Assignment No.4

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Download latex-tikz codes from

https://github.com/shishirNIPER/ASSIGNMENT04/blob/main/main.tex

Download python codes from

https://github.com/shishirNIPER/ASSIGNMENT04/blob/main/untitled29.py

Question taken from

linear_form, exercises 2.3,b,e

1 Question No 1

Draw the graphs of the following equations

$$a)\ \begin{pmatrix}1 & -1\end{pmatrix}\mathbf{x} = 2 \tag{1.0.1}$$

$$b)\ \begin{pmatrix}1 & -1\end{pmatrix}\mathbf{x} = 0 \tag{1.0.2}$$

2 Solution

a) put $\mathbf{x} = \begin{pmatrix}x\\0\end{pmatrix}$

$$\begin{pmatrix}1 & -1\end{pmatrix}\begin{pmatrix}x\\0\end{pmatrix} = 2 \tag{2.0.1}$$

$$\implies x = 2 \tag{2.0.2}$$

put $\mathbf{x} = \begin{pmatrix}0\\y\end{pmatrix}$

$$\begin{pmatrix}1 & -1\end{pmatrix}\begin{pmatrix}0\\y\end{pmatrix} = 2 \tag{2.0.3}$$

$$\implies y = -2 \tag{2.0.4}$$

$$\mathbf{P} = \begin{pmatrix}2\\0\end{pmatrix}, \mathbf{Q} = \begin{pmatrix}0\\-2\end{pmatrix} \tag{2.0.5}$$

b)

1) there is no constant in the line equation thus it passes through the origin

put $\mathbf{x} = \begin{pmatrix}1\\y\end{pmatrix}$ in equation

$$\mathbf{A} = \begin{pmatrix}0\\0\end{pmatrix}, \mathbf{B} = \begin{pmatrix}1\\1\end{pmatrix} \tag{2.0.6}$$

Graphs using python are constructed for equations (a) and (b)

The obtained lines have equal slope and their y-intercepts are different, Thus obtained lines can be said to be parallel

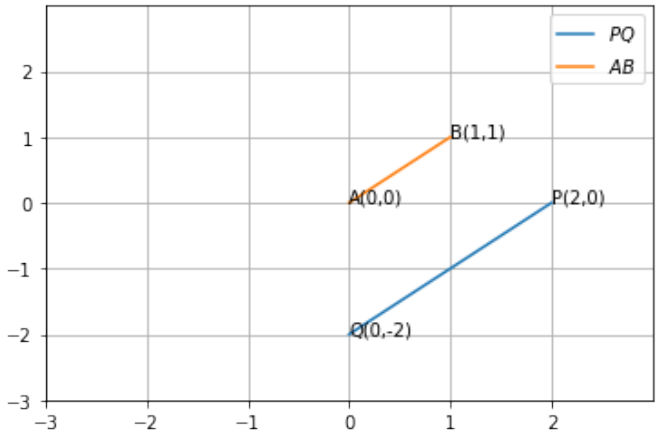

Fig. 2.1: Graphs of Equations (a) and (b)