Automorphic p-adic L-functions and regulators

Report of Contributions

Contribution ID: **1** Type: **not specified**

Spin p-adic L-function for GSp(6)

Monday, October 14, 2019 9:30 AM (1 hour)

In this talk we shall present the construction of the Spin p-adic L-function for p-ordinary Siegel modular forms of genus 6, using an integral expression due to Pollack. Joint work (still in progress) with E. Eischen and S. Shah.

Presenter: (CONCORDIA UNIVERSITY), Giovanni Rosso

Contribution ID: **2**   Type: **not specified**

The toric regulator

Monday, October 14, 2019 11:00 AM (1 hour)

I will present a map - The toric regulator, from motivic cohomology of algebraic varieties over p-adic fileds with "totally degenerate reduction", e.g., p-adically uniformized varieties, to "toric intermediate Jacobians" which are quotients of algebraic toruses by a discrete subgroup. The toric regulator recovers part of the ℓ-adic etale regulator map for every prime ℓ, and its logarithm recovers part of the log-syntomic regulator. I expect the toric regulator to be the home of "refined" Beilinson conjectures and I will present some evidence for this claim. This is joint work with Wayne Raskind from Wayne State university.

Presenter: (BEN-GURION UNIVERSITY), Amnon Besser

Contribution ID: **3**　　　　　　　　　　　　　　　　　　　　Type: **not specified**

Mini-course 2: Lecture 1

Monday, October 14, 2019 2:00 PM (1 hour)

General overview of triple product periods.
This lecture will describe the general conjectures on triple product periods formulated over the years in joint work with Alan Lauder and Victor Rotger, and discuss a few of their ramifications, including:
1. The connection with generalised Kato classes and their arithmetic applications.
2. Tame variants and the Harris-Venkatesh conjecture.
3. The special case of the adjoint, and a theorem of Rivero-Rotger.

Presenter:　(MCGILL UNIVERSITY), Darmon Henri

Contribution ID: **4** Type: **not specified**

Mini-course 3: Lecture 1

Monday, October 14, 2019 3:30 PM (1 hour)

In the first two lectures, Loeffler will recall Hida's theory of ordinary p-adic families of modular forms, and how it was used to construct p-adic Rankin–Selberg L-functions for $GL_2 \times GL_2$ (by Hida and Panchishkin), and triple-product L-functions for $GL_2 \times GL_2 \times GL_2$ (by Harris–Tilouine and Darmon–Rotger).

Then he will outline the key statements of Pilloni's higher Hida theory for the symplectic group GSp_4, which gives an analogous p-adic interpolation results for higher-degree coherent cohomology of Siegel threefolds, and describe how these techniques can be used to construct p-adic L-functions for GSp_4, $GSp_4 \times GL_2$, and $GSp_4 \times GL_2 \times GL_2$, as in the recent preprint of Loeffler –Pilloni–Skinner–Zerbes.

Presenter: (UNIVERSITY OF WARWICK), David Loeffler

Contribution ID: **5**   Type: **not specified**

The arithmetic of the adjoint of a weight one modular form

Monday, October 14, 2019 4:45 PM (1 hour)

Darmon, Lauder and Rotger have formulated different conjectures involving the so-called p-adic iterated integrals attached to a triple (f,g,h) of classical eigenforms of weights (2,1,1). When f is a cusp form, it involves the p-adic logarithm of distinguished points on the modular abelian variety attached to f. However, when f is Eisenstein, they conjecture a formula involving the p-adic logarithms of units and p-units in suitable number fields, which can be seen as a variant of Gross' p-adic analogue of Stark's conjecture. In a joint work with V. Rotger we prove the conjecture when h is dual to g. The proof rests on Hida's theory of improved p-adic L-functions and Galois deformation techniques. Further, it suggests a tantalizing connection with the theory of Beilinson–Flach elements, in a setting where an exceptional vanishing of these cohomology classes emerges.

Presenter: (UPC AND MCGILL UNIVERSITY), Oscar Rivero

Contribution ID: **6**   Type: **not specified**

Recent developments for p-adic families automorphic forms and L-functions, in the context of unitary groups

Tuesday, October 15, 2019 9:30 AM (1 hour)

The p-adic theory of modular forms plays a key role in modern number theory. Geometric developments have enabled vast expansion of Serre's original notion of p-adic modular forms, including by Hida to the case of automorphic forms on unitary groups. This talk will introduce some challenges that arise in the setting of unitary groups, recent efforts to overcome them, and applications.

