MATRICES USING PYTHON

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FWC22008 IITH Future Wireless Communication (FWC) ASSIGN-4

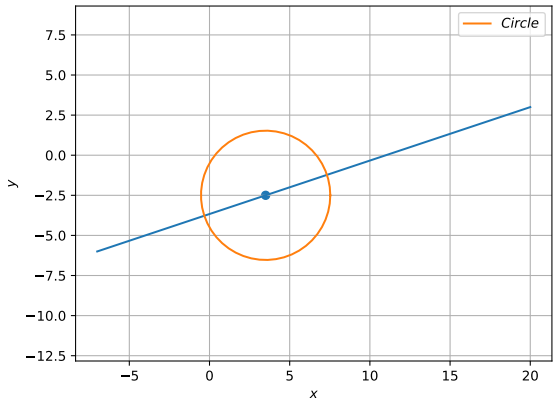
Contents

1 Problem

Find the equation of circle passing through the points (2,3) and (-1,1) and whose centre is on the line x-3y-11=0.

2 Construction

Figure of Construction



3 Solution

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.

$$\mathbf{x}^\top \mathbf{V}\mathbf{x} + 2\mathbf{u}^\top \mathbf{x} + f = 0 \tag{1}$$

$\mathbf{V} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, $\mathbf{u1}=\begin{pmatrix} 0 \\ 0 \end{pmatrix}$ f = -16

By substituting the given 2 point in $\mathbf{u1}=\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ and $\mathbf{u2}=\begin{pmatrix} -1 \\ 1 \end{pmatrix}$ we get one equation in the form of h and k

and, if we substitute h and k in the given line equation we get

$$h - 3k - 11 = 0 \tag{2}$$

by solving the both equations we get Radius and Centre And, from them we can find the equation of circle.

steps for constructing above figure are:

Symbol	Value	Description
r^2	$65/4$	Radius of the circle
C	$\begin{pmatrix} 7/2 \\ -5/2 \end{pmatrix}$	center of circle

By The below python code realizes the above construction:
https://github.com/Rahulraj00/Assignments/tree/main/Assignments/assg_5/xyz.py

Termux commands :

```
bash r.sh
```