Automorphic Representations, Automorphic Form, L-functions, and Related Topics

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RIMS

Abstract

Hiroki Aoki (Tokyo Univ. of Science)
Title: Vector valued Siegel modular forms with small levels

Abstract: On vector valued Siegel modular forms of degree 2 with respect to the symmetric tensor of degree 2, T.Satoh and T.Ibukiyama determined the structure with respect to the full modular group. There are ten generators with some relations. These generators are constructed from C-valued Siegel modular forms by using Rankin-Cohen-Ibukiyama differential operators.

In this talk, I will talk about the structures of vector valued Siegel modular forms with small levels. Their structures are similar to the structure with respect to the full modular group. Namely, there are ten generators which are constructed from C-valued Siegel modular forms by using Rankin-Cohen-Ibukiyama operators. To prove this result, we investigate the diagonal restriction of Siegel modular forms by using another kind of differential operators.

Jens Funke (Durham University)
Title: Special cohomology classes arising from the Weil representation

Abstract: Using the dual pair Sp(n) x O(p,q), we construct certain, special, cohomology classes for O(p,q) with values in the Weil representation. These classes are generalizations of previous work of Kudla and Millson. We discuss its geometric properties as Poincare dual forms for certain, special, cycles with coefficients in a finite dimensional representation of the orthogonal group. Moreover, globally, theta series associated to these classes give rise to vector-valued holomorphic Siegel modular forms. Furthermore, we also determine the behavior of the classes at the boundary of the Borel-Serre compactification of arithmetic quotients of the associated symmetric space for O(p,q). As a consequence we obtain certain non-vanishing results for these cycles. This is joint work with J. Millson.

Valery Gritsenko (Lille Univ.)
Title: A solution of one automorphic problem of K. Saito

Abstract: A 1-dimensional t-extension of the classical symmetric domain of type IV was introduced in the theory of singularities by K. Saito and E. Looijenga in 1983. In 1991 K. Saito formulated a problem about construction of automorphic forms on this non-classical domain. This is a question about existence of automorphic forms F(Z;t) on the orthogonal group O(2,n) depending on additional parameter t. In 1997 H. Aoki constructed the first example of such forms using my lifting procedure for the Jacobi modular forms in n variables. It means that there exist a t-parameter extension of the lifted modular forms.

In this talk I would like to present a totally different approach to the Saito problem.

THEOREM. For any modular form F(Z) of non-singular weight with respect to the orthogonal group O(2,n) there exists its t-extension F(Z;t), i.e, there exist a modular form F(Z;t) on the extended domain such that F(Z;0)=F(Z).

Yoshinori Hamahata (Tokyo University of Science)
Title: The Kodaira dimension of subvarieties of Siegel modular varieties

Abstract: We consider codimension 1 subvarieties of Siegel modular varieties. In principally polarized case, Freitag, Tsuyumine and Weissauer found subvarieties of general type. We present some subvarieties of general type in non-principally polarized case.

Shuichi Hayashida (Univ. of Siegen)
Title: Hilbert-Jacobi forms of a certain index of $Q(\sqrt{5})$ (joint work with N.-P.Skoruppa)

Abstract: Hilbert-Jacobi forms can be constructed by pair of Hilbert modular forms. The key of this construction is Wronski type Matrix of theta series. In the case $K = Q(\sqrt{5})$, by using this construction and by using the structure of space of Hilbert modular fomrs, we determined the structure of space of Hilbert-Jacobi forms of index $\epsilon/\sqrt{5}$ as module of Hilbert modular

forms, where O_K is principal order of $Q(\sqrt{5})$, and $\epsilon = (1+\sqrt{5})/2$.

Miki Hirano (Seikei Univ.)
Title: Principal series Whittaker functions on $GL(3, \mathbf{C})$

Abstract: In this talk, we will give explicit formulas for Whittaker functions for principal series representations of $GL(3, \mathbf{C})$. This is joint work with Takayuki Oda.

Tomoya Machide (Hokkaido Univ.)
Title: Elliptic Dedekind-Rademacher Sums and Transformation Formulae of Certain Infinite Series

Abstract: We give a transformation formula for certain infinite series in which some elliptic Dedekind-Rademacher sums arise. In the course of its proof, we also obtain a transformation formula for elliptic Dedekind-Rademacher sums. When a complex parameter τ tends to $i\infty$, these represent some classical results which include the reciprocity formula for Apostol-Dedekind sums.

