Brandeis University

Everytopic Seminar

Friday, March 5
in room 226 at 1:40pm

An experimental calculation of some Hilbert polynomials

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Abstract: Let $A = F[x, y, z]$, characteristic $F = p$, h be the nodal cubic $x^3 + y^3 + xyz$, and q be a power of p. Pardue wrote a simple formula for the dimension of $A/(x^q, y^q, z^q, h)$. It seems that by using results about vector bundles over the singular curve defined by h, one can generalize this, replacing x, y and z by any set of homogeneous polynomials. Indeed it should be possible to predict the dimension of the graded ring $A/((g_1)^q, ..., (g_s)^q, h)$ in all degrees.

These results had their genesis in computer calculations. But when $p = 2$ the computer even suggests that one can write down formulas for the dimensions when h is replaced by a power of $x^3 + y^3 + xyz$. Here nothing is proven, but there are remarkable experimental patterns.