

Programme

Jeudi 1er décembre 2016 (Salle B21, Campus Kirchberg)

- 13:45–14:45 **Job Kuit**
Cusp forms for reductive symmetric spaces
- 14:45–15:45 **Gilles Becker**
Cusp forms for locally symmetric spaces of infinite volume
- 15:45–16:15 Pause café
- 16:15–17:15 **Nicolas Prudhon**
Exhausting families of representations
- 17:15–18:15 **Sofiane Souaifi**
The constant term of tempered functions on a real spherical space
- 19:30 Dîner de conférence au Bouquet Garni
Rue de l'Eau 32, 1449 Luxembourg

Vendredi 2 décembre 2016 (Salle C02, Campus Kirchberg)

- 09:00–10:00 **Alexandre Afgoustidis**
On the analogy between the tempered dual of a reductive Lie group and that of its Cartan motion group
- 10:00–10:30 Pause café
- 10:30–11:30 **Rupert Yu**
Jet schemes of nilpotent orbit closures
- 11:30–12:30 **Jean-Louis Clerc**
Construction of covariant bi-differential operators on the space of matrices

- **Alexandre Afgoustidis** (Université Paris-Dauphine):

On the analogy between the tempered dual of a reductive Lie group and that of its Cartan motion group

George W. Mackey suggested in 1975 that there may be analogies between the representation theory of a semisimple Lie group and that of its Cartan motion group. Mackey's observations seem to have led to relatively few results until recently, when Nigel Higson (motivated by the Baum-Connes-Kasparov conjecture in operator K-theory) investigated the complex semisimple case in some detail. I will describe a natural bijection between the tempered dual of an arbitrary real reductive group and that of its Cartan motion group, and say how the representations paired by this bijection can be seen to deform upon one another as the contraction from one group to the other is performed.

- **Gilles Becker** (Université du Luxembourg):

Cusp forms for locally symmetric spaces of infinite volume

We investigate the right regular representation of a semisimple noncompact Lie group G of real rank one on $L^2(\Gamma \backslash G)$. Here, Γ is a discrete subgroup of G . In the group case and the finite volume case, cusp forms play an important role. From this arises the question whether one can also define cusp forms for locally symmetric spaces of infinite volume and which role they play in this setting. In this talk, we focus on the convex cocompact, noncompact case. First we define the space of cusp forms for these locally symmetric spaces and then we analyse the contribution of the discrete series representations to it.

- **Jean-Louis Clerc** (Université de Lorraine):

Construction of covariant bi-differential operators on the space of matrices

I will first present the Omega process, the transvectants in classical invariant theory and the Rankin-Cohen brackets, which correspond to the case $m = 1$. I will continue by some geometry and analysis of the real Grassmannian $G(m, 2m)$ and on the space of square matrix $\text{Mat}(m)$ under the action of $SL(2m)$. The core of the talk is the construction of a family of differential operators on $\text{Mat}(m) \times \text{Mat}(m)$ which are covariant for the diagonal action of $SL(2m)$. By composing with the restriction map from $\text{Mat}(m) \times \text{Mat}(m)$ into $\text{Mat}(m)$, families of covariant bi-differential operators will be obtained, generalizing the transvectants and the Rankin-Cohen brackets.

- **Job J. Kuit** (Universität Paderborn):

Cusp forms for reductive symmetric spaces

For a real reductive Lie group G , there exists a notion of cusp form, which was introduced by Harish-Chandra. He showed that the space of cusp forms coincides with the discrete part of the spectral decomposition of the space of

square integrable functions on G .

The class of real reductive symmetric spaces contains the real reductive Lie groups. It would be interesting to have a notion of cusp form for this class of spaces, but the generalization of Harish-Chandra's definition turns out to be somewhat problematic due to the fact that certain integrals are divergent. In this talk I will propose a definition of cusp forms for reductive symmetric spaces of split rank 1 and discuss the relation between cusp forms and discrete series representations.

This is a joint work with Erik van den Ban and Henrik Schlichtkrull.

- **Nicolas Prudhon** (Université de Lorraine):

Exhausting families of representations

A family of representations \mathfrak{F} of a C^* -algebra A is exhausting if every irreducible representation of A is weakly contained in some $\phi \in \mathfrak{F}$.

Such a family \mathfrak{F} has the property that $a \in A$ is invertible if, and only if, $\phi(a)$ is invertible for any $\phi \in \mathfrak{F}$.

The regular representations of amenable, second countable, locally compact groupoids form an exhausting family of representations. We consider also unbounded operators. A typical application is to parametric pseudodifferential operators.

- **Sofiane Souaifi** (Université de Strasbourg):

The constant term of tempered functions on a real spherical space

Generalizing some ideas of Harish-Chandra, we show the existence of the constant term for tempered functions on a unimodular wave-front real spherical space. In this talk, after a brief reminder of the definition of real spherical spaces and some of their properties, we will set out ideas used to prove the existence of the constant term. Finally, we will state some features satisfied by the constant term.

This is a joint work with Patrick Delorme.

- **Rupert Yu** (Université de Reims):

Jet schemes of nilpotent orbit closures

In this talk, we discuss jet schemes of nilpotent orbit closures in a semisimple Lie algebra over the complex numbers. In the case of the regular nilpotent orbit, its closure is the nilpotent cone, and their jet schemes are always irreducible. This was conjectured by Eisenbud and Frenkel, and is a consequence of a more general result of Mustata. We shall see that for a non regular and non zero nilpotent orbit, the jet schemes of its closure are in general not irreducible, and we can deduce from this certain geometric properties on the closure of this nilpotent orbit.

This is a joint work with Anne Moreau.