JOURNEES DE THEORIE DES REPRESENTATIONS ET ANALYSE HARMONIQUE [1]

En l'honneur de Hubert Rubenthaler à l'occasion de son départ à la retraite

IRMA, 22 mars - 23 mars 2018 - Salle de Conférences

Programme et Résumés

---

22 mars 2018

14h Robert J. Stanton (Ohio State University)

An application of the Selberg Trace Formula to vector bundles

   To a locally Hermitian symmetric space and a locally homogeneous vector bundle we shall associate a geometric zeta function. The analytic properties will be determined by means of the STF using several results from harmonic analysis.The partie finie of Hadamard will be a convenient tool to construct regularized determinants in terms of which the geometric function will be expressed. This is joint with H. Moscovici.

15h Pascale Harinck (Ecole Polytechnique)

On a local relative trace formula, example of PGL(2).

   Let E/F be a nonramified quadratic extension of p-adic fields. Let $\underline{H}$ be an algebraic reductive group defined and split over F. I will explain results on a local relative trace formula for $\underline{H}(E)$ relative to $\underline{H}(F)$. It is a analogue of the local trace formula of J. Arthur on the group. P. Delorme, S. Souaifi and me describe the geometric side of such a formula and give application to invert some orbital integrals. For $\underline{H} = PGL_2$, P. Delorme and me obtain the spectral side of this formula in terms of regularized periods. This work is inspired by results of B. Feigon.

16h-16h30 Pause Café

16h30 Jan Frahm (FAU Erlangen-Nürnberg) :

Symmetry breaking operators for strongly spherical reductive pairs

A real reductive pair (G, H) is called strongly spherical if the homogeneous space $(G \times H)/diag(H)$ is real spherical. It was proven by Kobayashi and Oshima that this geometric condition is equivalent to the representation theoretic property that $\operatorname{Hom}_H(\pi_{|_H}, \tau)$ is finite-dimensional for all smooth admissible representations π of G and τ of H. In this talk we explain how to explicitly construct for all strongly spherical pairs (G, H) intertwining operators in $\operatorname{Hom}_H(\pi_{|_H}, \tau)$ for π and τ spherical principal series representations of G and H. These so-called symmetry breaking operators depend meromorphically on the induction parameters and we further show that they generically span the space $\operatorname{Hom}_H(\pi_{|_H}, \tau)$. In the special case of multiplicity one pairs we extend our construction to vector-valued principal series representations and obtain generic formulas for the multiplicities between arbitrary principal series.

17h30 Angela Pasquale (Université de Lorraine, Metz) :

Heckman-Opdam hypergeometric functions with standard multiplicities and spherical functions for non-trivial K-types

Harish-Chandra's spherical functions on a Riemannian symmetric space of the noncompact type G/K, once restricted to a maximal flat subspace, are special instances of Heckman-Opdam's hypergeometric functions with nonnegative multiplicities. On the other hand, several known cases of spherical functions for non-trivial K-types, when restricted to the maximal flat, are (up to some trigonometric factors) Heckman-Opdam's hypergeometric functions for not necessarily positive multiplicities. In this talk, we consider the case of standard multiplicities, a notion introduced by Heckman in the middle of the 1990s. Their study includes that of the spherical functions for several 1-dimensional K-types as well as a few other instances of small K-types, recently considered by Oda and Shimeno.
This talk is mostly based on joint work with E. K. Narayanan (I.I.Sc. Bangalore).

19h45 Dîner : *L'Alsace à Table, 8 rue des Francs Bourgeois*

---

23 mars 2018

9h Michael Pevzner (Université de Reims) :

Conformal symmetry breaking operators for anti-de Sitter spaces

For a pseudo-Riemannian manifold X and a totally geodesic hypersurface Y, we consider the problem of constructing and classifying all linear differential operators $\mathcal{E}^i(X) \to \mathcal{E}^j(Y)$ between the spaces of differential forms that intertwine multiplier representations of the Lie algebra of conformal vector fields. Extending the recent results in the Riemannian setting obtained in a joint work with T. Kobayashi and T. Kubo we give a complete classification of such symmetry breaking operators in the case where both X and Y are of constant sectional curvature, illustrated by the examples of anti-de Sitter spaces and hyperbolic spaces.

10h-10h30 Pause Café

10h30 Jean-Louis Clerc (Université de Lorraine, Nancy) :

Generalized Rankin-Cohen brackets for simple Jordan algebras

In the introduction, I will recall the Ω-process and give a construction of covariant bi-differential operators for the group $SL(2, \mathbb{R})$ which yields both the *transvectants* (a basic tool in classical invariant theory) and the *Rankin-Cohen brackets* (used in the theory of modular forms). Then I will recall the equivalence between *real simple Jordan algebras V* and pairs (G, P) where G is a simple Lie group, P a maximal parabolic subgroup with unipotent radical such that the opposite parabolic subgroup $\overline{P}$ is conjugate to P. In this geometric context, I will describe a construction of the *source operator*, a differential operator on $V \times V$ which is covariant under the diagonal action of G. From the source operator, it is then easy to construct covariant bi-differential operators (from $V \times V$ to V) which generalize both the transvectants and the Rankin-Cohen bracket (joint work with S. Ben Saïd and K. Koufany).

11h30 Toshiyuki Kobayashi (University of Tokyo)

Conformally covariant symmetry breaking operators on differential forms and some applications

I plan to discuss some background of restriction problem and explain the complete classification of symmetry breaking operators on differential forms for spheres. If time permits, I would like to mention some applications.