Question: 11.11.1.15

Nikam Pratik Balasaheb (EE21BTECH11037)

1 Problem

Does the point $\binom{-2.5}{3.5}$ lie inside, outside or on the circle $x^2 + y^2 = 25$?

2 Solution

Given circle equation is,

$$||\mathbf{x}||^2 = 25 \tag{2.0.1}$$

The point \mathbf{x} lies inside a circle with centre \mathbf{O} and radius \mathbf{r} if $||\mathbf{x} - \mathbf{O}||^2 < r^2$. The point lies inside the circle if $||\mathbf{x} - \mathbf{O}||^2 > r^2$. And, the point lies on the circle if $||\mathbf{x} - \mathbf{O}||^2 < r^2$. Here,

$$\|\mathbf{x} - \mathbf{O}\|^2 = \left\| \begin{pmatrix} -2.5 \\ 3.5 \end{pmatrix} \right\|^2 = 18.5 \quad (2.0.2)$$

$$r^2 = 25 \quad (2.0.3)$$

$$r^2 = 25 (2.0.3)$$

$$\implies \|\mathbf{x} - \mathbf{O}\|^2 < r^2 \tag{2.0.4}$$

Therefore, the point lies inside the given circle.

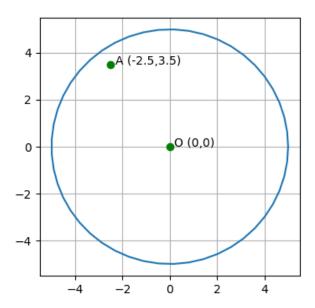


Fig. 0: Figure 1