

GATE 2018 SYLLABI

Unique, Infinite, Many, Consistent, Inconsistent Solutions ?

$$1) a_1x + b_1y = c_1$$

$$2) a_2x + b_2y = c_2$$

If

$$a_1/a_2 \neq b_1/b_2$$

Then, its called unique solution. it means intercepting lines. Its also called consistent solution.

If

$$a_1/a_2 = b_1/b_2 \neq c_1/c_2$$

Than its called no solution. It means parallel lines. Its also called inconsistent solution.

If

$$a_1/a_2 = b_1/b_2 = c_1/c_2$$

Than, its called infinite many soluiton. It means coincident lines. Its also called consistent solution.

For example-

$$\begin{aligned}
 & \textcircled{1} \quad \frac{3}{2}x + \frac{5}{3}y = 7 \\
 & \textcircled{2} \quad 9x - 10y = 14 \\
 & \text{Equ. ① can be standardized, } \textcircled{1} \times 6, \\
 & \quad 9x + 10y = 42 \\
 & \text{Now, } \textcircled{1} \quad 9x + 10y = 42 \\
 & \quad \textcircled{2} \quad 9x - 10y = 14 \\
 & \quad a_1 = 9, b_1 = 10, c_1 = 42 \\
 & \quad a_2 = 9, b_2 = -10, c_2 = 14 \\
 & \Rightarrow \frac{a_1}{a_2} = \frac{9}{9} = 1, \frac{b_1}{b_2} = \frac{10}{-10} = -1, \frac{c_1}{c_2} = \frac{42}{14} = 3 \\
 & \Rightarrow \frac{a_1}{a_2} \neq \frac{b_1}{b_2}, \text{ unique solution,} \\
 & \quad \text{intersecting lines.}
 \end{aligned}$$

Related Posts:

2. Normal Forms
3. L-HOSPITAL RULE
4. Static Single Assignment
6. Birthday Attack