Presenter: (UNIVERSITY OF OREGON), Ellen Eischen

Contribution ID: **7** Type: **not specified**

On the construction of elements in the Iwasawa cohomology of Galois representations for GSp(2n)xGSp(2n)

Tuesday, October 15, 2019 11:00 AM (1 hour)

The study of arithmetic invariants associated to Galois representations has often relied on the construction of a special family of elements in their Galois cohomology groups. For instance, it has been a crucial ingredient in the work of Kato in the proof of special cases of the conjecture of Birch and Swinnerton-Dyer and the Iwasawa main conjecture for modular forms.

In this talk, we describe how to construct elements in the Iwasawa cohomology of Galois representations associated to a product of two cohomological cuspidal automorphic representations of the similitude symplectic group GSp_{2n}, and, thus, p-adic L-functions using Perrin-Riou's machinery. This construction generalises the one given by Lei-Loeffler-Zerbes when $n = 1$.

Presenter: (UNIVERSITÉ LAVAL), Antonio Cauchi

Contribution ID: **8**   Type: **not specified**

Mini-course 2: Lecture 2

Tuesday, October 15, 2019 2:00 PM (1 hour)

Rigid meromorphic cocycles and their RM values.
This lecture will introduce the basic structures that arise in a p-adic approach
to explicit class field theory based on the values at real quadratic arguments
of rigid meromorphic cocycles.
These values comprise as special cases the
Gross-Stark units arising in Gross's p-adic analogue of the Stark conjecture
on p-adic Artin L-series at s=0, Stark-Heegner points on (modular) elliptic curves,
and singular moduli for real quadratic fields. They can often be expressed in terms of
(twisted variants of) the triple product periods covered in Lecture 1.

Presenter: (UNIVERSITY OF OXFORD), Jan Vonk

Contribution ID: **10** Type: **not specified**

Critical values of the Asai L-function for GL(n) over CM fields

Tuesday, October 15, 2019 4:45 PM (1 hour)

Let F be a totally real field, and K a CM extension. For a cuspidal, automorphic, cohomological representation π over GL_n/K, I will talk about the special values at critical points of the Asai L-function associated to π. I will also talk about the special values of the Asai L-function twisted by Hecke characters of F.

Presenter: (IISER PUNE), Baskar Balasubramanyam

Contribution ID: **11**   Type: **not specified**

Eisenstein congruences and Euler system for Siegel modular forms.

Wednesday, October 16, 2019 9:30 AM (1 hour)

I will discuss on some works in progress for the construction of Euler systems attached to the Standard p-adic L-function
attached to ordinary Siegel modular forms using congruences between Klingen-type Eisenstein series and cusp forms.

Presenter: (COLUMBIA UNIVERSITY), Eric Urban

Contribution ID: **12** Type: **not specified**

Mini-course 1: Lecture 1 (Critical L-values)

Wednesday, October 16, 2019 11:00 AM (1 hour)

We recall general conjectures about the existence of p-adic L-functions attached to motives and automorphic representations. Then the lecture is devoted to the study of the critical values of the complex L-function of cuspidal automorphic representations of $\mathrm{GL}(2n)$ admitting a Shalika model. In particular we describe such L-values in terms of classical evaluations constructed using the cohomology of the corresponding locally symmetric space and so-called automorphic cycles.

Presenter: (UNIVERSITY OF NOTRE DAME), Andrei Jorza

Contribution ID: **13** Type: **not specified**

Square root p-adic L-functions

Thursday, October 17, 2019 9:30 AM (1 hour)

The Ichino-Ikeda conjecture, and its generalization to unitary groups by N. Harris, has given explicit formulas for central critical values of a large class of Rankin-Selberg tensor products. Although the conjecture is not proved in full generality, there has been considerable progress, especially for L-values of the form $L(1/2, \mathrm{BC}(\pi) \times \mathrm{BC}(\pi'))$, where π and π' are cohomological automorphic representations of unitary groups $U(V)$ and $U(V')$, respectively. Here V and V' are hermitian spaces over a CM field, V of dimension n, V' of codimension 1 in V, and BC denotes the twisted base change to $\mathrm{GL}(n) \times \mathrm{GL}(n-1)$.

