

MATHEMATICS DEPARTMENT  
North Carolina State University

ALGEBRA SEMINAR

Wednesday, March 23, 2005

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NC State University

How Many Solutions?

**ABSTRACT:** Given a system of linear equations  $L$ , gaussian elimination allows one to transform this system to a new triangulated system from which one can easily read off answers to the following questions: Is  $L$  consistent, that is, does it have at least one solution? If  $L$  is consistent, does it have a unique solution? If  $L$  has more than one solution, what is the dimension of the space of solutions?

I am proposing to teach the course MA591G: Computational Algebraic Geometry in the Fall of 2005 where we will develop the theory (algebraic geometry) and algorithms that allow one to deal with similar questions for general polynomial systems. We will study algebraic varieties (= solution sets of systems of polynomial equations) and explore the notions of Groebner bases, elimination theory, affine and projective geometry and special topics (depending on the tastes and backgrounds of the students) such as sparse polynomial systems and applications to integer programming, coding theory and algebraic statistics.

In this short talk, I will give a taste of the flavor of the course by discussing the many answers to the question: Given a system of polynomial equations, how many solutions can we have?

1:30 - 2:00 pm    HA 370

Faculty and Students are invited to attend.