

Workshop on Modular forms and Galois representations

Date: 7~8 Jan. 2013 Place: 5th Seminar room / KIAS

Time	7(Mon)	Time	8(Tues)
10:00–11:00	Ito	10:00–11:00	Kim
11:30–12:30	Imai	11:30–12:30	Nakamura
12:30–14:30	Lunch	12:30–14:30	Lunch
14:30–15:30	Yoo	14:30–15:30	Lim
16:00–17:00	Park	16:00–17:00	Lee
17:15–18:15	Discussion/Q&A		
18:30~	Banquet		

– Invited Speakers:

Naoki Imai (RIMS)

–Good reduction of ramified affinoids in the Lubin–Tate perfectoid space

Tetsushi Ito (Kyoto)

–Supercuspidal representations in the cohomology of the Rapoport–Zink space for the unitary group in three variables

Kentaro Nakamura (Hokkaido)

–A generalization of Kato's local epsilon conjecture for (ϕ, Γ) -modules over the Robba ring

Chan–Ho Kim (BU)

–Anticyclotomic Iwasawa invariants and congruences of modular forms

Min Lee (Brown)

–Selberg's shifted convolutions, multiple Dirichlet series and second moments of L-functions

Subong Lim (KIAS)

–Zagier duality for harmonic weak Maass forms of integral weights

Jecheon Park (Postech)

–Period Integrals of Smooth Projective Hypersurfaces and L_{∞} -Homotopy Theory

Hwajong Yoo (UC Berkeley)

–Multiplicity one and level raising for reducible Galois representations

Title & Abstract

Naoki Imai (RIMS)

Title: Good reduction of ramified affinoids in the Lubin–Tate perfectoid space

Abstract: Recently, Weinstein finds some affinoids in the Lubin–Tate perfectoid space and computes their reduction in equal characteristic case. The cohomology of the reduction realizes the local Langlands correspondence for unramified representations of GL_h . In this talk, we introduce other affinoids in the Lubin–Tate perfectoid space in equal characteristic case, whose reduction realizes ramified representations of conductor exponent $h+1$. We call them “ramified affinoids”. We study the cohomology of the reduction and its relation with the local Langlands correspondence. This is a joint work with Takahiro Tsushima.

Tetsushi Ito (Kyoto)

Title: Supercuspidal representations in the cohomology of the Rapoport–Zink space for the unitary group in three variables

Abstract: We study the l -adic cohomology of the Rapoport–Zink space for the unitary group in three variables, and show how the local Langlands correspondence for supercuspidal representations is realized in it. We use both geometric methods such as p -adic uniformization of Shimura varieties and automorphic methods such as the structure of L -packets and A -packets. This is a report on a joint work with Yoichi Mieda (Kyoto).

Kentaro Nakamura (Hokkaido)

Title: A generalization of Kato's local epsilon conjecture for (ϕ, Γ) -modules over the Robba ring

Abstract: In his preprint "Lectures on the approach to Iwasawa theory of Hasse–Weil L-functions via B_{dR} , Part II ", Kazuya Kato proposed a conjecture called local epsilon conjecture. This conjecture predicts that the determinant of the Galois cohomology of a family of p -adic Galois representations has a canonical base whose specializations at de Rham points can be characterized by using Bloch–Kato exponential, L -factors and Deligne–Langlands epsilon constants of the associated Weil–Deligne representations. In my talk, I generalize his conjecture for families of (ϕ, Γ) -modules over the Robba ring, and prove a part of this conjecture in the trianguline case. The two key ingredients are the recent result of Kedlaya–Pottharst–Xiao on the finiteness of cohomologies of (ϕ, Γ) -modules and my result on Bloch–Kato exponential map for (ϕ, Γ) -modules.

Chan–Ho Kim (BU)

Title: Anticyclotomic Iwasawa invariants and congruences of modular forms

Abstract: In this talk, we will look at how congruences between Hecke eigensystems of modular forms affect the Iwasawa invariants of their anticyclotomic p -adic L -functions. It can be regarded as an application of Greenberg–Vatsal's idea on the variation of Iwasawa invariants to the anticyclotomic setting. As an application, we obtain examples of the anticyclotomic main conjecture for modular forms not treated by Skinner–Urban's work. An explicit example will be given.

Min Lee (Brown)

Title: Selberg's shifted convolutions, multiple Dirichlet series and second moments of L-functions

Abstract: Selberg's shifted convolution was introduced by Selberg in 1965 and since then it has been recognized that its analytic properties play a very important role in several problems in analytic number theory. Recently, Hoffstein and his student Hulse defined a variant of Selberg's convolutions in one and two variables and obtained their meromorphic continuations. In this talk, I will explain an application to second moment problems for $GL(2)$ L-series. This is a joint work with Jeff Hoffstein.

Subong Lim (KIAS)

Title: Zagier duality for harmonic weak Maass forms of integral weights

Abstract: Zagier introduced special bases for weakly holomorphic modular forms to give the new proof of Borcherds' theorem on the infinite product expansions of integer weight modular forms on $SL_2(\mathbb{Z})$ with a Heegner divisor. These good bases appear in pairs, and they satisfy a striking duality, which is now called the Zagier duality. After the result of Zagier, this type duality was studied broadly in various viewpoints including the theory of a mock modular form. We consider this problem with the Eichler cohomology theory, especially the supplementary function theory developed by Knopp. Using holomorphic Poincaré series and their supplementary functions, we construct a pair of families of vector-valued harmonic weak Maass forms satisfying the Zagier duality with integer weights $-k$ and $k+2$ respectively, $k > 0$, for a H -group. We also investigate the structures of them such as the images under the differential operators D^{k+1} and ∇_{-k} .

Jeehoon Park (Postech)

Title: Period Integrals of Smooth Projective Hypersurfaces and L_{∞} -Homotopy Theory

Abstract: We provide a new point of view of understanding period integrals of differential forms on a smooth projective hypersurface in terms of L_{∞} -homotopy theory and representation theory of Lie algebra. In order for that, we define a Lie algebra representation attached to a projective smooth hypersurface and a cochain complex associated to this representation. Then we show that the Griffiths' period integral can be understood as both a $\text{Wtextit{period integral}}$ of this Lie algebra representation and a cochain map of certain cochain complexes whose interpretation leads us to L_{∞} -homotopy theory. Consequently we verify that period integrals of smooth hypersurfaces are invariants of homotopy types of L_{∞} -morphisms. In fact, the theory is more general; we define a notion of $\text{Wtextit{period integrals}}$ of a Lie algebra representation and propose a general strategy of studying them via L_{∞} -homotopy theory, when the representation space has an associative and commutative algebra structure. Then period integrals of a smooth projective hypersurface can be viewed as an explicit example of our general theory. This is a joint work with Jae-Suk Park.

Hwajong Yoo (UC Berkeley)

Title: Multiplicity one and level raising for reducible Galois representations

Abstract: In this talk, we will discuss multiplicity one theorem for Jacobians of modular curves and level raising for reducible Galois representations. After introducing several basic notions in this field, we will study how to prove existence of newforms with specific Hecke eigenvalues which give rise to a reducible mod ℓ representation.