

# Queen's Algebraic Geometry — Seminar —

## A THEOREM OF SEVERI, NOETHER AND LEFSCHETZ & THE SECANT VARIETIES OF THE VARIETIES OF REDUCIBLE FORMS

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### Abstract

It is a classical theorem of Severi and Noether that for the general hypersurface in  $\mathbb{P}^3$  of degree  $d \geq 4$  the Picard Group of the variety is  $\mathbb{Z}$ . (This was subsequently generalized by Lefschetz to hypersurfaces in  $\mathbb{P}^n$  for all larger  $n$ .) It is a consequence of the Severi-Noether theorem that the only curves on such hypersurfaces are intersections of the hypersurface with another hypersurface, say of degree  $d'$ , i.e. the only curves on such hypersurfaces are complete Intersections of type  $d, d'$ . E.G. there are no lines on such surfaces.

The work I'll report on in this talk is joint with E. Carlini (Politecnico di Torino) and L. Chiantini (Universita' di Siena) and gives an elementary proof of this result as well as others about the existence of complete interesections of codimension bigger than or equal to 2, in  $\mathbb{P}^n$ , which can exist on the general hypersurfaces of  $\mathbb{P}^n$ . The method of proof gives a completely new way of looking at such problems and involves a consideration of the varieties of reducible forms and their higher secant varieties.

Monday, January 28, 2008  
4:30pm – 5:30pm  
319 Jeffery Hall