

ASSIGNMENT 1 - EE5600

RS Girish - EE20RESCH14005*

CONTENTS

1	Problem	1
2	Solution	1

Abstract—This paper contains solution to problem no 17 of Lines and Planes section. Links to Python codes are available below.

Download python codes using

<https://github.com/rsgirishkumar/Assignment1/codes/>

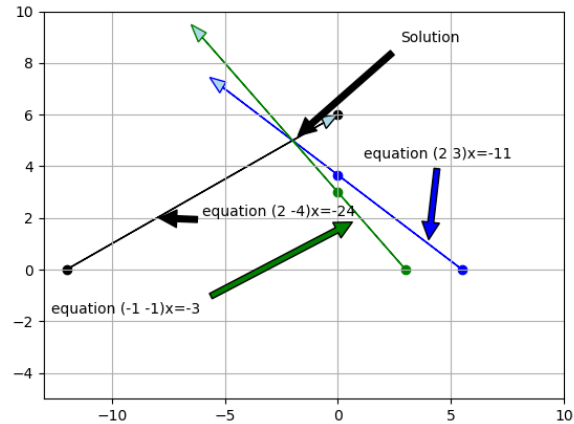


Fig. 0: System of Equations displaying intersecting at a point (-2 5).

1 PROBLEM

Find m if

$$\begin{pmatrix} 2 & 3 \end{pmatrix} \mathbf{x} = 11 \quad (1.0.1)$$

$$\begin{pmatrix} 2 & -4 \end{pmatrix} \mathbf{x} = -24 \quad (1.0.2)$$

$$\begin{pmatrix} m & -1 \end{pmatrix} \mathbf{x} = -3 \quad (1.0.3)$$

2 SOLUTION

Given, the system of equations in matrix equation format are as below

$$\begin{pmatrix} 2 & 3 \\ 2 & -4 \\ m & -1 \end{pmatrix} \mathbf{x} = \begin{pmatrix} 11 \\ -24 \\ -3 \end{pmatrix} \quad (2.0.1)$$

Step1: Assuming the system of equations are consistent, let's reduce the augmented matrix $[A'b]$, to

find the value of m .

$$\begin{pmatrix} 2 & 3 & 11 \\ 2 & -4 & -24 \\ m & -1 & -3 \end{pmatrix} \xrightarrow{R_2 \leftarrow R_2 - R_1} \begin{pmatrix} 2 & 3 & 11 \\ 0 & -7 & -35 \\ m & -1 & -3 \end{pmatrix} \xrightarrow{R_3 \leftarrow 2R_3 + R_1} \begin{pmatrix} 2 & 3 & 11 \\ 0 & -7 & -35 \\ 2m+2 & 1 & 5 \end{pmatrix} \xrightarrow{R_3 \leftarrow R_2 + 7R_3} \begin{pmatrix} 2 & 3 & 11 \\ 0 & -7 & -35 \\ 14m+14 & 0 & 0 \end{pmatrix} \quad (2.0.2)$$

Since the system of equations are assumed consistent,

$$\begin{aligned} \Rightarrow 14m + 14 &= 0 \\ \Rightarrow m &= -1 \end{aligned} \quad (2.0.3)$$

Step2: The system of equations can be represented as vectors as below:

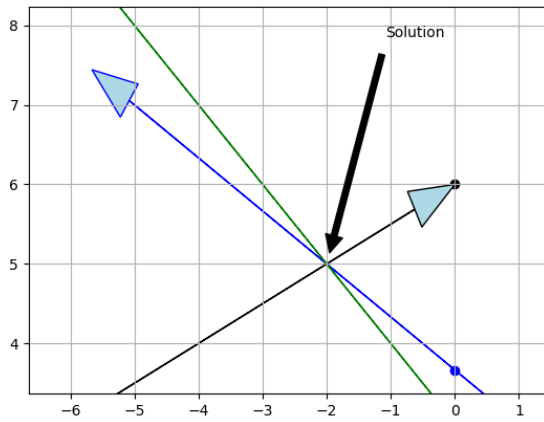


Fig. 0: A zoomed in view of System of Equations displaying intersecting at a point $(-2, 5)$.