

Representation Theory and Number Theory Workshop

20 – 22 April 2015

9am-6pm / 9am-2pm

S17-04-05



Department of Mathematics
Faculty of Science

Programme

20 April 2015 (Monday)

Room: S17-04-05

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|-------------------|---|
| 9.30am – 10.30am | Local and global wave-front sets
<i>Gordan SAVIN, University of Utah</i> |
| 10.30am – 11.00am | Break @ Mathematics Department Lounge |
| 11.00am – 12.00pm | Local symmetric square L-functions and trilinear forms
<i>Shunsuke YAMANA, Kyushu University</i> |
| 12.00pm – 2.00pm | Lunch |
| 2.00pm – 3.00pm | Endoscopy and the cohomology of arithmetic groups
<i>Anantharam RAGHURAMM IISER, Pune</i> |
| 3.00pm – 3.30pm | Break @ Mathematics Department Lounge |
| 3.30pm – 4.30pm | On applying the Deligne-Kazhdan philosophy to split classical groups
<i>Sandeep VARMA, Tata Institute</i> |
| 6.00pm | Dinner |

Programme

21 April 2015 (Tuesday)

Room: S17-04-05

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|-------------------|---|
| 9.30am – 10.30am | A Family of New-way Integrals for the Standard L-function of Cuspidal Representations of the Exceptional Group of Type G_2
<i>Avner SEGAL, Ben Gurion University</i> |
| 10.30am – 11.00am | Break @ Mathematics Department Lounge |
| 11.00am – 12.00pm | Branching laws for non-tempered A-packets: examples
<i>Nadya GUREVICH, Ben Gurion University</i> |
| 12.00pm – 2.00pm | Lunch |
| 2.00pm – 3.00pm | Eisenstein series and cohomology for unitary groups
<i>Neven GRBAC, University of Rijeka</i> |
| 3.00pm – 3.30pm | Break @ Mathematics Department Lounge |
| 3.30pm – 4.30pm | Whittaker functions on metaplectic groups and Tokuyama formula
<i>Lei ZHANG, National University of Singapore</i> |
| 6.00pm | Dinner |

Programme

22 April 2015 (Wednesday)

Room: S17-04-05

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|-------------------|---|
| 9.30am – 10.30am | The Langlands-Shahidi L-functions for Brylinski-Deligne extensions
<i>Fan GAO, National University of Singapore</i> |
| 10.30am – 11.00am | Break @ Mathematics Department Lounge |
| 11.00am – 12.00pm | Local theta correspondence between supercuspidal representations
<i>Jiajun MA, Chinese University of Hong Kong</i> |
| 12.00pm – 2.00pm | Lunch |

Abstract

The Langlands-Shahidi L-functions for Brylinski-Deligne extensions

Fan GAO, National University of Singapore

In the recent foundational work of Martin Weissman, the L-group for Brylinski-Deligne (BD) covering groups is constructed functorially. For BD covers of arbitrary split reductive group, we show that the constant term of Eisenstein series could be expressed in terms of global (partial) Langlands-Shahidi type L-functions. As in the linear algebraic case, this relies crucially on the analogous of Satake isomorphism, Gindikin-Karpelevich formula and local Langlands correspondence. In this talk, we will give a brief description of these. Meanwhile, we also indicate some applications and immediate questions arising from our result.

Eisenstein series and cohomology for unitary groups

Neven GRBAC, University of Rijeka

In this talk we present the joint work with Joachim Schwermer on the Eisenstein series for unitary groups, their analytic properties, and applications to the computation of the Eisenstein cohomology of unitary groups.

Branching laws for non-tempered A-packets: examples

Nadya GUREVICH, Ben Gurion University

Not available at time of printing.

Local theta correspondence between supercuspidal representations

Jiajun MA, Chinese University of Hong Kong

Supercuspidal representations are the building blocks of irreducible representations of reductive groups over p -adic fields.

