

Assignment 5

Sujal - AI20BTECH11020

Download all latex codes from

<https://github.com/sujal100/EE3900/blob/main/Assignment5/Assignment5.tex>

Download all python codes from

<https://github.com/sujal100/EE3900/blob/main/Assignment5/codes/code.py>

1 PROBLEM

(Quadratic forms Q-2.21) Solve $x^2 + 2 = 0$

2 SOLUTION

To solve the equation - $x^2 + 2 = 0$

The given equation can be represented as follows in the vector form

$$\mathbf{x}^T \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} \mathbf{x} + (0 \ 0) \mathbf{x} + 2 = 0 \quad (2.0.1)$$

where,

$$\mathbf{x} = \begin{pmatrix} x \\ 0 \end{pmatrix} \quad (2.0.2)$$

$$x^2 + 2 = 0 \quad (2.0.3)$$

$$\left(x - \begin{pmatrix} 0 \\ \sqrt{-2} \end{pmatrix} \right) \left(x - \begin{pmatrix} 0 \\ -\sqrt{-2} \end{pmatrix} \right) = 0 \quad (2.0.4)$$

$$x = \begin{pmatrix} 0 \\ \sqrt{-2} \end{pmatrix}, \begin{pmatrix} 0 \\ -\sqrt{-2} \end{pmatrix} \quad (2.0.5)$$

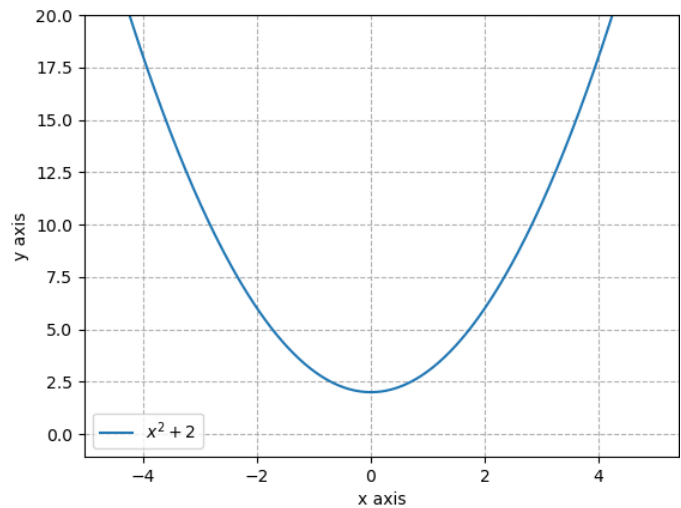


Fig. 0: $x^2 + 2$ generated using python

Figure 0 show that the equation does not intersect the x-axis hence there are no real roots.