GATE 2018 SYLLABI

Unique, Infinite, Many, Consistent, Inconsistent Solutions ?

1) $a_1x + b_1y = c_1$

2) $a_2x + b_2y = c_2$

If

$a_1/a_2 \neq b_1/b_2$

Than, 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-

$$① \quad \frac{3}{2}x + \frac{5}{3}y = 7$$

$$② \quad 9x - 10y = 14$$

Equ ① can be standardized, ①×6,

$$9x + 10y = 42$$

Now, ① $9x + 10y = 42$

② $9x - 10y = 14$

$a_1 = 9, \ b_1 = 10, \ c_1 = 42$

$a_2 = 9, \ b_2 = -10, \ c_2 = 14$

$\Rightarrow \frac{a_1}{a_2} = \frac{9}{9} = 1, \ \frac{b_1}{b_2} = \frac{10}{-10} = -1, \ \frac{c_1}{c_2} = \frac{42}{14} = 3$

$\Rightarrow \frac{a_1}{a_2} \neq \frac{b_1}{b_2}$, unique solution, intersecting lines.

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