Assignment 2

Sujal - AI20BTECH11020

Download all latex codes from

https://github.com/https://github.com/sujal100/EE3900/blob/main/Assignment2/Assignment2.tex

Download all python codes from

https://github.com/https://github.com/sujal100/EE3900/blob/main/Assignment2/codes/

1 Problem

(Matrix 2.11) If $x\begin{pmatrix}2\\3\end{pmatrix}+y\begin{pmatrix}-1\\1\end{pmatrix}=\begin{pmatrix}10\\5\end{pmatrix}$, find the values of x and y.

2 Solution

Given equation can be represented in a form as

$$\begin{pmatrix}2 & -1\\3 & 1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}10\\5\end{pmatrix} \tag{2.0.1}$$

The corresponding augmented matrix is

$$\left(\begin{array}{cc|c}2 & -1 & 10\\3 & 1 & 5\end{array}\right) \tag{2.0.2}$$

We use the Guass Jordan Elimination method as:

$$\left(\begin{array}{cc|c}2 & -1 & 10\\3 & 1 & 5\end{array}\right) \tag{2.0.3}$$

$$\xleftrightarrow{R_2\to R_2-\frac{3}{2}R_1}\left(\begin{array}{cc|c}2 & -1 & 10\\0 & \frac{5}{2} & -10\end{array}\right) \tag{2.0.4}$$

$$\xleftrightarrow{R_2\to\frac{2}{5}R_2}\left(\begin{array}{cc|c}2 & -1 & 10\\0 & 1 & -4\end{array}\right) \tag{2.0.5}$$

$$\xleftrightarrow{R_1\to R_1+R_2}\left(\begin{array}{cc|c}2 & 0 & 6\\0 & 1 & -4\end{array}\right) \tag{2.0.6}$$

$$\xleftrightarrow{R_1\to\frac{1}{2}R_1}\left(\begin{array}{cc|c}1 & 0 & 3\\0 & 1 & -4\end{array}\right) \tag{2.0.7}$$

Therefore, the values of x and y are:

$$x=3 \tag{2.0.8}$$

$$y=-4 \tag{2.0.9}$$

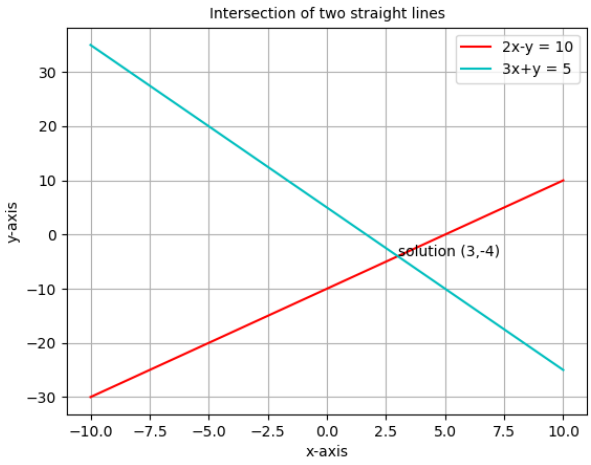

Fig. 0: Plot of the line