1.2.12

EE24BTECH11020 - Ellanti Rohith

Question:
If (1,2), (4,y), (x,6) and (3,5) are the vertices of parallelogram taken in order, find x and y.

Solution:
Let ABCD be the given Parallelogram,

$$\text{A} = \begin{pmatrix}1\\2\end{pmatrix};\ \text{B} = \begin{pmatrix}4\\y\end{pmatrix};\ \text{C} = \begin{pmatrix}x\\6\end{pmatrix};\ \text{D} = \begin{pmatrix}3\\5\end{pmatrix}$$

we know that AB is parallel to DC and $\|AB\| = \|DC\|$
Then,

$$B - A = C - D \tag{0.1}$$

$$\begin{pmatrix}4\\y\end{pmatrix} - \begin{pmatrix}1\\2\end{pmatrix} = \begin{pmatrix}x\\6\end{pmatrix} - \begin{pmatrix}3\\5\end{pmatrix} \tag{0.2}$$

$$\begin{pmatrix}3\\y-2\end{pmatrix} = \begin{pmatrix}x-3\\1\end{pmatrix} \tag{0.3}$$

From equation 0.3,

$$3 = x - 3 \Rightarrow x = 6 \tag{0.4}$$

$$y - 2 = 1 \Rightarrow y = 3 \tag{0.5}$$

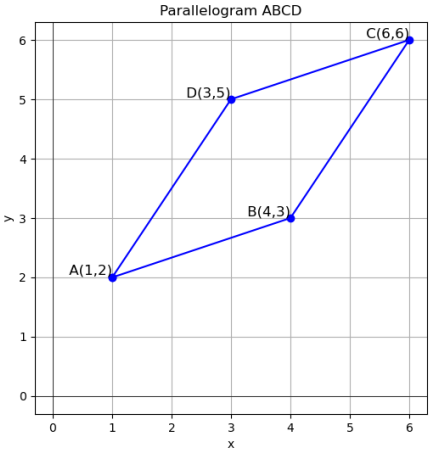

Fig. 0.1: Plot of parallelogram ABCD