EE24BTECH11001 - Aditya Tripathy

Question:

Find the length of the segment joining A(-6,7) and B(-1,-5). Also, find the midpoint of AB.

Solution:

From (1.1.7.1), length of vector X is given by

$$\|\mathbf{X}\| = \sqrt{\mathbf{X}^{\top}\mathbf{X}} \tag{0.1}$$

$$\mathbf{X} = \mathbf{B} - \mathbf{A} = \begin{pmatrix} -1 \\ -5 \end{pmatrix} - \begin{pmatrix} -6 \\ 7 \end{pmatrix} = \begin{pmatrix} 5 \\ -12 \end{pmatrix} \tag{0.2}$$

$$\|\mathbf{X}\| = \sqrt{(5 - 12)\binom{5}{-12}} = \sqrt{25 + 144} = 13.$$
 (0.3)

(0.4)

The length of the given vector = 13.

From (1.1.4.1), the point dividing **BC** in ratio k:1 is given by,

$$\mathbf{D} = \frac{k\mathbf{C} + \mathbf{B}}{k+1} \tag{0.5}$$

(0.6)

$$\mathbf{D} = \frac{\mathbf{B} + \mathbf{A}}{1 + 1} \tag{0.7}$$

$$\mathbf{D} = \begin{pmatrix} -3.5\\1 \end{pmatrix} \tag{0.8}$$

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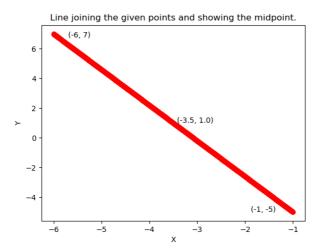


Fig. 0.1: Line joining the given points and the midpoint