Presenter: (COLUMBIA UNIVERSITY), Michael Harris

Contribution ID: **14** Type: **not specified**

Mini-course 1: Lecture 2 (Overconvergent cohomology)

Thursday, October 17, 2019 11:00 AM (1 hour)

We introduce and study the overconvergent cohomology adapted to the
Shalika setting. Then we describe how to evaluate this cohomology in order to produce distributions over the expected Galois group. Moreover, we verify that this overconvergent evaluation interpolates the classical evaluations explained in the first lecture. Another consequence of this method is the control of the growth of the distribution obtained. The p-adic L-functions are, as usual, the Mellin transform of these distributions.

Presenter: (UNIVERSIDAD DE SANTIAGO), Daniel Barrera

Contribution ID: **15** Type: **not specified**

Mini-course 2: Lecture 3

Thursday, October 17, 2019 2:00 PM (1 hour)

Diagonal restrictions of Hilbert Eisenstein series.
This last lecture explains how the diagonal restrictions of the p-adic family of
Hilbert modular Eisenstein series for a real quadratic field can be related to
RM values of certain rigid analytic cocycles, leading to an interpretation of
Gross-Stark units and Stark-Heegner points as triple product periods. The
p-adic deformation theory of the weight one Hilbert Eisenstein series, building on the
work of Bellaiche-Dimitrov, Darmon-Lauder-Rotger, and Betina-Dimitrov Pozzi,
is a key ingredient in some of the most important arithmetic applications.

Presenter: (UNIVERSITY COLLEGE LONDON), Alice Pozzi

Contribution ID: **16**   Type: **not specified**

Mini-course 3: Lecture 3

Thursday, October 17, 2019 3:30 PM (1 hour)

In the third lecture, Pilloni will outline the proofs of the main theorems of higher Hida theory for GSp_4, and describe work in progress to generalise these results to higher-rank symplectic groups.

Presenter: (ENS LYON, CNRS), Vincent Pilloni

Contribution ID: **17**   Type: **not specified**

Rationality for Rankin-Selberg L-functions

Thursday, October 17, 2019 4:45 PM (1 hour)

Investigating critical values of Rankin-Selberg L-functions has a long history, both, on the side of results as well as on the side of conjectures. While most of the known results treat the case of $\mathrm{GL}(n) \times \mathrm{GL}(n-1)$, in this talk we will shade some light on what can be said in the general case $\mathrm{GL}(n) \times \mathrm{GL}(m)$, when the ground field is CM.

Presenter: (UNIVERSITY OF VIENNA), Harald Grobner

Contribution ID: **18** Type: **not specified**

An explicit reciprocity law for the GSp(4)-Euler system

Friday, October 18, 2019 9:30 AM (1 hour)

I will report on work in progress with David Loeffler and Chris Skinner. I will sketch a proof for of an explicit reciprocity law for the Euler system attached to the spin representation of genus 2 Siegel modular forms, relating the Euler system to the spin p-adic L-function that we constructed in joint work with Vincent Pilloni. As an application, we obtain bounds on Selmer groups, conditional on the nonvanishing of non-critical p-adic L-values.

Presenter: (UNIVERSITY COLLEGE LONDON), Sarah Zerbes

Contribution ID: **19** Type: **not specified**

Mini-course 1: Lecture 3 (p-adic families)

Friday, October 18, 2019 11:00 AM (1 hour)

The correct eigenvarieties to be considered in the Shalika setting are constructed using the parabolic subgroup of $\mathrm{GL}(n)$ having Levi subgroup $\mathrm{GL}(n) \times \mathrm{GL}(n)$. After the introduction of these parabolic eigenvarieties the talk is devoted to the study of the local properties of them and the existence of Shalika components. We use such results in order to perform a p-adic variation of the distributions obtained in the second lecture. Using the Mellin transform we produce p-adic families of p-adic L-functions.

Presenter: (IMPERIAL COLLEGE LONDON), Chris Williams

Contribution ID: **20** Type: **not specified**

Mini-course 3: Lecture 2

Tuesday, October 15, 2019 3:30 PM (1 hour)

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Then he will outline the key statements of Pilloni's higher Hida theory for the symplectic group GSp_4, which gives an analogous p-adic interpolation results for higher-degree coherent cohomology of Siegel threefolds, and describe how these techniques can be used to construct p-adic L-functions for GSp_4, $GSp_4 \times GL_2$, and $GSp_4 \times GL_2 \times GL_2$, as in the recent preprint of Loeffler –Pilloni–Skinner–Zerbes.

Presenter: (UNIVERSITY OF WARWICK), David Loeffler