Assignment-3($EE5600$)

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***Abstract*—This assignment deals with basic linear form.**

Download tex file from

https://github.com/satyam463/EE5600Ass1/blob/main/Assignment3.tex

1 Problem Statement

1.1 Vector2, Example 5, Question No 4

Find the equation to the straight line cutting off an intercept -3 from the axis of y and inclined at an angle $\tan^{-1}\frac{3}{5}$ to the axis of x.

2 Solution

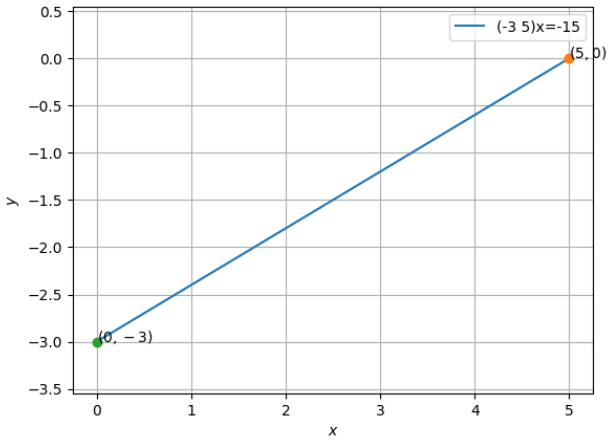

Fig. 0: Required plot of the line $\begin{pmatrix}-3 & 5\end{pmatrix}\mathbf{x} = -15$

Given information:

$$\mathrm{m} = \tan\theta = \frac{3}{5}, c = -3 \text{ (intercept)} \tag{2.0.1}$$

The direction vector of the line is

$$\mathbf{m} = \begin{pmatrix}1\\ m\end{pmatrix} \implies \mathbf{m} = \begin{pmatrix}1\\ \frac{3}{5}\end{pmatrix} \tag{2.0.2}$$

The normal vector of the line is

$$\mathbf{n} = \begin{pmatrix}\frac{-3}{5}\\ 1\end{pmatrix} \tag{2.0.3}$$

Equation of the line is

$$\mathbf{n}^T\mathbf{x} = c \tag{2.0.4}$$

$$\begin{pmatrix}\frac{-3}{5} & 1\end{pmatrix}\mathbf{x} = -3 \tag{2.0.5}$$

$$\begin{pmatrix}-3 & 5\end{pmatrix}\mathbf{x} = -15 \tag{2.0.6}$$

(2.0.6) is the required equation of the line and Fig.0 is the plot of the line.