5.2.7

EE25BTECH11004 - Aditya Appana

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Question

Solve the following system of linear equations.

$$\frac{3}{2}x + \frac{5}{3}y = 7$$
$$9x - 10y = 14$$

Solution

Organizing the given equations into an augmented matrix:

$$\begin{pmatrix} \frac{3}{2} & \frac{5}{3} & 7 \\ 9 & -10 & 14 \end{pmatrix} \tag{1}$$

Performing row operations:

$$\begin{pmatrix} \frac{3}{2} & \frac{5}{3} & 7 \\ 9 & -10 & 14 \end{pmatrix} \xrightarrow{\mathrm{R}_2 \to \mathrm{R}_2 - 6R_1} \begin{pmatrix} \frac{3}{2} & \frac{5}{3} & 7 \\ 0 & -20 & -28 \end{pmatrix} \xrightarrow{\mathrm{R}_1 \to \mathrm{R}_1 + \frac{1}{12}R_2} \begin{pmatrix} \frac{3}{2} & 0 & \frac{14}{3} \\ 0 & -20 & -28 \end{pmatrix} \tag{2}$$

Solving, we get the solution as:

$$\mathbf{x} = \begin{pmatrix} \frac{28}{9} \\ \frac{7}{5} \end{pmatrix} \tag{3}$$

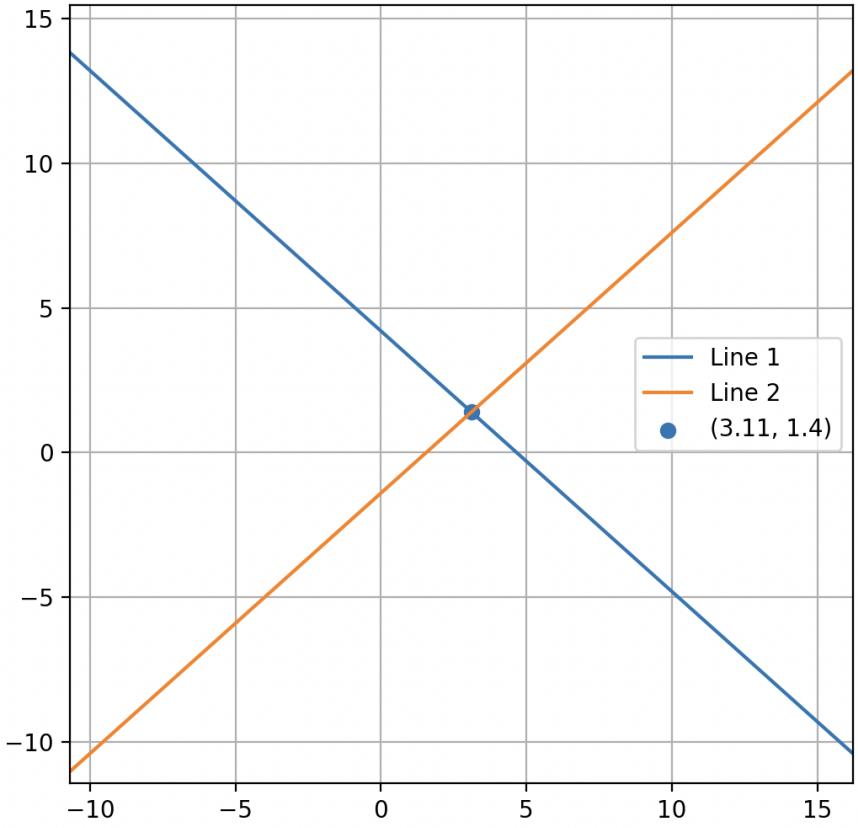

Figure 1: Plot