Kimball Martin (Univ. of Oklahoma)
Title: Central L-values and periods for GL(2)

Abstract: We will give a brief survey the problem of expressing central values of (twisted) GL(2) L-functions in terms of period integrals over compact tori (coming from the Jacquet-Langlands correspondence). Waldspurger first obtained a general formula relating these quantities, but there was also an interest in more refined formulas, such as those obtained by Gross, Zhang and others in special cases. These approaches rely on the theta correspondence, however there is also a trace formula approach to this problem initiated by Jacquet. We will end by discussing recent joint work with David Whitehouse, which follows Jacquet's approach and results in explicit formulas (a la Gross and Zhang) of the above type.

Alberto Minguez (Université Paris Sud)

Title: l-modular local theta correspondence

Abstract: In this talk we will discuss about the possibility of having a local theta correspondence for l-modular representations. For the dual pair of type (Gl(n), Gl(m)) we will show a new proof, valid if l is a prime number said *banal*. This proof allows us to describe the correspondence in terms of Langlands parameters.

Toshiyuki Kikuta (Kinki Univ.), and **Shoyu Nagaoka** (Kinki Univ.)
Title: Some p-adic properties of Siegel-Eisenstein series

Abstract: In our previous study, we attempted to generalize the notion of Serre's p-adic Eisenstein series and obtained several interesting formulas. For example, in the Siegel modular case, a correspondence between p-adic Siegel-Eisenstein series and theta series was reported. More precisely, certain p-adic Siegel-Eisenstein series were shown to coincide with the genus theta series of level p. This indicates a remarkable relationship between p-adic Siegel modular forms and Siegel modular forms on the congruence subgroup $\Gamma_0(p)$ of the so-called Nebentypus. In this talk, we show that a similar phenomenon occurs for Haupttypus.

Hiroaki Narita (Osaka City Univ.)
Title: Fourier expansion of Arakawa lifting.

Abstract: There is a theta lift to an automorphic form on $GSp(1,1)$ from a pair of an elliptic cusp form f and an automorphic form f' on a definite quaternion algebra over $\mathbb{Q}$ (which we call Arakawa lifting). The aim of this talk is to present an explicit formula for Fourier coefficients of the theta lift in terms of toral integrals of (f, f'). As an application we show the existence of non-vanishing lifts.

Takeo Okazaki (Kyoto Univ.)
Title: Base change type spinor L-function of $GSp(2, \mathbf{Q})$

Abstract: In the theory of automorphic representaion of $GSp(4)$, it is known that the CAP representations (cuspidal) have the same L-functions of non-

cuspidal one. Besides, we happened to find a cuspidal representation whose spinor L-function is equal to that of non-cuspidal one. We will determine when such a phenomenon occurs by generalizing the 'Zharkovskaya relation'. If we have time, for imaginary quadratic field K, we would like to talk about when π_K on $GL_2(K)$ is distinguished, related to the former topic.

Masao Tsuzuki (Sophia Univ.)
Title: Spectral square means of period integrals for wave forms on real hyperbolic spaces

Abstract: By using the automorphic Green function and the automorphic heat kernel, we obtain an asymptotic behavior of the spectral square means of wave functions on real hyperbolic spaces.

Shunsuke Yamana (Kyoto Univ.)
Title: An explicit construction of Jacobi forms and its applications

Abstract: From an elliptic cusp form, we construct a Jacobi cusp form, which gives a section of the descent map. This construction yields cusp forms in a Maass space on orthogonal groups. As an application, we show that the subspace of Siegel cusp forms generated by Ikeda lifts of elliptic cusp forms can be characterized by certain linear relations among Fourier coefficient.

Atsuo Yamauchi (Nagoya Univ.)
Title: Some vector-valued theta series on U(2,2) and Sp(1,1)

Abstract: In this talk, we will explicitly construct some vector-valued singular forms on U(2,2), which are generalizations of theta series. The pull-backs of such singular forms to Sp(1,1) are modular forms generating quaternionic discrete series, and have very simple Fourier coefficients. These modular forms (on Sp(1,1)) can be regarded as theta series on the hyperbolic space of dimension 4. (This is a joint work with Hiro-aki Narita.)