

Monday, January 1, 2018 (Dey 11, 1396)		
14-15	Le Tuan Hoa	Castelnuovo–Mumford regularity (I)
16-17	Tim Römer	Cut Polytopes in Commutative Algebra
Tuesday, January 2, 2018 (Dey 12, 1396)		
9-10	Tim Römer	Prony's Method for Multivariate Exponential Sums
11-12	Le Tuan Hoa	Castelnuovo–Mumford regularity (II)

Abstracts

Castelnuovo–Mumford regularity

In this lecture, I will give some basic properties of the Castelnuovo-Mumford regularity and its applications to bound Hilbert coefficients.

1. Denition and some basic properties

In this part, I will give the denition of the Castelnuovo-Mumford regularity by using local cohomology. Then I will recall basic properties such as Castelnuovo's lemma and the relation of the Castelnuovo-Mumford regularities of modules in an exact sequence.

2. Characterization of the Castelnuovo-Mumford regularity by syzygies

The main focus of this part is to present Mumford's characterization of the Castelnuovo-Mumford regularity for sheaves on projective spaces and its extension by Eisenbud and Goto to modules in terms of the minimal free resolution.

3. Some bounds on Castelnuovo-Mumford regularity

In this part, I will make a very brief review on bounding the Castelnuovo-Mumford regularity in terms of its dening degree.

4. Castelnuovo-Mumford regularity and Hilbert coefficients

The Castelnuovo-Mumford regularity can be bounded in terms of Hilbert coefficients and vice versa. The main focus will be in the graded case. A hint to the local case will be mentioned.

Cut Polytopes in Commutative Algebra

The study of cuts in graphs is a very interesting topic in discrete mathematics with relations and applications to many other fields like algebraic geometry, combinatorial optimization or algebraic statistics.

Here we focus on cut polytopes, generalizations of them and associated algebraic objects. We discuss new results and open questions related to cut constructions.

The talk is based on joint work with Sara Saeedi Madani.

Prony's Method for Multivariate Exponential Sums

Prony proposed 1795 a method to solve the parameter reconstruction problem for exponential sums in the univariate case. The key idea is to consider an associated polynomial equation and to study an equivalent algebraic problem.

In this talk, we present a generalization of Prony's method to the multivariate case. We discuss related algebraic problems and methods. The talk is based on joint work with Stefan Kunis, Thomas Peter and Ulrich von der Ohe.