Assignment 1

M Pavan Manesh

***Abstract*—This document explains the equation of the line passing through the point of intersection of the lines that has equal intercepts on the axes**

Download all python codes from

https://github.com/pavanmanesh/EE5609/tree/master/codes

and latex-tikz codes from

https://github.com/pavanmanesh/EE5609

1 Problem

Find the equation of the line passing through the point of intersection of the lines

$$\begin{pmatrix}4 & 7\end{pmatrix}\mathbf{x} = 3. \tag{1.0.1}$$

$$\begin{pmatrix}2 & -3\end{pmatrix}\mathbf{x} = -1. \tag{1.0.2}$$

that has equal intercepts on the axes

2 Explanation

1 Find the point of intersection of the two lines . $\begin{pmatrix}4 & 7\end{pmatrix}\mathbf{x}$=3 and $\begin{pmatrix}2 & -3\end{pmatrix}\mathbf{x}$=-1

This is done finding the solution of the linear equations

The above line equations can be expressed as the matrix equation

$$\begin{bmatrix}4 & 7\\ 2 & -3\end{bmatrix}\mathbf{x} = \begin{bmatrix}3\\ -1\end{bmatrix}$$

2 Calculate the value of x using matrix inversion method.

$$\mathbf{x} = \begin{bmatrix}0.07692307692307682\\ -10.38461538461538464\end{bmatrix}$$

3 Solution

The standard equation with the intercepts is : x/a +y/b =1. As per the question ,a=b

so the line equation becomes x+y = a

Required line equation passing through the point of intersection is x+y=0.46153846153846145