ASSIGNMENT 5

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Download all python codes from

https://github.com/balumurisandhyarani550/Assignment5/tree/main/Assignment5

and latex-tikz codes from

https://github.com/balumurisandhyarani550/Assignment5/tree/main/Assignment5

1 Question No 2.18(Quad forms)

Find the zeroes of the quadratic polynomial $x^2 + 7x+10$ and verify the relationship between the zeros and coefficients.

2 SOLUTION

1) The vector form of equation is

$$y = x^2 + 7x + 10 \tag{2.0.1}$$

$$is \tag{2.0.2}$$

$$\mathbf{x}^T \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} \mathbf{x} + \begin{pmatrix} 7 & 0 \end{pmatrix} \mathbf{x} + 10 = 0 \tag{2.0.3}$$

Thus

$$y = 0 \implies x^2 + 7x + 10 = 0 \tag{2.0.4}$$

$$x^2 + 5x + 2x + 10 = 0 \tag{2.0.5}$$

$$(x + 2)(x + 5) = 0 \tag{2.0.6}$$

$$x = -2, -5 \tag{2.0.7}$$

$$\tag{2.0.8}$$

The roots are -2 and -5.

Compare given quadratic equation $x^2+7x+10 = 0$ with $ax^2 + bx + c = 0$,we get

$$a = 1, b = 7, c = 10 \tag{2.0.9}$$

$$The sum of the roots = \frac{-b}{a} \tag{2.0.10}$$

$$= \frac{-7}{1} = -7 \tag{2.0.11}$$

$$The product of roots = \frac{c}{a} \tag{2.0.12}$$

$$= \frac{10}{1} = 10 \tag{2.0.13}$$

$$\tag{2.0.14}$$

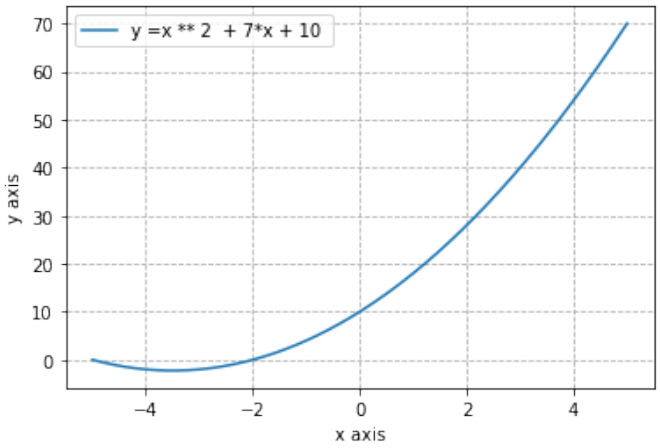

Fig. 2.1: roots of $x^2 + 7x + 10$.