Abstracts

Park, Jeehoon (POSTECH)

On a p-adic deformation of the local Langlands for GL_2

We construct a finitely generated $\Lambda[[\mathrm{GL}_2(\mathbb{Z}_p)]]$-module W, where $\Lambda = \mathbb{Z}_p[[T]]$ is the Iwasawa algebra, using a certain projective limit of the theta correspondences between GO(2) and GL(2) over finite commutative rings $\mathbb{Z}_p[[T]]/((1+T)^{p^n}-1)$. Then we study the specializations of W and show that they are the duals of admissible p-adic Banach representations of $\mathrm{GL}_2(\mathbb{Z}_p)$. We use these to construct p-adic Banach irreducible admissible representations of $\mathrm{GL}_2(\mathbb{Q}_p)$ which are in the p-adic local Langlands correspondence (due to P. Colmez, C. Breuil and others) with the 2-dimensional p-adic Galois representations of $\mathrm{Gal}(\overline{\mathbb{Q}}_p/\mathbb{Q}_p)$ coming from the induction of p-adic characters of $\mathrm{Gal}(\overline{\mathbb{Q}}_p/E)$ with E a quadratic unramified extension of $\mathbb{Q}_p$. This construction provides a very explicit description of p-adic Banach irreducible representations of $\mathrm{GL}_2(\mathbb{Q}_p)$ attached to a certain class of p-adic Galois representations without resorting to (φ,Γ)-modules.

Hachimori, Yoshitaka (Tokyo University of Science)

Iwasawa λ-invariants of Selmer groups and congruence of Galois representations

We generalize a part of results of Greenberg-Vatsal, Emerton-Pollack-Weston etc. on the Iwasawa λ-invariants of "algebraic sides" i.e., Selmer groups of Galois representations. We consider the cases when the residual representations are reducible.

Kim, Dohyeong (POSTECH)

Construction of a branch of the p-adic L-function over nonabelian number fields

We study how to p-adically interpolate the critical values of L-functions of certain CM modular forms, twisted by a family of Artin representations. We use the measure constructed by Katz and Hida-Tilouine. As an application, we prove a congruence between critical values of L-functions predicted by the noncommutative Iwasawa theory.

Morisawa, Takayuki (Waseda University)

On ℓ-indivisibility of class number of $\mathbb{Z}_{p_1}\times\cdots\times\mathbb{Z}_{p_s}$-extension of $\mathbb{Q}$

Let $p_1,\ldots,p_s$ be distinct prime numbers. In this talk, we will talk about the ℓ-indivisibility of class number of intermediate fields of $\mathbb{Z}_{p_1}\times\cdots\times\mathbb{Z}_{p_s}$-extension of the rational number field for large prime number ℓ.

Sun, Hae-Sang (Chungbuk National University)

Special values of L-functions and coefficient fields

Following Rohrlich's method to prove non-vanishing of special values of elliptic L-function with cyclotomic twists, we will discuss the equality between two fields generated by the special values and cyclotomic characters, over the Fourier coefficient fields of the eigencusp newform of weight 2. One of main ingredients in the discussion is an estimation of a variant of Kloosterman sums.

Arai, Keisuke (Tokyo Denki University)
Algebraic points on Shimura curves of $\Gamma_0(p)$-type

Mazur and Momose studied points on the modular curve $X_0(p)$ for a prime p. They showed that over $\mathbb{Q}$ or a quadratic field (other than an imaginary quadratic field of class number one) there are only cusps on $X_0(p)$ if p is sufficiently large. In this talk we show a similar result for Shimura curves.

Choi, Dohoon (Korea Aerospace University)
Non-vanishing of central values of modular L-functions mod ℓ

In this talk, considering the non-existence of newform having a reducible Galois representation, we study the algebraic parts of the central critical values of these twisted L-series modulo primes ℓ. As an application, we consider, under the assumption of BSD conjecture, the non-vanishing for the orders of the Tate-Shafarevich groups of elliptic curves mod ℓ.

