Queen's Algebraic Geometry — Seminar —

HILBERT FUNCTIONS AND POINTS IN UNIFORM POSITION

Juan Migliore
University of Notre Dame

Abstract

In a paper of Bigatti, Geramita and Migliore, the authors study the geometric consequences imposed on a zero-dimensional scheme Z by the condition that the Hilbert function $h(d)$ of the Artinian reduction have maximal growth, in the sense of Macaulay. When the points have the Uniform Position Property (UPP), the consequences are even more striking. An important special case is when $h(d) = h(d+1) = s$, under the assumption that $d \geq s$ (which guarantees maximal growth). This forces the degree d component of $I(Z)$ to have a one-dimensional base locus. If Z has UPP then all the points of Z lie on this curve, and furthermore this curve must be reduced and irreducible. This in turn has strong consequences for the Hilbert function of the points. In this talk we seek a weaker assumption than $d \geq s$, given in terms of the second reduction number of Z (so there is no longer maximal growth). We obtain surprisingly similar consequences for the base locus in the general case, but (in view of that) surprisingly different behavior for the base locus and Hilbert function when UPP is imposed. Finally, the role of the Weak Lefschetz Propert (WLP) is discussed. Some very unexpected (to me) examples are produced that are of interest even outside of the context of our results.

Monday, September 27, 2004
2:30pm – 3:30pm
319 Jeffery Hall