ABSTRACT

Speaker: Blomer, Valentin

Title: Reciprocity of automorphic L-functions and applications

Abstract: We present various reciprocity formulae for moments of central values of automorphic L-functions and show how they can be used to show subconvexity and non-vanishing.

Speaker: Coates, John

Title: Stronger forms of old theorems of Gross and Rohrlich

Abstract: My lecture will report on joint work with Yongxiong Li giving a new proof using Iwasawa theory at the prime 2 of stronger forms of old theorems of Gross and Rohrlich about the arithmetic of the simplest elliptic curve with complex multiplication by the maximal order of the field $K = \mathbb{Q}((-q)^{1/2})$, where q is any prime congruent to 7 modulo 8.

Speaker: Diamantis, Nikolaos

Title:

Abstract:

Speaker: Fesenko, Ivan

Title: Class field theory of two types and its three fundamental generalisations

Abstract: I will discuss two types of class field theory and the current state of three main generalisations of class field theory with respect to these two types. The talk will include several conclusions and perspectives in relation to new relations between generalisations of class field theory and further developments. A text, related to the talk, is available from my www-pages.

Speaker: Hoffstein, Jeffrey

Title:

Abstract:

Speaker: Huang, Bingrong

Title: Super-positivity of a family of L-functions

Abstract: Zhiwei Yun and Wei Zhang introduced the notion of "super-positivity of self-dual L-functions" which specifies that all derivatives of the completed L-function at the central value $s = 1/2$ should be non-negative. The Grand Riemann Hypothesis implies super-positivity for self-dual cuspidal automorphic L-functions on $GL(n)$. We proved that there are infinitely many L-functions associated to modular forms for $SL(2, \mathbb{Z})$ and Hecke congruence subgourps each of which has the super-positivity property. This is joint work with Dorian Goldfeld.

Speaker: Iwaniec, Henryk

Title: Gaussian primes with prime and almost-prime coordinates

Abstract: I will present recent results and techniques for capturing primes which are sums of square of a prime and square of a number having at most 13 prime divisors. Some open problems will be discussed. This is joint work with John Friedlander.

Speaker: Kontorovich, Alex

Title:

Abstract:

Speaker: Lee, Min

Title: Twist-minimal trace formulas and applications

Abstract: One of the most-well known examples of L-functions of degree 2 are L-functions of modular forms. Less well known, but equally important are the L-functions of Maass forms. A Maass form is a function on a hyperbolic surface which is also an eigenfunction of the Laplace-Beltrami operator. Named after H. Maass, who discovered some examples in the 1940s, Maass forms remain largely mysterious.

Fortunately, there are concrete tools to study Maass forms: trace formulas, which relate the spectrum of the Laplace operator on a hyperbolic surface to its geometry. After Selberg introduced his famous trace formula in 1956, his ideas were generalised, and various trace formulas have been constructed and studied. However, there are few numerical results from trace formulas, the main obstacle being their complexity. Various types of trace formulas are investigated, constructed and used to understand automorphic representations and their L-functions from theoretical point of view, but most of them are not explicit enough to implement in computer code.

In this talk, we present a fully explicit version of the Selberg trace formula for twist-minimal Maass forms of weight 0, and and its applications.

This is a joint work with Andrew Booker and Andreas Strombergsson.

Speaker: Li, Xiaoqing

Title: Lower bounds of Rankin-Selberg L-functions on the line 1

Abstract: In this talk, we will outline a soft method based on Maass-Selberg relations, without using sieve theory, to derive inverse powers of log type lower bounds of Rankin-Selberg L-functions on the line 1.

Speaker: Luo, Wenzhi

Title: A new type of shifted convolution sums

Abstract: The study of shifted convolution sums of multiple divisor functions is a classic problem closely related to the higher moments of the Riemann zeta function, and was pioneered by Linnik via his dispersion method. Its natural generalization to various additive problems for the Fourier coefficients of automorphic forms, has recently seen interesting developments, via variants of circle method and Voronoi-Poisson type formula. In this talk I'll consider a different generalization, and sketch my recent work on bounding them.

Speaker: Qiu, Yannan

Title: The applications of the $GL(n)$ Kuznetsov formula

Abstract: The Kuznetsov formula is a basic tool in the spectral method of $GL(2)$ automorphic forms. We will explicitly describe its generalization on $GL(n)$ in terms of higher exponential sums and higher Bessel functions and then discuss some related applications to $GL(n)$ automorphic forms.

Speaker: Smith, Alexander

Title:

Abstract:

Speaker: Sun, Binyong

Title: Cohomological test vectors

Abstract: Various types of modular symbols provide a powerful tool to study arithmetic of special values of L-functions. The Archimedean behaviors of the modular symbols are captured by certain restriction maps of relative Lie algebra cohomology spaces. We call these restriction maps modular symbols at infinity. The modular symbols are non-zero and of arithmetic interest only when the associated modular symbols at infinity are non-zero. Moreover, the latter holds if and only if certain invariant linear functionals on cohomological representations do not vanish on the minimal K-types (in the sense of Vogan). We will give some examples of invariant linear functionals on cohomological representations which does not vanish on the minimal K-types, including the Rankin-Selberg case $GL(n) \times GL(n-1)$.

Speaker: Tian, Ye

Title: p-converse to a theorem of Gross-Zagier and Kolyvagin-Rubin: CM case

Abstract: Let E be an elliptic curve over $\mathbb{Q}$ (or a totally real field) with CM and p a good prime. In this talk, we prove that if the corank of p-Selmer group of E is one then the analytic rank of E is also one. This is a joint work with Burungale and Skinner.

Speaker: Zannier, Umberto

Title: Some specialization theorems for families of abelian varieties

Abstract: We shall illustrate some specialisation theorems, especially for algebraic families $\pi : A \to S$ of abelian varieties. We shall be concerned with properties of the generic fiber which are preserved by taking some (or 'many') suitable special fibers. We shall give explicit examples of past results. Then we shall discuss a more recent issue, raised by Katz and Oort, concerning the existence of abelian varieties over $\overline{\mathbb{Q}}$ not isogenous to a Jacobian. (This concerns joint work with David Masser.)

Speaker: Zhang, Wei

Title: Selmer groups for Rankin-Selberg L-functions

Abstract: Let Π (resp. Σ) be a cohomological (for the trivial coefficient) cuspidal automorphic representation of $GL(n+1)$ (resp. $GL(n)$) over a CM number field, and assume that they are base change from unitary groups. We prove the following theorem: if the Rankin-Selberg L-function $L(\Pi \times \Sigma, s)$ does not vanish at its center, then the associated ℓ-adic Bloch-Kato Selmer group vanishes (for primes ℓ where the mod ℓ Galois representations satisfy certain mild conditions). The conditions on ℓ come from Euler system type argument. We will discuss

some examples from elliptic curves. This is a joint work with Yifeng Liu, Yichao Tian, Liang Xiao, and Xinwen Zhu.

Speaker: Zhang, Yitang

Title: Divisor functions in arithmetic progressions

Abstract: Let $\tau_k(n)$ denote the k-fold divisor function. It is recently realized that the methods used to study the distribution of primes in arithmetic progressions to large moduli also apply to the distribution of $\tau_k(n)$. In this talk we describe the basic ideas and techniques that lead to some results uniformly in k.