

ALGEBRAIC GEOMETRY AND COMMUTATIVE ALGEBRA SEMINAR

Speaker: Bernd Ulrich
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Date: Tuesday, October 11, 2022

Time: 2:30 PM

Location: 258 Hurley Hall

Zoom URL: NA

Lecture Title:
Duality and blowup algebras

Abstract

This talk is concerned with a classical problem in elimination theory, the determination of the implicit equations defining the graphs and images of rational maps between projective varieties. The problem amounts to identifying the torsion in the symmetric algebra of an ideal, and one technique to achieve this is based on a duality statement due to Jouanolou that expresses the torsion of a graded algebra in terms of a graded dual of this algebra. Unfortunately, Jouanolou duality requires the algebra to be Gorenstein, a rather restrictive hypothesis for symmetric algebras. In this talk, I introduce a generalized notion of Gorensteinness, which we call weakly Gorenstein, and prove that Jouanolou duality generalizes to this larger class of algebras. Surprisingly, the weak Gorenstein property is rather common and is satisfied, for instance, by symmetric algebras assuming, mainly, that these are Cohen-Macaulay. This leads to the solution of the implicitization problem for new classes of rational maps. The talk is based on joint work with Yairon Cid-Ruiz and Claudia Polini.