Plan of lectures of our number theory seminar on Euler systems

2017

September 18, room 409.B in Omega Building: Victor Rotger, on: B. Mazur, J. Tate, Refined conjectures of the Birch and Swinnerton-Dyer type, Duke Math Journal, vol. 54 1987.

September 25: That Monday is City Holiday in Barcelona. We go for dinner on that Monday evening.

October 2 at 10h, room 409.B in Omega building: Óscar Rivero on H. Darmon, S. Dasgupta. Elliptic units for real quadratic fields.

October 9 at 10h, room 409.B in Omega building: Ishai Dan Cohen on Applications of Goncharov's conjectures to point-counting

The classical theory of multiple polylogarithms found a wealth of interesting relations between interesting transcendental numbers. It also accounted, at least conjecturally, for the transcendental part of certain special values of L-functions. This led, through the theory of regulators, to the search for associated elements of K-groups. Goncharov's theory places these K-groups inside a certain graded Hopf algebra of "framed mixed Tate motives". The classical regulators are then related to certain transcendental period maps. The special elements are vastly generalized by Goncharov's motivic multiple polylogarithms, whose periods are the classical multiple polylogarithms.

Goncharov's theory led to a series of intricate conjectures about the structure of the mixed Tate Hopf algebra, and has placed this object in the center of a growing area of research. In ongoing joint work with David Corwin, we use one of Goncharov's more intricate conjectures to make my "Kim-theoretic" algorithm for computing solutions to the unit equation (partly joint with Stefan Wewers) simpler and clearer. As applications, we hope to obtain numerical evidence for Goncharov's conjecture, as well as for Kim's nonabelian Shafarevich-Tate conjecture.

On the same October 9, at 11:30: Daniel Barrera on: Robert Coleman, p-adic Banach spaces and families of modular forms, Invent. Math. 127, 417-479 (1997).

October 11 (Wednesday) at 10h, room 409.B in Omega building: Daniel Barrera again on: Robert Coleman, p-adic Banach spaces and families of modular forms, Invent. Math. 127, 417-479 (1997).

October 16 at 10h, room 409.B in Omega building: Florian Sprung on: Limites de représentations cristallines, by Laurent Berger

October 23 at 10h, room 409.B in Omega building: Adel Betina on E. de Shalit, On the p-adic periods of X_0(p). Mathematische Annalen (1995). Volume: 303, Issue: 3, page 457-472.

October 30 at 10h, room 409.B in Omega building: Valentin Hernandez on
On number fields with given ramification,Compositio Mathematica 143 no 6, 1359-1373 (2007) by Gaétan Chenevier.

November 6 at 10h, room 409.B in Omega building: Santi Molina "On the p-adic variation of Heegner points**"** by Francesc Castellà.

November 13 at 10h, room 409.B in Omega building: Victor Rotger on

S. Dasgupta, Factorization of p-adic RankinL-series, Inventiones Math vol. 205, 2016.

November 27 at 10h, room 409.B in Omega building: Francesc Fité on «Heegner cycles and p-adic L-functions» by Castellà and Hsieh.

December 4 at 10h, room 409.B in Omega building: Carl Wang-Erickson (Imperial College), "The rank of Mazur's Eisenstein ideal".

Abstract: In his landmark 1976 paper "Modular curves and the Eisenstein ideal", Mazur studied congruences modulo p between cusp forms and an Eisenstein series of weight 2 and prime level N. He proved a great deal about these congruences, and also posed some questions: how big is the space of cusp forms that are congruent to the Eisenstein series? How big is the extension generated by their coefficients? In joint work with Preston Wake, we give an answer to these questions in terms of cup products (and Massey products) in Galois cohomology. In this talk, we will introduce this subject and these product structures. In particular, we will discuss how these products reflect delicate algebraic number-theoretic interactions between the primes N and p and can be related to analytic objects. Time permitting, we will also discuss some partial generalizations of Mazur's results to square-free level N.

December 5 at 12h, room 409.B in Omega building: Carl Wang-Erickson (Imperial College), "On a question of Greenberg".

Abstract: Let f be a classical p-ordinary cuspidal eigenform of weight at least two. Ralph Greenberg asked for a characterization of those with complex multiplication. The following characterization has been proposed, with supporting evidence provided by Ghate and Vatsal: the associated 2-dimensional p-adic representation of the absolute Galois group of is split (that is, isomorphic to a sum of two characters) after restriction to a decomposition group at p. In joint work with Francesc Castellà, we give additional evidence supporting this answer to Greenberg's question. The strength of our conclusions is proportional to the smallness of certain anti-cyclotomic Iwasawa-theoretic ideal class groups.

December 18 at 10h, room 409.B in Omega building: Francesca Gatti on "Generalised Heegner cycles and p-adic Rankin L-series" by Bertolini, Darmon, Prasanna.

2018

February 12 at 10h, room 409.B in Omega building: Xevi Guitart on
Coates, J., Wiles, A., On the conjecture of Birch and Swinnerton-Dyer

February 19 at 10h, room 409.B in Omega building: Santi Molina on
K. Kato, Iwasawa theory and p-adic Hodge theory. Kodai Math. J. 16 (1993), no. 1, 1–31.

February 26 at 10h, room 409.B in Omega building, Valentin Hernandez on Artin conjecture for odd two dimensional representations of G_Q following maybe Buzzard-Taylor Companion forms and weight one forms and/or Pilloni-Stroh Surconvergence, ramification et modularité.

March 5 at 10h, room 409.B in Omega building: Denis Benois (Bordeaux),

Advanced Course (I).

March 12 at 10h, room 409.B in Omega building: Denis Benois (Bordeaux), Advanced Course (II).

March 19 at 10h, room 409.B in Omega building: Denis Benois (Bordeaux), Advanced Course (III).

April 9th at 10h, room 409.B in Omega building: Daniel Barrera on Richard Taylor “l-adic representations associated to modular forms over imaginary quadratic fiels. II”, Inventions 1994.

To be continued.