

Assignment 3

Vishal Mate

Plotting Line

Abstract—This document contains the sketching of the line using points and intercept given.

Download all python codes from

<https://github.com/vishu1302/Assignment3.git>

Download latex-tikz codes from

<https://github.com/vishu1302/Assignment3.git>

1 PROBLEM

Solve: **Problem set: Vector2, Example-5,7(1)**
Find the equation to the straight line which passes through the point (5,6) and has intercept on the axes ,equal in magnitude and both positive.

2 SOLUTION

The line passes through the given point

$$\mathbf{P} = (5, 6)$$

The direction vector of the line having equal intercept is

$$\mathbf{m} = \begin{pmatrix} -1 \\ 1 \end{pmatrix} \quad (2.0.1)$$

The normal vector of the line is

$$\mathbf{n} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} \quad (2.0.2)$$

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

$$\mathbf{n}^T \mathbf{x} - \mathbf{P} = 0 \quad (2.0.3)$$

where P is given point on the line,

$$\begin{aligned} (\mathbf{P}) &= 5, 6 \\ (1 \ 1) \left(x - \frac{5}{6}\right) &= 0 \end{aligned}$$

As intercept are equal, $a = b$

$$(1 \ 1)x - (11) \left(5/6\right) = 0 \quad (2.0.4)$$

resulting in the the equation

$$(1 \ 1)(x) - 11 = 0 \quad (2.0.5)$$

$$(1 \ 1)x = 11 \quad (2.0.6)$$

Finding the equation of line using value of a
Thus the equation of the desired line is

$$(1 \ 1)x = 11 \quad (2.0.7)$$

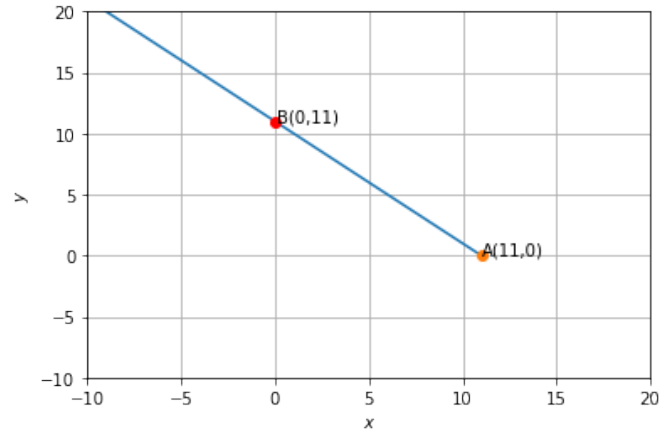


Fig. 1: Plot obtained from Python code