

TWO-DAY WORKSHOP ON LIE THEORY

November 26 -27, 2022

Zoom Meeting ID: 876 5446 7186 , Password: 000000

Speakers

Chengyu Du (Soochow University)

Fan Gao (Zhejiang University)

Chun-Ju Lai (Academia Sinica)

Ning Li (Nankai University)

Caihua Luo (Chinese University of Hong Kong)

Wei Xiao (Shenzhen University)

Shizhuo Yu (Nankai University)

Hongfeng Zhang (Chinese University of Hong Kong, Shenzhen)

Organizers

Zhanqiang Bai (Soochow University)

Kei Yuen Chan (Fudan University)

Chaoping Dong (Soochow University)

Daniel Kayue Wong (Chinese University of Hong Kong, Shenzhen)

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Chengyu Du (Soochow University)

Title: Spin norm and lambda norm

Abstract: Given a K -type π , it is known that its spin norm (due to C.-P. Dong) is lower bounded by its lambda norm (due to Vogan).

That is, $\|\pi\|_{\text{spin}} \geq \|\pi\|_{\text{lambda}}$. This note aims to describe for which π one can actually have equality. We apply the result to tempered Dirac series.

Fan Gao (Zhejiang University)

Title: Quasi-admissible, raisable nilpotent orbits, and theta representations.

Abstract: We recall the notion of quasi-admissible and raisable nilpotent orbits. In particular, for a central n -fold cover of a reductive group, we determine the n such that a given nilpotent orbit is quasi-admissible and non-raisable. This helps us to understand the wavefront set of a genuine representation of such central cover, and in particular of the theta representations. The talk is based on joint work with Baiying Liu and Wan-Yu Tsai.

Chun-Ju Lai (Academia Sinica)

Title: Quasi-hereditary covers, Hecke subalgebras and quantum wreath product

Abstract: The Hecke algebra is in general not quasi-hereditary (i.e., its module category is not a highest weight category). It admits a quasi-hereditary cover (or, 0-cover) via the category \mathcal{O} of a certain rational Cherednik algebra due to Ginzburg-Guay-Opdam-Rouquier. In type A/B/C, the Hecke algebra further admits a 1-cover via the module category of the q -Schur algebra, which in turn is equivalent to the category \mathcal{O} . An essential step in the type D analog is to study Hu's Hecke subalgebra, which deforms from a wreath product that is not a Coxeter group. In this talk, I'll talk about a new theory allowing us to take the "quantum wreath product" of an algebra by a Hecke algebra. Our wreath product produces the Ariki-Koike algebra as a special case, as well as new "Hecke algebras" of wreath products between symmetric groups. We expect them to play a role in answering the GGOR conjecture for complex reflection groups. This is a joint work with Dan Nakano and Ziqing Xiang.

Ning Li (Nankai University)

Title: Invariants in representation theory of real reductive groups

Abstract: One of the most basic and fundamental problems in the representation theory of real reductive groups is to classify the irreducible representations. Following the ideal of introducing homology and homotopy groups to a topological space, one can also attach certain invariants to irreducible representations, such as infinitesimal characters, K -types, associated cycles, wavefront cycles, Lie algebra cohomology. In this talk, I will report on some progress on computing these invariants. We mainly focus on two parts, explicitly computation of associated cycles and wavefront cycles for certain classes of representations, and comparison theorem of certain cohomology of representations.

Caihua Luo (Chinese University of Hong Kong)

Title: GCD of Cai-Friedberg-Ginzburg-Kaplan's generalized doubling method

Abstract: Recently, Cai-Friedberg-Ginzburg-Kaplan discovered and developed a new type of integral representations of tensor-product L -functions for classical groups, globally and locally. To get a complete theory, a gcd approach to the local counterpart might be necessary. In the talk, we will report some progress on this aspect. Once worked out, it is supposed to be merged with Cai's project.

Wei Xiao (Shenzhen University)

Title: Jantzen coefficients and generalized Harish-Chandra modules

Abstract: In this talk, we will give some recent results about generalized Harish-Chandra modules in representation theory of Lie groups and Lie algebras, focusing on highest weight modules. In particular, we introduce the Jantzen coefficient which is a useful tool in the research about highest weight modules.

Shizhuo Yu (Nankai University)

Title: Kazhdan-Lusztig isomorphism and Bott-Samelson atlas on flag varieties

Abstract: On a flag variety, Kazhdan-Lusztig isomorphisms can be defined on shifted big cells and applied to construct the Bott-Samelson atlas. In this talk, we introduce the compatibility between the standard Poisson structures, the induced cluster structures and the Lusztig's total positivity on flag varieties based on Bott-Samelson atlas. This is the joint work with Jiang-Hua Lu.

Hongfeng Zhang (Chinese University of Hong Kong, Shenzhen)

Title : Compute the multiplicities of K-types via intertwining operators

Abstract : The intertwining operator play an important role in the determination of unitary dual of real groups. We review Barbasch's paper "The unitary spherical spectrum for split classical groups" and explain how to determine the unitarity of Hermitian modules. Secondly, we show how to get the multiplicities of some K-types of the irreducible Langlands subquotient by computing the intertwining operators.