

# 5.2.26

EE25BTECH11023 - Venkata Sai

**Question:**

Solve the following system of linear equations

$$\frac{x}{a} - \frac{y}{b} = 0 \quad (1)$$

$$ax + by = a^2 + b^2 \quad (2)$$

**Solution:** Given

$$\frac{x}{a} - \frac{y}{b} = 0 \implies bx = ay \quad (3)$$

$$bx - ay = 0 \quad (4)$$

$$ax + by = a^2 + b^2 \quad (5)$$

As a matrix equation

$$\left( \begin{array}{cc|c} b & -a & 0 \\ a & b & a^2 + b^2 \end{array} \right) \xrightarrow{R_2 \rightarrow bR_2 - aR_1} \left( \begin{array}{cc|c} b & -a & 0 \\ 0 & b^2 + a^2 & (a^2 + b^2)b \end{array} \right) \quad (6)$$

$$(b^2 + a^2)y = (a^2 + b^2)b \quad (7)$$

$$\implies y = b \quad (8)$$

Substituting in equation (3)

$$bx = ab \implies x = a \quad (9)$$

Hence  $x = a, y = b$  is the solution for given system of linear equations

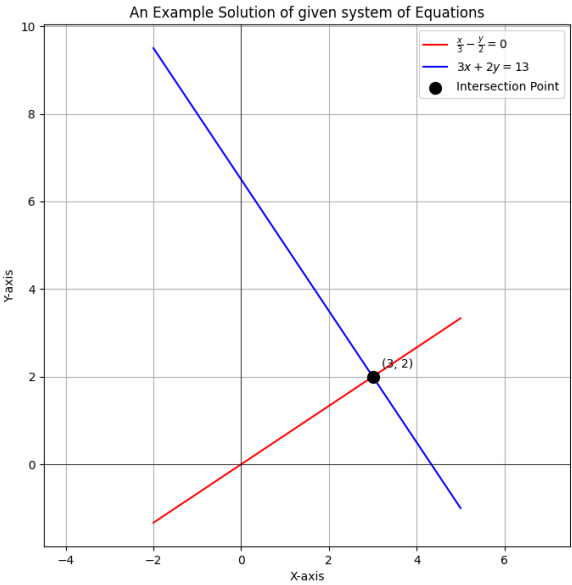


Fig. 0.1