Thanks to the works of Yu, Kim, Hakim-Murnaghan and others, we have a parameterization/construction of all supercuspidal representations when p is sufficiently big.

In this talk, I will explicitly describe the local theta correspondences between supercuspidal representations in terms of Yu/Kim's parameters. In fact, a notion of lifting of supercuspidal data will be defined based on moment maps and theta correspondences over finite fields. As a corollary, the occurrence of a supercuspidal representation becomes an easy problem, mod the part of theta correspondence over finite fields (which may not always enter the picture). This is a joint work with Hung Yean Loke.

Endoscopy and the cohomology of arithmetic groups

Anantharam RAGHURAMm IISER, Pune

Given an integer k , taken to be at least 2, it is well-known that there are holomorphic cusp forms of weight k for some subgroup of $SL(2, \mathbb{Z})$. In this talk, I will discuss some higher-dimensional analogues, which beg the question: given a connected reductive group G , and a finite-dimensional representation V of G , is the cuspidal cohomology of G with coefficients in V nonzero?

After introducing the context, and discussing some general themes, I will present some results, obtained in an ongoing collaboration with Chandrasheel Bhagwat, that give an endoscopic construction of nonzero cuspidal cohomology classes when G is $GL(n)$ over a totally real field.

Local and global wave-front sets

Gordan SAVIN, University of Utah

I will describe an algorithm that, starting from an orbit in the wave-front set, produces a slightly larger orbit, if certain conditions are satisfied. This is a joint work with Baiying Liu and Dihua Jiang.

A Family of New-way Integrals for the Standard L-function of Cuspidal Representations of the Exceptional Group of Type G_2

Avner SEGAL, Ben Gurion University

In a joint work with N. Gurevich we have constructed a family of Rankin-Selberg integrals representing the standard twisted L-function of a cuspidal representation of the exceptional group of type G_2 . This integral representations use a degenerate Eisenstein series on the family of quasi-split forms of $Spin_8$ associated to an induction from a character on the Heisenberg parabolic subgroup. This integral representations are unusual in the sense that they unfold with a non-unique model. A priori this integral is not factorizable but using remarkable machinery proposed by I. Piatetski-Shapiro and S. Rallis we prove that in fact the integral does factor. As the local generating function of the local \mathcal{L} -factor was unknown to us, we used the theory of C^* -algebras in order to approximate it and perform the unramified computation. If time permits, I will discuss the poles of the relevant Eisenstein series and some applications to the theory of CAP representations of G_2 .

On applying the Deligne-Kazhdan philosophy to split classical groups

Sandeep VARMA, Tata Institute

I will report on an ongoing joint project with Radhika Ganapathy. The theory of 'close local fields', or the Deligne-Kazhdan philosophy, proposes to study either side of the local Langlands correspondence for a reductive group over a local function field (i.e., of the form $F_q((t))$) by comparison with its analogues over (varying) finite extensions of \mathbb{Q}_p . We will discuss an approach to using this philosophy to study the local Langlands correspondence for split classical groups over local function fields, as a transfer from its characteristic zero variant, which was established by Arthur.

Local symmetric square L-functions and trilinear forms

Shunsuke YAMANA, Kyushu University

I will develop a local theory of symmetric square L-functions for general linear groups and prove a certain characterization of a pole of symmetric square L-factors of square-integrable representations, a uniqueness of certain trilinear forms and nonexistence of Whittaker models of higher exceptional representations.

Whittaker functions on metaplectic groups and Tokuyama formula

Lei ZHANG, National University of Singapore

We will discuss Whittaker functions on covers of symplectic groups and will give an explicit formula for certain Whittaker coefficients in terms of crystal graphs. Such a formula provides a connection between automorphic forms and Weyl group multi-variable Dirichlet series. Moreover, as an application of our results, we obtain a generalization of Tokuyama formula in the case of the Lie algebra B_n .