

Assignment No.5

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Download latex-tikz codes from

<https://github.com/shishirNIPER/ASSIGNMENT05/blob/main/main.tex>

Download python codes from

<https://github.com/shishirNIPER/ASSIGNMENT05/blob/main/ellipse.py>

Question taken from

Quadratic_forms, exercise 2.28

1 QUESTION No 1

Find the equation of the ellipse whose vertices are $\begin{pmatrix} \pm 13 \\ 0 \end{pmatrix}$ and foci are $\begin{pmatrix} \pm 5 \\ 0 \end{pmatrix}$

2 SOLUTION

We have been provided with values for vertices and foci

The given vertices are- $\begin{pmatrix} \pm 13 \\ 0 \end{pmatrix}$

The given vertices are in the form of $\begin{pmatrix} \pm a \\ 0 \end{pmatrix}$

Here, The major axis is along X axis

The equation of ellipse is of form

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

Thus, based on the values of vertices and equation form

$$a = 13$$

Also, The given coordinate of foci are $\begin{pmatrix} \pm 5 \\ 0 \end{pmatrix}$

We know that foci = $\begin{pmatrix} \pm c \\ 0 \end{pmatrix}$ Thus

$$C = 5$$

We know that,

$$c^2 = a^2 - b^2$$

$$5^2 = 13^2 - b^2$$

$$b^2 = 13^2 - 5^2$$

$$b^2 = 169 - 25$$

$$b^2 = 144$$

The equation of ellipse is-

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

Putting values to get equation for given ellipse-

$$\frac{x^2}{169} + \frac{y^2}{144} = 1$$

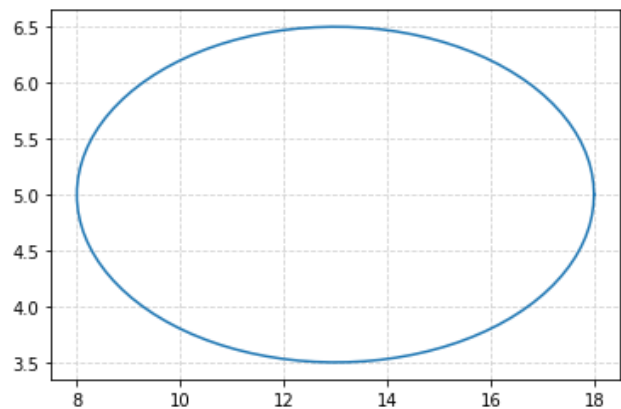


Fig. 0: Ellipse