Assignment - 4

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Download all and latex-tikz codes from

svn co https://github.com/Ganeshyadav712/Assignment−4.git

Question taken from

https://github.com/gadepall/ncert/blob/main/linalg/linear_forms/gvv_ncert_linear_forms.pdf− 2.3 a,c

1 Question

Draw the graphs of the following equations

$$a)\begin{pmatrix}1 & 1\end{pmatrix}\mathbf{x} = 4 \tag{1}$$

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

2 Solution

$$\begin{pmatrix}1 & 1\end{pmatrix}\mathbf{x} = 4 \tag{3}$$

let x=$\begin{pmatrix}a\\0\end{pmatrix}$ substitute in (3)

$$\begin{pmatrix}1 & 1\end{pmatrix}\begin{pmatrix}a\\0\end{pmatrix} = 4 \tag{4}$$

$$a = 4 \tag{5}$$

similarly let x=$\begin{pmatrix}0\\b\end{pmatrix}$substitute in (3)

$$\begin{pmatrix}1 & 1\end{pmatrix}\begin{pmatrix}0\\b\end{pmatrix} = 4 \tag{6}$$

$$b = 4 \tag{7}$$

intercept on X and Y axis for equation 1 can be

$$\mathbf{A} = \begin{pmatrix}4\\0\end{pmatrix}, \mathbf{B} = \begin{pmatrix}0\\4\end{pmatrix}$$

$$(b)\begin{pmatrix}3 & -1\end{pmatrix}\mathbf{x} = 0 \tag{8}$$

In this equation there is no constant thus line passes through origin,
so

$$\mathbf{P} = \begin{pmatrix}0\\0\end{pmatrix} \tag{9}$$

for **Q** point,
let x=$\begin{pmatrix}x\\y\end{pmatrix}$ substitute in (8)

$$\begin{pmatrix}3 & -1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix} = 0 \tag{10}$$

$$x = 2 \tag{11}$$

$$\implies y = 6 \tag{12}$$

$$\mathbf{Q} = \begin{pmatrix}2\\6\end{pmatrix} \tag{13}$$

$$\mathbf{P} = \begin{pmatrix}0\\0\end{pmatrix}, \mathbf{Q} = \begin{pmatrix}2\\6\end{pmatrix}$$

Graphs of the both equations constructed by using python as

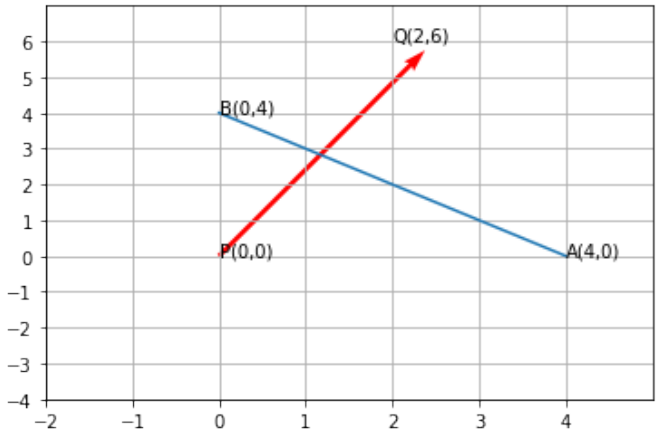

Fig. 2.1. Graph 4