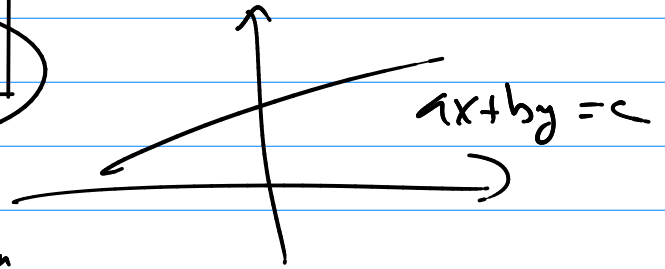


Math 511

Systems of Linear Equations



Vars: x_1, x_2, \dots, x_n
Coef: a_1, a_2, \dots, a_n

$$a_1 x_1 + a_2 x_2 + \dots + a_n x_n = b$$

eqn 1	[$a_{11} x_1 + a_{12} x_2 + \dots + a_{1n} x_n = b_1$	Solve? ① ∞ solns or ② 0 solns or ③ 1 soln
eqn 2		$a_{21} x_1 + a_{22} x_2 + \dots + a_{2n} x_n = b_2$	
:			
eqn M		$a_{m1} x_1 + a_{m2} x_2 + \dots + a_{mn} x_n = b_m$	

$M > n$ more eqn's than variables \rightarrow typically 0 solns

$M < n$ less eqn's than variables \rightarrow typically ∞ solns

$M = n \rightarrow$ typically 1 soln.

our usual goal

Solving: (Review)

① Substitution \checkmark

② Elimination (using row ops) \checkmark

Over det.

Under det.