ASSIGNMENT 4

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Download all python codes from

https://github.com/Y.Nagarano/Assignment4/tree/main/codes

and latex-tikz codes from

https://github.com/Y.Nagaranj/Assignment4/tree/main/Assignment4

1 Question No 2.19(Quad forms)

Find the zeroes of the quadratic polynomial x^2-3 and verify the relationship between the zeros and coefficients.

2 SOLUTION

1) The vector form of equation is

$$y = x^2 - 3 \tag{2.0.1}$$

$$\mathbf{x}^T \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} \mathbf{x} + \begin{pmatrix} 0 & 0 \end{pmatrix} \mathbf{x} - 3 = 0 \tag{2.0.2}$$

Thus

$$y = 0 \implies x^2 - 3 = 0 \tag{2.0.3}$$

$$x = \sqrt{3} \tag{2.0.4}$$

The roots are $\alpha = \sqrt{3}$ and $\beta = -\sqrt{3}$.
Compare given quadratic equation $x^2 - 3 = 0$ with $ux^2 + vx + f = 0$,we get
u=1 , v=0 , f= -3.
Sum of the roots

$$\alpha + \beta = \frac{-v}{u} = 0 \tag{2.0.5}$$

product of the roots

$$\alpha\beta = \frac{f}{u} = -3 \tag{2.0.6}$$

where u,v,f are parameters

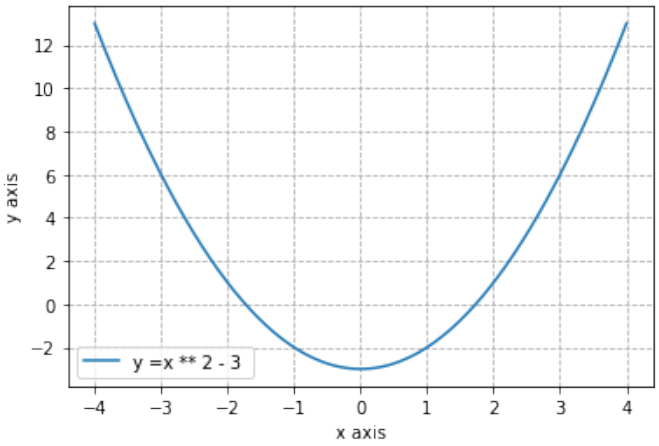

Fig. 2.1: roots of $x^2 - 3$.