

Assignment-2(EE5600)

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EE20MTECH14015

Abstract—This assignment deals with basic linear form.

$$\begin{pmatrix} -3 & 0 \\ 0 & 1 \end{pmatrix} \mathbf{c} = \begin{pmatrix} 9 \\ 0 \end{pmatrix} \quad (2.0.8)$$

Download tex file from

<https://github.com/satyam463/EE5600Ass1/blob/main/Assignment2.tex>

$$\mathbf{c} = \begin{pmatrix} -3 \\ 0 \end{pmatrix} \quad (2.0.9)$$

1 PROBLEM STATEMENT

1.1 Vector2, Example 4, Question No 6

Sketch the loci of the following equation

$$3x = y^2 - 9 \quad (1.1.1)$$

2 SOLUTION

Consider given equation

$$y^2 - 3x - 9 = 0 \quad (2.0.1)$$

2.0.1 can be expressed as

$$\mathbf{x}^T \mathbf{V} \mathbf{x} + 2\mathbf{u}^T \mathbf{x} + f = 0 \quad (2.0.2)$$

with parameters

$$\mathbf{V} = \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}, \mathbf{u} = \begin{pmatrix} -\frac{3}{2} \\ 0 \end{pmatrix}, f = -9 \quad (2.0.3)$$

$$|V| = 0 \quad (2.0.4)$$

Hence, the curve is parabola.

The vertex of parabola can be given as \mathbf{c}

$$\begin{pmatrix} \mathbf{u}^T + \eta \mathbf{p}_1^T \\ V \end{pmatrix} \mathbf{c} = \begin{pmatrix} -f \\ \eta \mathbf{p}_1 - \mathbf{u} \end{pmatrix} \quad (2.0.5)$$

where

$$\eta = \mathbf{p}_1^T \mathbf{u}, \mathbf{p}_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad (2.0.6)$$

$$\begin{pmatrix} -3 & 0 \\ 0 & 0 \\ 0 & 1 \end{pmatrix} \mathbf{c} = \begin{pmatrix} 9 \\ 0 \\ 0 \end{pmatrix} \quad (2.0.7)$$

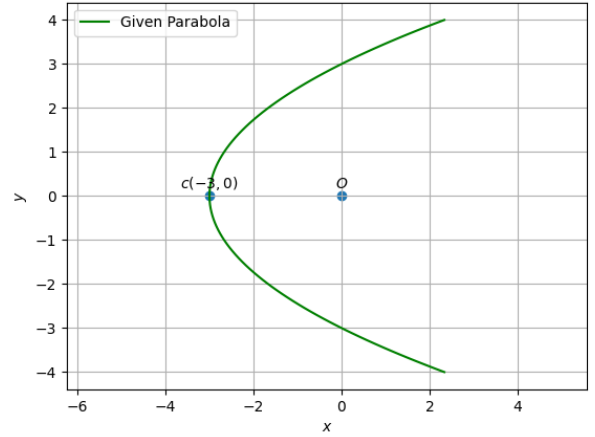


Fig. 0: parabola with vertex $\mathbf{c} \begin{pmatrix} -3 \\ 0 \end{pmatrix}$