Harvard-M.I.T. Algebraic Geometry Seminar

MULTIPLE BASE POINTS OF LINEAR SERIES

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Given a generic collection of points in $\mathbb{C}^n$, may we find a polynomial of degree m whose partial derivatives up to a given order k have prescribed values? And, if not, we wish to count the number of obstructions to the existence of such a polynomial. This information amounts to finding the Hilbert function of a multiple point scheme $\mathcal{Z}$ supported on $\Gamma \subset \mathbb{P}^n$.

In the case of $\mathbb{P}^2$ one expects that the **maximal rank property** should usually hold; that is, the Hilbert function behaves just as that of a general collection of (reduced) points. The conjecture of Segre–Harbourne–Hirschowitz specifies precisely when the maximal rank property holds, based on natural intersection obstructions.

In higher dimnesion, however, there are "many more" exceptions to maximal rank. This motivated conjectures of Iarrobino on the Hilbert function values, which I shall describe geometrically. The main focus will be the proof of the weak conjecture. I shall comment on construction of counterexamples to the strong one and the search for its revision.

Tuesday, May 10th, 2005
3:00 p.m.
MIT Room 4–163

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