Research Workshop:
Seminar in Representation Theory

Organizers:
Jan Frahm (Aarhus University)
Bent Ørsted (Aarhus University)

September 8–9, 2021

The purpose of this seminar is to present recent developments in the representation theory of real reductive groups and related areas. The time slots were chosen so that researchers from both Asia and Europe can attend. We hope that this meeting also helps to bring together Asian and European colleagues within the AIM Research Community "Representation Theory & Noncommutative Geometry" on the Sococo platform.

Zoom details

Zoom link: https://aarhusuniversity.zoom.us/j/68808112524
Meeting-ID: 688 0811 2524

Speakers

- Wee Teck Gan (National University of Singapore)

- Toshiyuki Kobayashi (The University of Tokyo)

- Yoshiki Oshima (Osaka University)

- Binyong Sun (Zhejiang University)

- Chen-Bo Zhu (National University of Singapore)

Schedule

WEDNESDAY, SEPTEMBER 8		
9:00 – 9:50 CET 15:00 – 15:50 CST 16:00 – 16:50 JST	Kobayashi	*Tempered representations and limit algebras*
9:50 – 10:40 CET 15:50 – 16:40 CST 16:50 – 17:40 JST	Zhu	*Theta correspondence and special unipotent representations*
Virtual Coffee/Tea		
11:00 – 11:50 CET 17:00 – 17:50 CST 18:00 – 18:50 JST	Gan	*Twisted GGP problems and conjectures*

THURSDAY, SEPTEMBER 9		
9:00 – 9:50 CET 15:00 – 15:50 CST 16:00 – 16:50 JST	Sun	*Archimedean period relations and period relations for automorphic L-functions*
Virtual Coffee/Tea		
10:10 – 11:00 CET 16:10 – 17:00 CST 17:10 – 18:00 JST	Oshima	*On the asymptotic support of Plancherel measures for homogeneous spaces*

CET = Central European Time
CST = China Standard Time = CET + 6hrs
JST = Japan Standard Time = CET + 7hrs

Abstracts

Wednesday, September 8

9:00 – 9:50 CET
Toshiyuki Kobayashi (The University of Tokyo)
Tempered representations and limit algebras

I plan to discuss some new connection between the following four (apparently unrelated) topics:

1. (analysis) Tempered unitary representations on homogeneous spaces
2. (combinatorics) Convex polyhedral cones
3. (topology) Limit algebras
4. (symplectic geometry) Quantization of coadjoint orbits,

based on a series of joint papers with Y. Benoist "Tempered homogeneous spaces I–IV".

9:50 – 10:40 CET
Chen-Bo Zhu (National University of Singapore)
Theta correspondence and special unipotent representations

The theory of theta correspondence, initiated by Howe, provides a powerful method of constructing irreducible admissible representations of classical Lie groups. In this talk, I will discuss a recent work, joint with Barbasch, Ma and Sun, in which we show that in addition to irreducible unitary parabolic inductions, theta lifts yield all special unipotent representations of a classical Lie group G. As a consequence of the construction and the classification, we conclude that all special unipotent representations of G are unitarizable, as predicted by the Arthur–Barbasch–Vogan conjecture.

11:00 – 11:50 CET
Wee Teck Gan (National University of Singapore)
Twisted GGP problems and conjectures

I will discuss some twisted variants of the GGP restriction problems in the setting of skew-Hermitian spaces. Together with Gross and Prasad, we formulate conjectural answers to these twisted GGP problems and provide some evidences in low rank and for unitary principal series.

Thursday, September 9

9:00 – 9:50 CET
Binyong Sun (Zhejiang University)
Archimedean period relations and period relations for automorphic L-functions

It was known to Euler that $\zeta(2k)$ is a rational multiple of π^{2k}, where ζ is the Euler–Riemann zeta function, and k is a positive integer. Following the pioneering works of G. Shimura, P. Deligne and etc., D. Blasius proposed a conjecture which asserts that similar rationality results hold for very general automorphic L-functions. We confirm Blasius's conjecture in two cases: the standard L-functions of symplectic type (joint with Dihua Jiang and Fangyang Tian), and the Rankin-Selberg L-functions for $GL(n) \times GL(n-1)$ (joint with Jian-Shu Li and Dongwen Liu). The key ingredient is the Archimedean period relations for the modular symbols at infinity. These two cases have already been studied by many authors, including Harris–Lin, Grobner–Raghuram, Harder–Raghuram, Januszewski, Grobner–Lin, and etc.

10:10 – 11:00 CET
Yoshiki Oshima (Osaka University)
On the asymptotic support of Plancherel measures for homogeneous spaces

Let G be a real reductive group and X a homogeneous G-manifold. The Plancherel measure for X describes how $L^2(X)$ breaks up into irreducible unitary representations of G. We discuss asymptotics of the support of Plancherel measure and relate it with geometry of coadjoint orbits. In particular, we give a sufficient condition for the existence of discrete series. This is a joint work with Benjamin Harris.