Assignment 1

Anjali Bagade,EE21MTECH11001

Linear form

Abstract—**This document contains the graph of lines**

Download all python codes from

and latex codes from

Problem

Linear form, Example-2, Question-3 (a,c)

Draw the graphs of the following equations

1) $\begin{pmatrix} 1 & 1 \end{pmatrix}\mathbf{x}=4$
2) $\begin{pmatrix} 3 & -1 \end{pmatrix}\mathbf{x}=0$

Solution:

1) Given that,

$$\begin{pmatrix} 1 & 1 \end{pmatrix}\mathbf{x} = 4 \qquad (0.0.1)$$

Let us consider

$$\mathbf{x} = \begin{pmatrix} 0 \\ a \end{pmatrix} \qquad (0.0.2)$$

Substitute above equation in 0.0.1

$$\begin{pmatrix} 1 & 1 \end{pmatrix}\begin{pmatrix} 0 \\ a \end{pmatrix} = 4 \qquad (0.0.3)$$

Solving above equation

$$a = 4 \qquad (0.0.4)$$

Now,Let us consider

$$\mathbf{x} = \begin{pmatrix} b \\ 0 \end{pmatrix} \qquad (0.0.5)$$

Substitute above equation in 0.0.1

$$\begin{pmatrix} 1 & 1 \end{pmatrix}\begin{pmatrix} b \\ 0 \end{pmatrix} = 4 \qquad (0.0.6)$$

Solving above equation

$$b = 4 \qquad (0.0.7)$$

Hence,

$$\mathbf{x} = \begin{pmatrix} 0 \\ 4 \end{pmatrix} and \begin{pmatrix} 4 \\ 0 \end{pmatrix} \qquad (0.0.8)$$

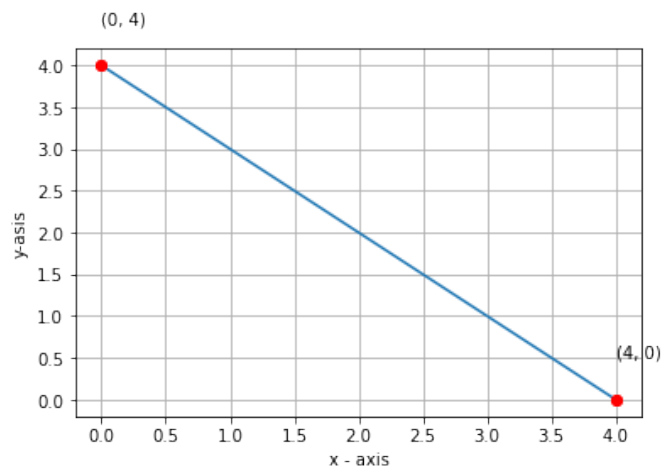Graph of line obtained from Python code is shown below.

Fig. 1: Graph-1

2) Given that,

$$\begin{pmatrix} 3 & -1 \end{pmatrix}\mathbf{x} = 0 \qquad (0.0.9)$$

Let us consider

$$\mathbf{x} = \begin{pmatrix} 0 \\ a \end{pmatrix} \qquad (0.0.10)$$

Substitute above equation in 0.0.9

$$\begin{pmatrix} 3 & -1 \end{pmatrix}\begin{pmatrix} 0 \\ a \end{pmatrix} = 0 \qquad (0.0.11)$$

Solving above equation

$$a = 0 \qquad (0.0.12)$$

Now,Let us consider

$$\mathbf{x} = \begin{pmatrix} a \\ b \end{pmatrix} \qquad (0.0.13)$$

Substitute above equation in 0.0.9

$$\begin{pmatrix} 3 & -1 \end{pmatrix} \begin{pmatrix} a \\ b \end{pmatrix} = 0 \qquad (0.0.14)$$

Solving above equation

$$3a = b \qquad (0.0.15)$$

If a=1 then b=3 Hence,

$$\mathbf{x} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} and \begin{pmatrix} 1 \\ 3 \end{pmatrix} \qquad (0.0.16)$$
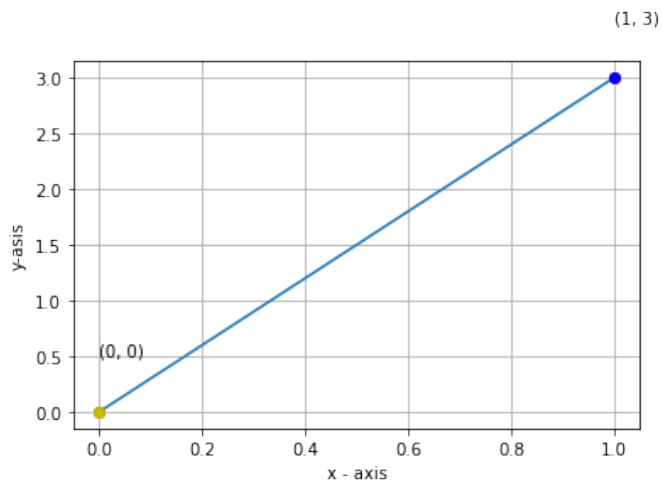
Graph of line obtained from Python code is shown below.

Fig. 2: Graph-2