Assignment-2

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***Abstract*—This document contains the procedure to solve system of linear equations using matrix method.**

Download the python code from

https://github.com/ankuraditya13/Assignment2

and latex-file codes from

https://github.com/ankuraditya13/Assignment2

1 Problem

Solve the system linear equations,using matrix method.

$$5x + 2y = 4 \tag{1.0.1}$$

$$7x + 3y = 5 \tag{1.0.2}$$

2 Solution

The above equations can be expressed in vector form as,

$$\begin{pmatrix}5 & 2\end{pmatrix}\mathbf{x} = 4 \tag{2.0.1}$$

$$\begin{pmatrix}7 & 3\end{pmatrix}\mathbf{x} = 5 \tag{2.0.2}$$

Now, writing it in the matrix form as,

$$\begin{pmatrix}5 & 2\\ 7 & 3\end{pmatrix}\mathbf{x} = \begin{pmatrix}4\\ 5\end{pmatrix} \tag{2.0.3}$$

The augmented matrix of above equation is solved by row reduction as follows

$$\begin{pmatrix}5 & 2 & 4\\ 7 & 3 & 5\end{pmatrix} \xleftrightarrow{R_2 \leftarrow R_2 - \left(\frac{7}{5}\right)R_1} \begin{pmatrix}5 & 2 & 4\\ 0 & \frac{1}{5} & \frac{-3}{5}\end{pmatrix} \tag{2.0.4}$$

$$\xleftrightarrow{R_1 \leftarrow R_1 - 10R_2} \begin{pmatrix}5 & 0 & 10\\ 0 & \frac{1}{5} & \frac{-3}{5}\end{pmatrix} \tag{2.0.5}$$

$$\implies \mathbf{x} = \begin{pmatrix}2\\ -3\end{pmatrix} \tag{2.0.6}$$

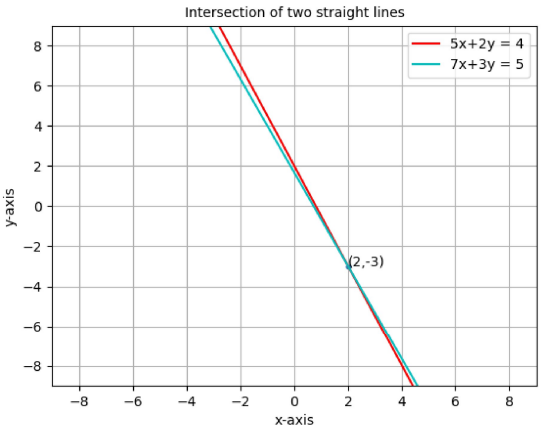

Fig. 0: Intersection of 2 lines