

Conic Assignment

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1 Problem:

Find the equation of circle passing with radius 5 whose center lies on x-axis and passes through point $(2, 3)$.

assumed as $\begin{pmatrix} a \\ 0 \end{pmatrix}$. Substitute $\begin{pmatrix} a \\ 0 \end{pmatrix}$ in eq.1 we get,

$$(x - a)^2 + (y)^2 = 25 \quad (3)$$

(4)

2 Solution:

As the point $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ passes through the circle, substitute $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ in the equation, we get,

$$(2 - a)^2 + (3)^2 = 25 \quad (5)$$

$$4 + a^2 - 2a + 9 = 25 \quad (6)$$

$$a^2 - 2a + 13 = 25 \quad (7)$$

$$a^2 - 2a - 12 = 0 \quad (8)$$

(9)

The roots of the equation will be $(6, -2)$. Hence, the center of the circle can be $\begin{pmatrix} 6 \\ 0 \end{pmatrix}$ or $\begin{pmatrix} -2 \\ 0 \end{pmatrix}$. The equation of circle will therefore be,

$$(x - 6)^2 + y^2 = 25 \quad (10)$$

$$(x + 2)^2 + y^2 = 25 \quad (11)$$

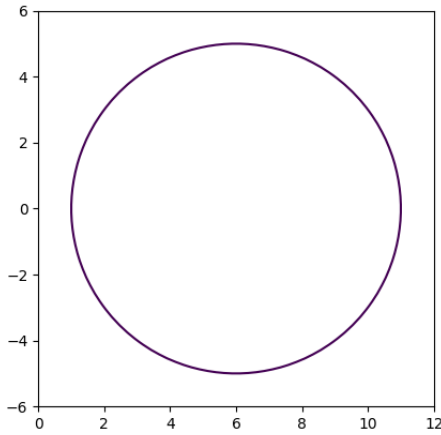


Figure 1: Circle

2.1 Theory:

The circle equation when its center and radius are given is

$$(x - a)^2 + (y - b)^2 = r^2 \quad (1)$$

(2)

where the centre of the circle is $\begin{pmatrix} a \\ b \end{pmatrix}$.

2.2 Mathematical Calculation:

Given the radius of circle is 5. The circle passes through a point $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$. Also, the center of circle is

3 Construction:

variable	length/point	Description
A	np.roots(coeff)	coeff = (1,-4,-12)
c	$(a - A[0])^2 + b^2 - r^2$	Circle Eqn