

Title: Spectral halo

By Coleman

1.Spectral halo

I will explain my ideas about what is happening in families of modular forms at the boundary of weight space.

2.Canonical subgroups

These subgroups of elliptic curves were discovered about 40 years ago . Now they are essential in modern research . I will give a simple definition.

3.The Tchebotarev density Theorem

Title: Introduction to special values of L-functions: The Dirichlet class number formula and Stark's conjectures

By Dasgupte

Abstract: I will introduce the topic of special values of L-functions, using the Dirichlet class number formula as a motivational example. I will state the abelian Stark conjecture and work out the example of the base field \mathbb{Q} .

Talk 2 Title: Trivial zeroes of p-adic L-functions

Abstract: We will give some examples of Ralph Greenberg's conjecture on trivial zeroes of p-adic L-functions. The first example will concern the simplest p-adic L-function, namely the Kubota-Leopoldt p-adic L-function. The leading term of this p-adic L-function at $s=0$ was computed by Ferrero and Greenberg and related to units in number fields by Katz, Gross, and Koblitz. Gross stated a conjecture generalizing this formula to arbitrary totally real base fields. A few years ago, we proved this conjecture under certain assumptions in joint work with Darmon and Pollack. I will conclude the talk with a discussion of the Mazur-Tate-Teitelbaum conjecture (proven by Greenberg and Stevens), which concerns the trivial zero of the p-adic L-function associated to an elliptic curve with split multiplicative reduction at p .

Talk 3 Title: Factorization of p-adic Rankin L-series

Abstract: We report on work in progress that aims to show that the p-adic L-function associated to the tensor square of a p-ordinary eigenform factors as the product of the symmetric square p-adic L-function of the form with a Kubota-Leopoldt p-adic L-function. Our method of proof follows that of Gross, who proved a factorization for Katz's p-adic L-function for a character arising as the restriction of a Dirichlet character. We prove certain special value formulae for classical and p-adic Rankin L-series at non-critical points. The formula of Bertolini, Darmon, and Rotger in the p-adic setting is a key element of our proof. As demonstrated by Citro, we obtain as a corollary of our main result a proof of the exceptional zero conjecture of Greenberg for the symmetric square.

Title: LOCAL EPSILON CONSTANTS

By Kakde

Abstract: In the first talk I will give an exposition of Deligne's construction of local epsilon constants. In the second talk I will give an exposition of Kato's local epsilon conjecture "in the $l \neq p$ case". This uses K_1 group of

some Iwasawa algebras. I will briefly give an explicit description of this K_1 groups. In the last talk I will sketch a proof of the conjecture of Kato.

Title: On the structure of ideal class groups and Selmer groups

By Kurihara

Abstract: I begin with the basic facts on Iwasawa theory, and talk about the structure of ideal class groups of number fields and Selmer groups of elliptic curves as Galois modules.

The subtitles of my 3 talks are 1) Initial Fitting ideals

2) Higher Fitting ideals of ideal class groups

3) Selmer groups and modular symbols

Title : On Greenberg's conjecture.

By N. QuangDo

Abstract: The conjecture of the title is one of the last important unsolved problems of cyclotomic Iwasawa theory. As a "reasonable" generalization of Vandiver's conjecture, it predicts the nullity of the mu and lambda invariants of the unramified Iwasawa module X_+ attached to a totally real number field. In the first two (expository) talks, I'll present the conjecture and give a survey of the already known (mostly of a "numerical" nature) results in its direction. In the third (research) talk, I'll show new results on explicit Galois annihilators (for example the initial Fitting ideal) of X_+ .
Talk 1 : Presentation of the conjecture and direct asymptotical approach for computing X_+
Talk 2 : More theoretical approaches based on cyclotomic units and the (classical) Main Conjecture
Talk 3 : New equivariant approach to produce explicit Galois annihilators of X_+ .

Title: Galois cohomology with restricted ramification

By Sharifi

We will discuss cyclotomic units, class groups of cyclotomic fields, cup products in Galois cohomology, Iwasawa modules, and reciprocity maps as connecting homomorphisms.

2) Homology and cohomology of modular curves

We will discuss modular symbols and Manin symbols in the homology of modular curves, Hida theory, and the inverse limit of ordinary parts of modular curves. We will discuss the use of the latter in the proof of the main conjecture of Iwasawa theory.

3) A conjecture relating cup products and modular symbols

We will discuss a conjecture that a composition of two maps between Galois cohomology and the cohomology of modular curves is the identity, providing a relationship between cup products of cyclotomic units to Manin symbols. We will also relate the recent progress of Fukaya and Kato on this conjecture.

Title: Title: On congruences of Galois representations of function fields

By Taguchi

Abstract: We give a simple criterion for two v -adic Galois representations of a global function field K to be locally isomorphic at a place u in terms of their reductions mod v . As an application, we prove that there exist no t -motives over K which have very special properties (in particular, very special types of v -torsion points) if v is "too large". This study is motivated by a conjecture of Rasmussen-Tamagawa on the finiteness of certain types of Abelian varieties over a number field. In the "introductory" lectures, I would like to discuss the background materials used in such studies, such as Drinfeld modules and t -motives.

Title: Cyclotomic units and p -adic L -functions I and II.

By Tsuji

Abstract: We fix an odd prime number p and an abelian field K . Let \mathcal{U} be the inverse limit of semi-local units at p in each intermediate field of the cyclotomic \mathbb{Z}_p -extension K_∞/K with respect to the norm maps. By using Coleman power series, a \mathbb{Z}_p -homomorphism from \mathcal{U} to the completed group ring $\mathbb{Z}_p[[\text{Gal}(K_\infty/\mathbb{Q})]]$ with small kernel and cokernel is defined. In this talk, after we explain the definition and some properties of this homomorphism, we will see that the image of the cyclotomic unit in \mathcal{U} by this map constructs Kubota-Leopoldt p -adic L -function.

Title: p -adic representations and p -adic Hodge theory.

By Yasuda

Abstract: In my first talk, we will introduce basic notions and give a survey of basic results on p -adic representations of the absolute Galois groups of p -adic fields. In my second talk, I will explain how these notions appear in the geometry by giving an outline of a proof of the comparison theorem of cohomologies of varieties over p -adic fields. In my third talk, I will explain joint work with Go Yamashita on the computation of the reduction of some two dimensional crystalline representations.