

BI-CO MATH

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" Syzygies, Hilbert polynomials, and matrix varieties

Monday, November 14, 2016

Talk at 4:00 H109

Tea at 3:30 KINSC Math Lounge, H208

Abstract

Given N equations in M unknowns, a helpful intuition is that the solution space should have dimension $M - N$. Unfortunately, many useful and interesting spaces break this idea--they require many, many equations, so that even basic geometric facts (like their size) are unclear. Hilbert, in the 1890s, found a solution: he looked at partial redundancies in systems of equations--called "syzygies"--and introduced the Hilbert polynomial, an invariant that accurately computes the dimension (and more) of the space solutions.

We'll talk about Hilbert polynomials and their refinements: Betti tables, which detect a wealth of geometric and algebraic data. My own research is classifying Betti tables, outlining the behaviors we can encounter for matrix varieties, determinantal loci and other spaces coming from linear algebra.

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