

Assignment 2

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vector

Abstract—This assignment deals with basic linear form.

Download all python codes from

<https://github.com/NamrataMishra97/Assignment2-EE5600>

and latex codes from

<https://www.overleaf.com/project/614345a6bf02a0749cba133f>

Problem

Vector-2, Example-5, Question-3

Find the equation to the straight line cutting off an intercept 2 from the negative direction of the axis of Y and inclined at 30° to the X-axis.

Solution:

From the given information we have, angle $\theta = 30^\circ$, intercept=-2

$$m = \tan \theta = \tan 30^\circ = \frac{1}{\sqrt{3}}, c = -2 \quad (0.0.1)$$

The direction vector of the line is

$$\mathbf{m} = \begin{pmatrix} 1 \\ m \end{pmatrix} \Rightarrow \mathbf{m} = \begin{pmatrix} 1 \\ \frac{1}{\sqrt{3}} \end{pmatrix} \quad (0.0.2)$$

The normal vector of the line is

$$\mathbf{n} = \begin{pmatrix} \frac{-1}{\sqrt{3}} \\ 1 \end{pmatrix} \quad (0.0.3)$$

Equation of the line in terms of the normal vector is then obtained as

$$\mathbf{n}^T \mathbf{x} = c \quad (0.0.4)$$

$$\begin{pmatrix} \frac{-1}{\sqrt{3}} & 1 \end{pmatrix} \mathbf{x} = -2 \quad (0.0.5)$$

Solve the above equation we get,

$$\begin{pmatrix} -1 & \sqrt{3} \end{pmatrix} \mathbf{x} = -2\sqrt{3} \quad (0.0.6)$$

We get the required equation of the straight line to plot of the line

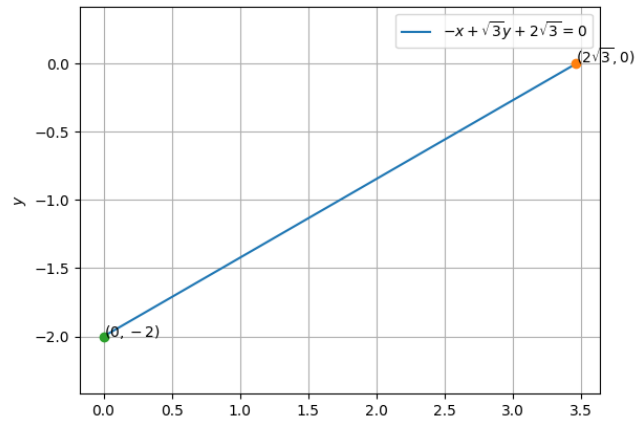


Fig. 0: Plot obtained from python code. We get the required equation.