Assignment 3

Priyanka - EE21MTECH12002

Download all python codes from

https://github.com/PeriPriyanka/Linear_forms_assign/Assignment3/code

and latex-tikz codes from

https://github.com/PeriPriyanka/Linear_forms_assign/Assignment3

1 Problem

(Linear forms 2.3) Draw the graphs of the following equations

$$\begin{pmatrix}1 & 1\end{pmatrix}\mathbf{X} = 4 \tag{1.0.1}$$

$$\begin{pmatrix}1 & -1\end{pmatrix}\mathbf{X} = 2 \tag{1.0.2}$$

$$\begin{pmatrix}3 & -1\end{pmatrix}\mathbf{X} = 0 \tag{1.0.3}$$

2 Solution

Consider the equation (1.0.1)

$$\begin{pmatrix}1 & 1\end{pmatrix}\mathbf{X} = 4 \tag{2.0.1}$$

where,

$$\mathbf{X} = \begin{pmatrix}x\\y\end{pmatrix} \tag{2.0.2}$$

By performing matrix multiplication

$$\begin{pmatrix}1 & 1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix} = 4 \tag{2.0.3}$$

$$\mathbf{AB} = \mathbf{x} + \mathbf{y} = 4 \tag{2.0.4}$$

Point Vector

$$\overrightarrow{AB} = \overrightarrow{B} - \overrightarrow{A} \tag{2.0.5}$$

$$\overrightarrow{AB} = \begin{pmatrix}4\\0\end{pmatrix} - \begin{pmatrix}0\\4\end{pmatrix} \tag{2.0.6}$$

$$\overrightarrow{AB} = \begin{pmatrix}4\\-4\end{pmatrix} \tag{2.0.7}$$

Consider the equation (1.0.2)

$$\begin{pmatrix}1 & -1\end{pmatrix}\mathbf{X} = 2 \tag{2.0.8}$$

By performing matrix multiplication

$$\begin{pmatrix}1 & -1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix} = 2 \tag{2.0.9}$$

$$\mathbf{CD} = \mathbf{x} - \mathbf{y} = 2 \tag{2.0.10}$$

Point Vector

$$\overrightarrow{CD} = \overrightarrow{D} - \overrightarrow{C} \tag{2.0.11}$$

$$\overrightarrow{CD} = \begin{pmatrix}2\\0\end{pmatrix} - \begin{pmatrix}0\\-2\end{pmatrix} \tag{2.0.12}$$

$$\overrightarrow{CD} = \begin{pmatrix}2\\2\end{pmatrix} \tag{2.0.13}$$

Consider the equation (1.0.3)

$$\begin{pmatrix}3 & -1\end{pmatrix}\mathbf{X} = 0 \tag{2.0.14}$$

By performing matrix multiplication

$$\begin{pmatrix}3 & -1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix} = 0 \tag{2.0.15}$$

$$\mathbf{EF} = \mathbf{3x} - \mathbf{y} = 0 \tag{2.0.16}$$

Point Vector

$$\overrightarrow{EF} = \overrightarrow{F} - \overrightarrow{E} \tag{2.0.17}$$

$$\overrightarrow{EF} = \begin{pmatrix}0\\0\end{pmatrix} - \begin{pmatrix}2\\6\end{pmatrix} \tag{2.0.18}$$

$$\overrightarrow{EF} = \begin{pmatrix}-2\\-6\end{pmatrix} \tag{2.0.19}$$

Lines AB, CD, EF are shown in the Fig0

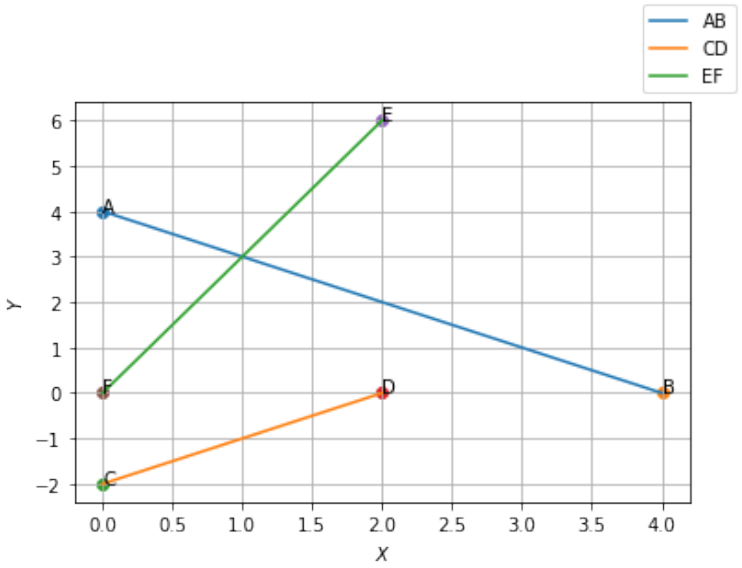

Fig. 0: Plot of 2D Lines.