Bannai, Kenichi (Keio University)
p-adic Eisenstein-Kronecker functions and periods of the elliptic polylogarithm

I will introduce the p-adic Eisenstein-Kronecker function, defined with Hidekazu Furusho and Shinichi Kobayashi, which is a Coleman function analogue of the real analytic Eisenstein-Kronecker function. We then show how this function may be used to describe the p-adic elliptic polylogarithm sheaf, when the elliptic curve has complex multiplication and good supersingular reduction at p.

Oh, Byeong-Kweon (Seoul National University)
Class numbers of ternary quadratic forms

In this talk, we investigate the behavior of class numbers of ternary quadratic forms under the Watson's transformation. We compute the class numbers of arbitrary ternary quadratic forms by using some data on maximal ternary quadratic forms.

Taguchi, Yuichiro (Kyushu University)
A generalization of a theorem of Imai

The theorem of Imai in the title states that, if A is an abelian variety over a finite extension K of $\mathbb{Q}_p$ having good reduction, then the torsion subgroup of $A(K_\infty)$ is finite, where K_∞ denotes the p^∞-th cyclotomic extension of K. We generalize it for a more general type of varieties A and for larger extensions than K_∞.

Yhee, Donggeon (Seoul National University)
Gross-Zagier formula combined with BSD conjecture

Let E be an elliptic curve and P_K be a Heegner point. Assume P_K has infinite order. Gross-Zagier formula for L-derivative and BSD conjecture present a conjectural formula for $L'(E/K, 1)$. In this talk, I will introduce the formula and some numerical examples.

Shiomi, Daisuke (Nagoya University)

On the p-rank of the Jacobian of cyclotomic function fields

Let q be a power of prime p. For a monic polynomial $m \in \mathbb{F}_q[T]$, let K_m be the m-th cyclotomic function field. In this talk, we will state some results of the p-rank of the Jacobian of K_m. In particular, we will give a necessary and sufficient condition of m such that K_m is supersingular (or ordinary).

Kim, Hyun Kwang (POSTECH)

Waring's problem for polytope numbers II

This is a continuation of author's talk 'Waring's problem for polytope numbers (Preliminary version)' which was presented in Japan-Korea Number Theory Seminar held in January 2006 at KAIST, Taejon, Korea. We first briefly review materials which was discussed in the previous talk. In the next, we prove decomposition theorem for polytope numbers which was announced as a conjecture in the previous lecture. We also discuss how we approach to the main conjecture for Waring's problem for polytope numbers.

Kitaoka, Yoshiyuki (Meijo University)

A statistical relation of roots of a polynomial in different primes

Let $f(x) = x^n + a_{n-1}x^{n-1} + \cdots$ be an irreducible polynomial with integer coefficients, and L a natural number. For a prime p for which $f(x) \bmod p$ is completely decomposable, we consider the n roots r_i of $f(x)$ with $r_i \equiv 0 \bmod L$ and $0 \leq r_i < pL$. We propose several conjectures on the distribution of integers $(a_{n-1} + \sum r_i)/p$ when p varies.

Takai, Yuuki (The University of Tokyo/Keio University)

An analogue of Sturm's theorem for Hilbert modular forms

Sturm showed that holomorphic mod ℓ elliptic modular forms of weight k and level $\Gamma_1(N)$ are determined by the first few $(k/12)[\Gamma_1(1) : \Gamma_1(N)] \bmod \ell$ Fourier coefficients. In this talk, I will introduce an analogue of Sturm's theorem for Hilbert modular forms.

Nomura, Jiro (Keio University)

A certain example for non-abelian Brumer's conjecture

In this talk, I will introduce a non-abelian generalization of Brumer's conjecture fomulated by Andreas Nickel and give a certain example for non-abelian Brumer's conjecture which is not covered by known results.

Yamagami, Atsushi (Kyoto Sangyo University)

On p-adic families of Hilbert eigenforms for the base change of p-supercuspidal newforms

In this talk, we shall see a construction of a p-adic analytic family of Hilbert eigenforms passing through the base change of a p-supercuspidal newform, and its application to the adjoint Selmer group for the mod p Galois representation associated to the p-supercuspidal newform.

Choi, Suh-Hyun (KAIST)

Local Universal Lifting Rings of Galois groups when $\ell \neq p$

I will explain some structure including dimension and irreducible components of universal lifting rings for some mod p Galois representations for local groups when ℓ is not equal to p.

