EE5600 Assignment 2

Perabhattula Venkatesh
AI20MTECH01004

***Abstract*—This document contains the solution to a Equation of the lines problem.**

Download all python and latex codes from

https://github.com/venky-p/EE5600/Assignment_2

1 Problem

Problem Set: Vector2, Example V, Problem 8

1.1. Find the equations to the straight lines which pass through the point $\begin{pmatrix}1\\-2\end{pmatrix}$ and cut off equal distances from the two axes.

2 Solution

Given: Line passes through

$$x_0 = \begin{pmatrix}1\\-2\end{pmatrix} \tag{2.1.1}$$

Line 1:

$$\frac{x}{a} + \frac{y}{a} = 1 \tag{2.1.2}$$

Rewriting above equation,

$$\begin{pmatrix}1 & 1\end{pmatrix}\mathbf{x} = a \tag{2.1.3}$$

We know that, Line passes through (2.1.1),

$$\begin{pmatrix}1 & 1\end{pmatrix}\begin{pmatrix}1\\-2\end{pmatrix} = a \tag{2.1.4}$$

$$\implies a = -1 \tag{2.1.5}$$

By Substituting (2.1.5) in (2.1.3), We get the Line 1 equation

$$\boxed{\begin{pmatrix}1 & 1\end{pmatrix}\mathbf{x} = -1} \tag{2.1.6}$$

Line 2:

$$\frac{x}{a} + \frac{y}{-a} = 1 \tag{2.1.7}$$

Rewriting above equation,

$$\begin{pmatrix}1 & -1\end{pmatrix}\mathbf{x} = a \tag{2.1.8}$$

We know that, Line passes through (2.1.1),

$$\begin{pmatrix}1 & -1\end{pmatrix}\begin{pmatrix}1\\-2\end{pmatrix} = a \tag{2.1.9}$$

$$\implies a = 3 \tag{2.1.10}$$

By Substituting (2.1.10) in (2.1.8), We get the Line 2 equation

$$\boxed{\begin{pmatrix}1 & -1\end{pmatrix}\mathbf{x} = 3} \tag{2.1.11}$$

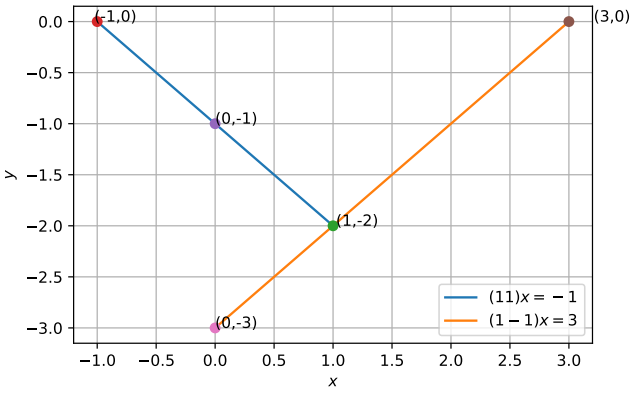

Fig. 2.1: Plot obtained from Python code