

ABSTRACTS OF TALKS

(Partial list)

Marc Chardin, *Liaison of varieties of small dimensions and cohomology*

Liaison shows that the cohomology of a scheme is isomorphic to the one of the canonical module of its link, up to a shift in degrees. If one (or equivalently both) of the linked schemes is Cohen-Macaulay, Serre duality shows that the cohomology of the canonical module is expressible in terms of the cohomology of the scheme itself. Therefore, up to duality and degree shift the cohomology passes from a scheme to its link whenever they are Cohen-Macaulay. We here investigate the case where both schemes are not Cohen-Macaulay, and describe the behaviour of deficiency modules (the graded duals of cohomology modules) under liaison in the case of surfaces and three-folds. This study relies on an extension of Serre duality to non Cohen-Macaulay coherent sheaves.

Eduardo Esteves, *Limits of ramification points in families of plane curves*

I will describe a method to compute limits of ramification points of linear systems in families of plane curves. An upshot is a formula for limits of (higher) flexes at any plane curve along a general pencil. This is joint work in progress with Nivaldo Medeiros (UFF).

Arnaldo Garcia, *Some constructions of curves over finite fields*

We are going to present some constructions of algebraic curves defined over finite fields with many rational points with respect to their genera. Most of the examples of good curves considered will be Kummer covers of the projective line. We will also consider the asymptotic behaviour of the number of rational points on towers of curves over a fixed finite field, as the genus goes to infinity.

Philippe Gimenez, *Saturation and regularity of a homogeneous ideal*

Let I be a homogeneous ideal of $S = K[x_0, \dots, x_n]$, the polynomial ring in $n+1$ variables over a field K . In this talk, we study two invariants of I : its satiety, $\text{sat}(I)$, and its Castelnuovo-Mumford regularity, $\text{reg}(I)$. We give an algorithm for computing the satiety of a monomial ideal, and use it to give an effective method for computing the Castelnuovo-Mumford regularity of an arbitrary ideal I of S , when K is infinite and assuming that the variables are in Noether position. In particular, when K has characteristic zero and I is Borel fixed, we shall recover the known values for the satiety (Green) and for the Castelnuovo-Mumford regularity (Bayer and Stillman) of I . This is a joint work with Isabel Bermejo (University of La Laguna, Tenerife, Spain) that generalizes our previous work on ideals defining projective curves and arithmetically Cohen-Macaulay subschemes of \mathbf{P}^n_K .

Abramo Hefez, *Analytic classification of plane branches up to multiplicity four*

In this joint work with M. Hernandez, we classify all germs of analytic irreducible plane curves under analytic contact equivalence, furnishing their normal forms and criteria for equivalence between normal forms.

Marc Hindry, *About the rank of Jacobians over function fields*

Let $f: X \rightarrow C$ be a fibration of curves of genus at least 1 over a curve C defined over a number field k . We give a conjectural description of the rank of $k(C)$ -rational points of the Jacobian of the generic fiber of f in terms of averages of traces of Frobenius. We will explain the known cases and the connection with Tate's conjecture on algebraic cycles on X . This joint work with Amílcar Pacheco, generalizes works of Nagao, Rosen-Silverman and Wazir.

Masaaki Homma, *Weierstrass pairs on a curve*

I will give an overview of recent progress of a combinatorial approach to the theory of Weierstrass pairs on a curve.

Amílcar Pacheco, *Distribution of the traces of Frobenius on elliptic curves over function fields*

Given a non-constant elliptic curve E defined over a one-variable function field K over a finite field, let S/C be its minimal regular model. We investigate the number of points of C where the fiber is smooth and ordinary having a prescribed trace of Frobenius. We discuss the maximality of the bound obtained for this number in the case of some examples of universal elliptic curves over certain modular curves.

Hans-Georg Rück, *Elliptic Curves over Finite Fields and Cryptography*

We show how elliptic curves can be used for cryptographic protocols. Special care is needed for choosing appropriate curves.

Francesco Russo, *Birational maps and projective geometry*

We will illustrate by pertinent examples the principle: "Remarkable projective geometry of a variety \Leftrightarrow Special subhomaloidal system of forms associated to it." We will give some applications to the (explicit) construction of interesting extremal contractions, according to Mori, defined over sufficiently "small" fields. This will show the richness of birational geometry in dimension greater than 3 and also the classic origins (Room, Todd, Semple and Tyrrell) of higher dimensional birational extremal contractions (not inverses of blow-ups!) and of the notion of "Jacobian Dual" in algebraic geometry, a constructive theory developed in a joint paper with Aron Simis. We hope to end with some applications to rationality problems over arbitrary fields.

Rene Schoof, *Abelian varieties over \mathbb{Q} with bad, semi-stable reduction in one prime only*

For certain small prime numbers l we describe the set of abelian varieties over \mathbb{Q} that have good reduction outside l and are semi-stable at l .