Takahashi, Yuto (Nagoya University)

Class field towers with restricted degrees of extensions

I propose a generalization of class field towers. When P is a set of prime numbers, we define the "P-restricted class field tower", restricting degrees of extensions to products of elements of P. In this talk, for some odd primes l, we show that there exist infinitely many quadratic fields with finite 2-class field towers and infinite $\{2, l\}$-restricted class field towers.

Ito, Akiko (Nagoya University)

On certain infinite families of imaginary quadratic fields whose Iwasawa λ-invariant is equal to 1

In this talk, we state the existence of certain infinite families of imaginary quadratic fields whose Iwasawa λ-invariant is equal to 1.

Park, Jeongho (POSTECH)

Waring's Problem for Polytope Numbers: Local & Combinatorial

Waring, Lagrange, Fermat, Gauss, Cauchy, Hilbert, Hardy, Vinogradov, Hua, $\cdots$ Cauchy's Polygonal Number Theorem used to be the beginning sentence of many papers on additive number theory, and Polytope Number is the high dimensional analogue of polygonal numbers. Trying to solve the Waring's problem for this family of polynomials, we can taste a blending of real analysis, algebraic number theory, p-adic methods together with geometry and combinatorics. Perusing the results in last century the local-global principle will be introduced first. After that we will slide into finding out what the essential obstacle is, comparing various 'nice' polynomials with 'the worst' polynomial, which alludes to the necessity of a stronger statement than the decomposition theorem.

Suzuki, Kazuyoshi (Nagoya University)

Partial Epstein zeta functions for linear codes over $\mathbb{Z}/p\mathbb{Z}$

Partial Epstein zeta functions for linear codes over the integer residue-class ring $\mathbb{Z}/p\mathbb{Z}$ modulo odd prime p, which are related with Lee weight enumerators of the codes, are newly defined. Those zeta functions for the codes extend analytically to entire functions on the whole complex plane except for a simple pole and functional equations of those zeta functions are presented. In particular, simple functional equations hold for partial Epstein zeta functions for linear self-dual codes.

Jeon, Daeyeol (Kongju National University)

Bielliptic modular curves and Brings curves

In this talk, we determine all the bielliptic intermediate modular curves between $X_0(N)$ and $X_1(N)$. Especially we focus on the relationship between bielliptic modular curves and Brings curves.

Murabayashi, Naoki (Kansai University)
On torsion points of CM elliptic curves

Let E be a CM elliptic curves defined over an algebraic number field F with endomorphism algebra isomorphic to K. We determine the $K_{ab}F$ rational torsion points of E. By its application, for certain CM elliptic curves E defined over $\mathbb{Q}(j_E)$, we determine $\mathbb{Q}(j_E)$ rational torsion points of E.

Kang, Soon-Yi (Kangwon National University)
Mock theta functions and orthogonal polynomials

Recently, Andrews discovered a relation between a third order mock theta function and Askey-Wilson polynomial. In this talk, we will discuss the general relation between mock theta functions and orthogonal polynomials.

Aoki, Miho (Shimane University)
On the Coates-Sinnott conjecture

Let k be a totally real number field and let F be a totally real or CM field which is a finite abelian extension over k. The Coates-Sinnott conjecture asserts that certain elements constructed by special values of the partial zeta functions annihilate the K-groups of the ring of algebraic integers of F. In this talk, we study the character-components of the p-part of the K-groups for odd prime numbers p, and give the proof for special cases.

Kim, Chang Heon (Hanyang University)
Recursion formulas for modular traces of weak Maass forms of weight zero

(joint work with Soyoung Choi) In this talk I will explain how to derive recursion formulas satisfied by modular traces of weakly weakly holomorphic modular functions and more generally modular traces of certain weak Maass forms of weight zero.

Matsumoto, Kohji (Nagoya University)
Zeta-functions of root systems and multiple zeta values

I will report the theory of zeta-functions of root systems, which has been developed recently in several joint papers with Yasushi Komori and Hirofumi Tsumura. Also I will mention some new aspects on multiple zeta values of Euler-Zagier type, from the viewpoint of zeta-functions of root systems.