MATRICES USING PYTHON

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1 termux commands :

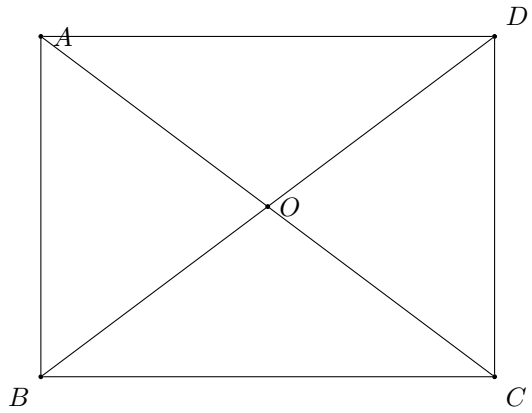
1 python3 matrix.py

2 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

1 Problem

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



2 Solution

Theory:
In a parallelogram if diagonals are equal all angles should be the same.
To Prove: Any angle in the parallelogram is 90 degrees
Theorem : In a parallelogram if diagonals are equal and one of its angle is 90 degrees then its a rectangle.

$$\text{In } \Delta ABC \text{ and } \Delta DCB$$
$$AB = DC \text{ (Opposite side of a parallelogram)}$$
$$BC = BC \text{ (Common)}$$
$$AC{=}DB \text{ (Given)}$$
$$\therefore \Delta ABC = \Delta DCB \text{ (SSS congruence rule)}$$
$$\angle ABC = \angle DCB \text{ (CPCT)}$$

To Prove: Any angle in the parallelogram is 90 Degrees.
We know that AB $\parallel$ DC
BC is a Transversal

$$\angle B + \angle C = 180$$
$$\angle B + \angle B = 180$$
$$2\angle B = 180$$
$$\angle B = 90$$
Hence, Proved

To Prove: $\angle C = 90$

AC = BD by Δle law of vector addition,
AC = AD + DC
AD - CD
BC - CD
BD = BC + CD
Now, **BD = AC**
Or, $BD^2 = AC^2$
$(BD)^2 = AC^2$
$(BC+CD)^2 = (BC-CD)^2$
$(CD-CB)^2 = (CD+CB)^2$
$(CD)^2-2CD.CB+(CB)^2 = (CD)^2+2CD.CB+(CB)^2$
4CD.CB=0
CD $\perp$ CB
$\angle C = 90$

https://github.com/Rahulraj00/Assignments/tree/main/Assignments/matrix.py

3 Construction

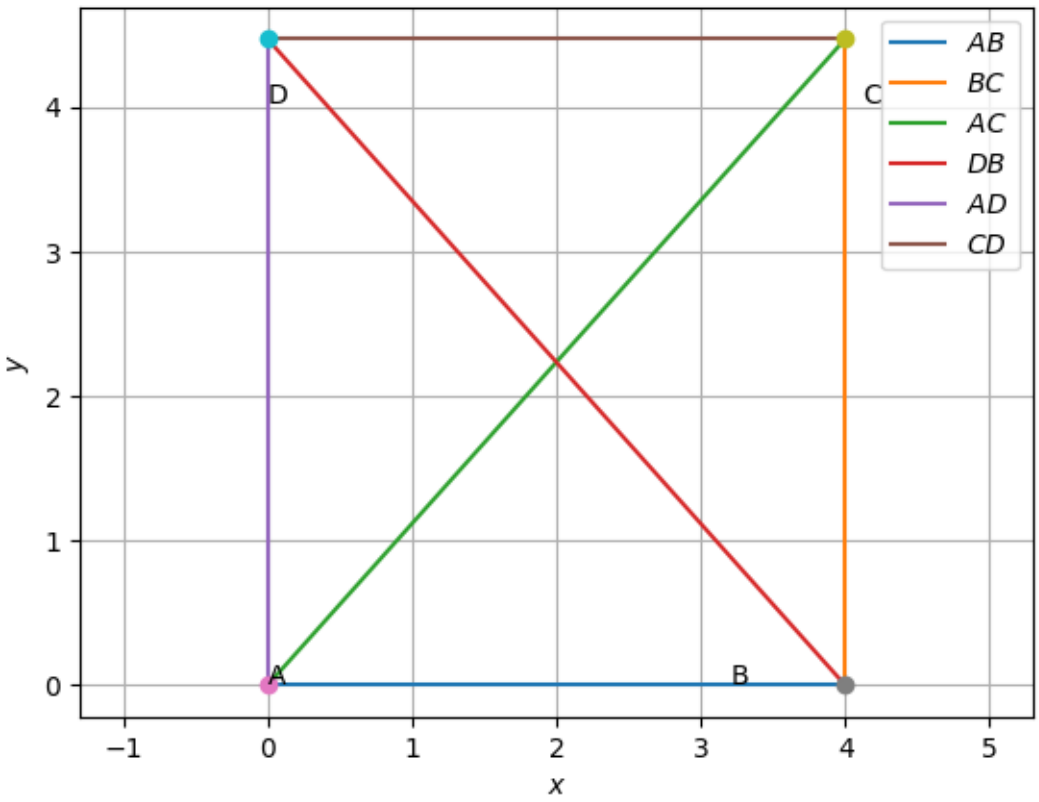


Figure of construction