

Workshop on Arithmetic Geometry, Number Theory, and Computation
Lightning Talks
June 2, 2020
Session II

Tame torsion of Jacobians

Matthew Bisatt, University of Bristol

Given a prime p and positive integer g , does there exist a genus g curve defined over the rationals whose p -torsion field of the jacobian is everywhere tamely ramified?

Average size of the automorphism group of projective hypersurfaces

Vlad Matei, University of California Irvine

We show that average size of the automorphism group over \mathbb{F}_q of a smooth projective hypersurface in $\mathbb{P}^n(\mathbb{F}_q)$ goes to 1 as the degree of the hypersurface goes to infinity. We also discuss implication for the moduli space of smooth projective hypersurfaces.

Distinguishing Curves via L-Functions of Hilbert Class Fields

Jeremy Booher, University of Canterbury I will briefly discuss some work in progress with Felipe Voloch about distinguishing curves over finite fields via L-functions of their Hilbert class fields.

Explicit Motivic Non-Abelian Chabauty

David Corwin, UC Berkeley

We mention the approach of Dan-Cohen and Wewers to computing images of Selmer varieties using the theory of motives, then give an overview of recent and ongoing work of the speaker and Dan-Cohen in this direction. In more detail, we have developed a hypothetical algorithm for computing integral solutions to the unit equation, and we are working on extending to elliptic and even higher genus curves.

Dimension formulas for the cohomology of $\mathrm{Sp}(4, \mathbb{Z})$ with nontrivial coefficients

Matias Victor Moya Giusti, Université de Lille - Laboratoire Paul Painlevé

In this talk, we describe dimension formulas for the cohomology of the arithmetic group $\mathrm{Sp}(4, \mathbb{Z})$ with coefficients in any finite dimensional highest weight representation. We use, as main tools, the calculation of the Euler characteristic and the theory of Eisenstein cohomology. This is a joint work with Jitendra Bajpai and Ivan Horozov.

Local representations attached to rational elliptic curves with non-trivial torsion

Manami Roy, Fordham University

There is a classification of rational elliptic curves with a non-trivial torsion subgroup given by two-parameter (or three-parameter) families. Our goal is to find the associated local representations of $GL(2, \mathbb{Q}_p)$ for each of these families. In order to do that we compute the Kodaira-Neron types for these parametrized families.

Shifted convolutions and lattice point counting

David Lowry-Duda, ICERM

I describe how much of my recent research has stemmed from a few lattice point counting problems and approaches to studying them through studying shifted convolutions. I'll also link this to spectral theory and my recent work computing Maass forms.

Models and Integral Differentials of Hyperelliptic Curves

Simone Muselli, University of Bristol

Let C be a hyperelliptic curve over \mathbb{Q} , and let J be its Jacobian. One of the invariants in the statement of the Birch & Swinnerton-Dyer conjecture for J is its period. Computing (the local p -part of) this quantity relies on finding a basis of integral differentials for C (at p), i.e. a basis for the global sections of the dualizing sheaf of a regular model of C . Under certain conditions on C , mild when p is not 2, we explicitly construct the minimal regular model with normal crossings of C enabling us to determine a basis of integral differentials.