

MATH 5342 (02) Groebner Bases and Applications

Summer II 2006

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Groebner bases are one of the most widely applied algebraic tools. They are used in the study of properties of sets of polynomials in several variables, in finding solutions of systems of polynomial equations and, among other applications, in deciding invertibility of polynomial mappings. Many disciplines in which some mathematical models involve polynomials are enjoying the benefits of this theory. Examples of subjects, other than algebra, in which Groebner bases are used are statistics, cryptography and control theory.

In this course we will study Groebner bases, their properties and applications. Particular emphasis will be given to algorithms.

The prerequisite for this course is Linear Algebra.

The text will be “Using algebraic geometry” by Cox, Little and O’Shea.

There will be a Maple lab session each Friday. The worksheets completed on each session will provide 70% of the course points. The other 30% will be assigned to class participation. Previous knowledge of Maple is not required, we will start with the Groebner package from the beginning.