MATRICES USING PYTHON

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FWC22008   IITH Future Wireless Communication (FWC)   ASSIGN-4
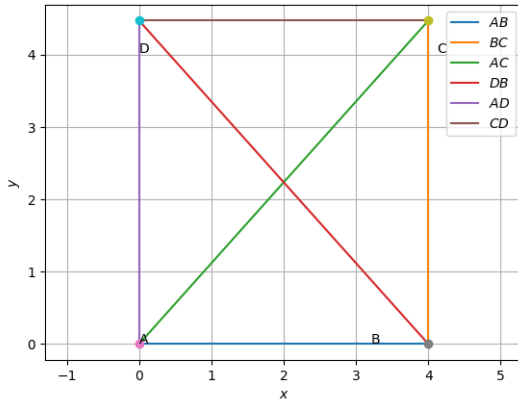
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1   Problem

If diagonals of a parallelogram are equal then show that it is a rectangle

2   Construction

Figure of Construction

The input parameters for this construction are

Symbol	Value	Description
r	6	AC
k	4	AB
θ	$\arccos(k/r)$	$\angle$AC
A	$\begin{pmatrix} 0 \\ 0 \end{pmatrix}$	Point A

Given: ABCD is a parallelogram

$$\mathbf{B} - \mathbf{A} = \mathbf{D} - \mathbf{C} \tag{1}$$

We can wirte this as

$$\mathbf{A} - \mathbf{C} = \mathbf{B} - \mathbf{D} \tag{2}$$

And, Diagonals of the parallelogram are equal.

$$\mathbf{C} - \mathbf{A} = \mathbf{D} - \mathbf{B} \tag{3}$$

If we take a point on the intersection of diagonals then we can write

$$\|O - D\| = \|O - C\| = \|O - B\| = \|O - A\| \tag{4}$$

Then we can say that diagonals bisect each other.

$\therefore$ It is a rectangle

The below python code realizes the above construction: https://github.com/Rahulraj00/Assignments/tree/main/Assignment assg_4

3   Solution

Termux commands :

```
python3 matrixline.py
```

To Prove: ABCD is a rectangle