MATRICES USING PYTHON

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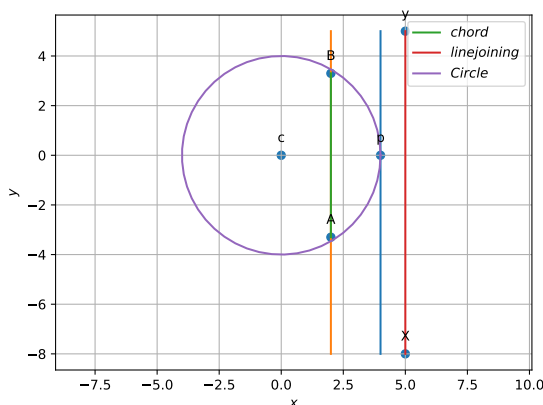FWC22008   IITH Future Wireless Communication (FWC)   ASSIGN-4

Contents

1 Problem

Draw a circle and two lines parallel to a given line such that one is a tangent and the other is a secant to the circle

2 Construction

Figure of Construction

The input parameters for this construction are

Symbol	Value	Description
r	4	Radius of the circle
C	$\begin{pmatrix} 0 \\ 0 \end{pmatrix}$	Point A

3 Solution

Termux commands :

```
python3 xyz.py
```

To Prove: In a given circle and a line draw two lines such that one is a secant and other one is tangent.

Given: Circle center with (0,0), radius 4 and a line.

$$\mathbf{x}^\top \mathbf{V} \mathbf{x} + 2\mathbf{U}^\top \mathbf{x} + f = 0 \qquad (1)$$

$$\mathbf{V} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}, \ \mathbf{U} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \ f = \text{-16}$$

By substituting above values in the equation (1) , we get cirle equation.

Now let us take the given line equation as

$$\mathbf{x} - \mathbf{5} = \mathbf{0} \qquad (2)$$

then the tanget line equation which is parallel to the give line becomes

$$\mathbf{x} - \mathbf{4} = \mathbf{0} \qquad (3)$$

and the secant which is also parallel to the given line will be

$$\mathbf{x} - \mathbf{3} = \mathbf{0} \qquad (4)$$

The below python code realizes the above construction:

https://github.com/Rahulraj00/Assignments/tree/main/Assignments/assg_5/xyz.py