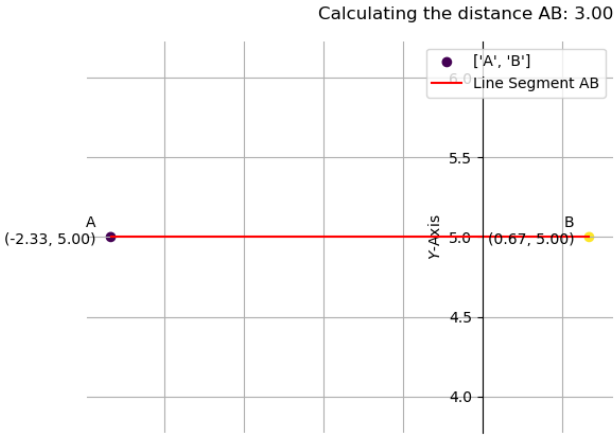
Calculating the distance AB: 3.00
['A', 'B']
Line Segment AB
5.5
A
(-2.33, 5.00)
Y-Axis
5.0
B
(0.67, 5.00)
4.5
4.0

Fig. 0.1