

INITIAL IDEALS OF GENERIC IDEALS AND THE MORENO-SOCIÁS CONJECTURE

Edith Aguirre, University of Texas at El Paso; Juan Ariel Ortiz-Navarro, University of Puerto Rico-Humacao; Rogelio Torrez, Arizona State University.

Faculty Advisor: Reinhard Laubenbacher, New Mexico State University

Many problems in science and engineering can be modeled by systems of polynomial equations in several variables. Finding numerical solutions to such systems is an important mathematical problem. Several recent approaches combine numerical with symbolic techniques that rely on methods from computational algebra. Treating collections of polynomials symbolically is best accomplished by studying the ideal in the ring of polynomials generated by the system one wants to solve. An important ingredient in symbolic methods is an ordering of terms in the multivariate polynomials similar to the univariate case and an understanding of the ideal I generated by these polynomials. The ideal $\{LT(I)\}$ of leading terms of I contains important information about I , but is in general difficult to describe. Our topic for this presentation is the structure of $\{LT(I)\}$ for a so-called *generic* ideal $I \subset k[x_1, \dots, x_n]$, k a field, generated by a collection of polynomials f_1, \dots, f_n . We present special cases of a conjecture by Moreno-Sociás, which characterizes a closure property of the ideal of leading terms with respect to certain term orders.