

Assignment 1

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Download all python codes from

<https://github.com/rubeenaafreen20/EE5600AI-ML/tree/master/Codes>

and latex codes from

<https://github.com/rubeenaafreen20/EE5600AI-ML>

and,

$$\mathbf{B} - \mathbf{C} = \mathbf{A} - \mathbf{D} \quad (3.0.2)$$

We can say that opposite edges of the quadrilateral are parallel.

Hence, ABCD is a parallelogram

1 PROBLEM

Without using distance formula, show that points $\begin{pmatrix} -2 \\ -1 \end{pmatrix}$, $\begin{pmatrix} 4 \\ 0 \end{pmatrix}$, $(3, 3)$ and $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$ are the vertices of a parallelogram.

2 EXPLANATION

Let points of quadrilateral be A, B, C, D such that,

$$A = \begin{pmatrix} -2 \\ -1 \end{pmatrix}, B = \begin{pmatrix} 4 \\ 0 \end{pmatrix}, C = \begin{pmatrix} 3 \\ 3 \end{pmatrix}, D = \begin{pmatrix} -3 \\ 2 \end{pmatrix} \quad (2.0.1)$$

We have vector equations for each side as:

$$\mathbf{A} - \mathbf{B} = \begin{pmatrix} -2 \\ -1 \end{pmatrix} - \begin{pmatrix} 4 \\ 0 \end{pmatrix} = \begin{pmatrix} -6 \\ -1 \end{pmatrix} \quad (2.0.2)$$

$$\mathbf{B} - \mathbf{C} = \begin{pmatrix} 4 \\ 0 \end{pmatrix} - \begin{pmatrix} 3 \\ 3 \end{pmatrix} = \begin{pmatrix} 1 \\ -3 \end{pmatrix} \quad (2.0.3)$$

$$\mathbf{D} - \mathbf{C} = \begin{pmatrix} -3 \\ 2 \end{pmatrix} - \begin{pmatrix} 3 \\ 3 \end{pmatrix} = \begin{pmatrix} -6 \\ -1 \end{pmatrix} \quad (2.0.4)$$

and

$$\mathbf{A} - \mathbf{D} = \begin{pmatrix} -2 \\ -1 \end{pmatrix} - \begin{pmatrix} -3 \\ 2 \end{pmatrix} = \begin{pmatrix} 1 \\ -3 \end{pmatrix} \quad (2.0.5)$$

3 PROOF

Since,

$$\mathbf{A} - \mathbf{B} = \mathbf{B} - \mathbf{C} \quad (3.0.1)$$

4 RESULT

Plot of quadrilateral obtained from Python code is shown below.

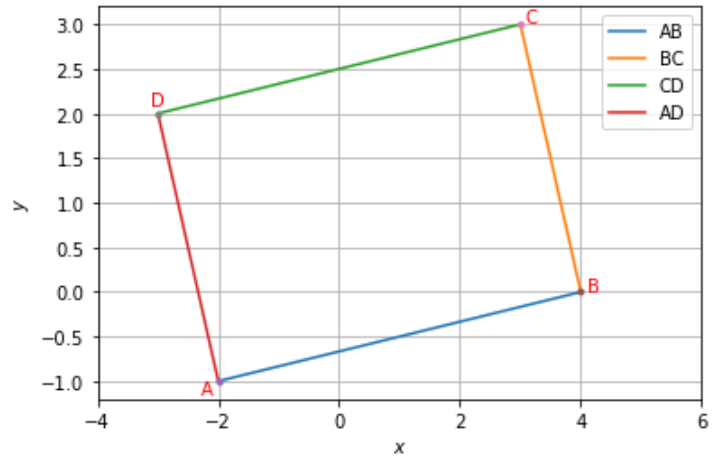


Fig. 0: Plot of parallelogram ABCD