ASSIGNMENT-5

A.Tejasri

Download all python codes from

https://github.com/tejasri3657/Assignment−5/blob/main/Assignment−5.py

and latex-tikz codes from

https://github.com/tejasri3657/Assignment−5/blob/main/main.tex

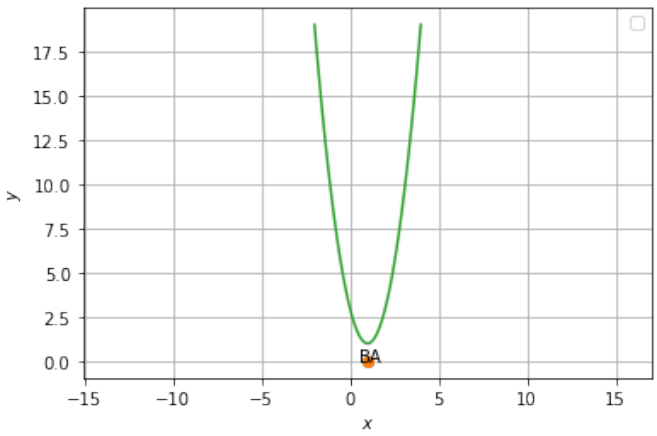

Fig. 2.1: Roots of $2x^2 - 4x + 3 = 0$

1 Question No 2.24

Find the discriminant of the quadratic equation $2x^2 - 4x + 3 = 0$ hence find the nature of its roots.

2 SOLUTION

Given $2x^2 - 4x + 3 = 0$ can be expressed as

$$\mathbf{x}^T \begin{pmatrix} 2 & 0 \\ 0 & 0 \end{pmatrix} \mathbf{x} + \begin{pmatrix} -4 & 0 \end{pmatrix} \mathbf{x} + 3 = 0 \tag{2.0.1}$$

Compare given quadratic equation $2x^2 - 4x + 3 = 0$ with $ax^2 + bx + c = 0$,we get

$$a = 2, b = -4, c = 3 \tag{2.0.2}$$

$$Discriminant(D) = b^2 - 4ac \tag{2.0.3}$$

$$= (-4)^2 - 4(2)(3) \tag{2.0.4}$$

$$= 16 - 24 \tag{2.0.5}$$

$$= -8 \quad (\because D < 0) \tag{2.0.6}$$

Discriminant is negative and the nature of roots of equation $2x^2 - 4x + 3 = 0$ has no real roots.

From the graph the quadratic equation doesn't intersect x-axis. Thus it doesn't have real roots.

It has complex and conjugate roots.