

1135-13-3255

Craig L. Huneke*, 400 Emmet Street South, Charlottesville, VA 22904. *How complicated are polynomials in many variables?*

The title question refers to systems of polynomial equations in many variables over a field. It can be made precise in many ways, for example, through the complexity of detecting whether a given polynomial can be expressed as a linear combination (with polynomial coefficients) of other polynomials.

Another sense in which it can be made precise is through comparisons of numerical data about the ideal generated by the polynomial equations, which generalize the numbers of generators and relations. This additional numerical data was originally introduced in the 1890's by David Hilbert to "count" the number of polynomial invariants of the action of a group (this was the work that "killed" invariant theory for a brief time!). In the last two years, three long-standing problems about these numerical invariants have been solved.

This talk will introduce the main players in this story: Hilbert functions, free resolutions, projective dimension, Betti numbers, and regularity. The first part of the talk will be historical and introductory, and the second half will focus on the solution of Ananyan and Hochster of Stillman's conjecture. (Received October 12, 2017)