1.2.14

EE24BTECH11053 - S A Aravind Eswar

Question: Verify if the points $\mathbf{A}(4,3), \mathbf{B}(6,4), \mathbf{C}(5,-6)$ and $\mathbf{D}(-3,5)$ are the vertices of a parallelogram.

Solution:

Symbol	Value	Description
A	$\begin{pmatrix}4\\3\end{pmatrix}$	Point **A**
B	$\begin{pmatrix}6\\4\end{pmatrix}$	Point **B**
C	$\begin{pmatrix}5\\-6\end{pmatrix}$	Point **C**
D	$\begin{pmatrix}-3\\5\end{pmatrix}$	Point **D**

TABLE 0: Given Values

It requires two vectors formed by two unique points to be equivalent for points A,B,C and D to form a parallelogram, .

$$\mathbf{AB} = \mathbf{B} - \mathbf{A} = \begin{pmatrix}2\\1\end{pmatrix} \tag{0.1}$$

$$\mathbf{BC} = \mathbf{C} - \mathbf{B} = \begin{pmatrix}-1\\-10\end{pmatrix} \tag{0.2}$$

$$\mathbf{CD} = \mathbf{D} - \mathbf{C} = \begin{pmatrix}-8\\11\end{pmatrix} \tag{0.3}$$

$$\mathbf{DA} = \mathbf{A} - \mathbf{D} = \begin{pmatrix}7\\-2\end{pmatrix} \tag{0.4}$$

$$\mathbf{BD} = \mathbf{D} - \mathbf{B} = \begin{pmatrix}-9\\1\end{pmatrix} \tag{0.5}$$

$$\mathbf{AC} = \mathbf{C} - \mathbf{A} = \begin{pmatrix}1\\-9\end{pmatrix} \tag{0.6}$$

Thus, the points $\mathbf{A}, \mathbf{B}, \mathbf{C}$ and $\mathbf{D}$ are not forming a parallelogram.

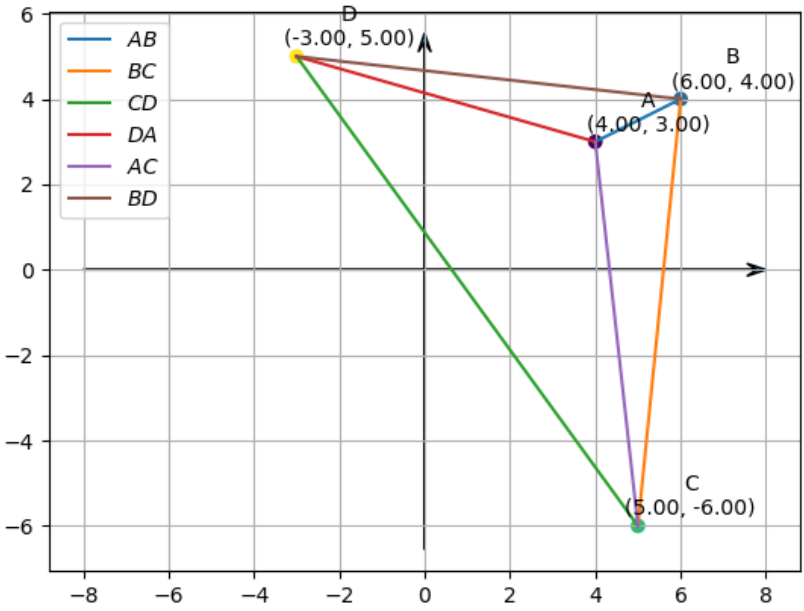

Fig. 0.1: Points **A**,**B**,**C** and **D**