Mathematics Seminar
of the
University of Luxembourg
in cooperation with the
Luxembourg Mathematical Society

February 2008

5 February 2008, at 5 pm   **Room 3.04 bs**

Shizan Fang

University of Bourgogne - Dijon

Wasserstein space over the Wiener space

Abstract

We shall carry out the programme of Ambrosio-Gigli-Savaré on gradient flows to the Wiener space (X, H, μ). The suitable class of measures in this case is the one of measures having finite entropy, the notion of moments being not convenient.

19 February 2008, at 5 pm   **Room 3.04 bs**

Salah Mehdi

University Paris 10

Harmonic spinors and representations of Lie groups

Abstract

In the 1970s it was shown that discrete series representations of non-compact semisimple Lie groups are realized on spaces of square integrable vector-valued harmonic spinors on non-compact Riemannian symmetric spaces. The introduction of the Dirac operator, replacing the usual Dolbeault operator, allows one to treat all non-compact semisimple Lie groups rather than just the ones whose symmetric space is hermitian. We define a product for harmonic spinors on reductive homogeneous spaces. We give also some examples where harmonic spinors with coefficients in a module are expressed as a linear combination of products of harmonic spinors with coefficients in two other modules. One such example involves discrete series representations. We will also explain how to construct explicit solutions of the cubic Dirac equation on reductive homogeneous spaces.

Robert Wolak

Jagiellonian University of Krakow

Dynamics of pseudogroups and foliations

Abstract

The theory of smooth dynamical systems can be understood as a qualitative theory of systems of ordinary differential equations, and the theory of foliations as a qualitative theory of partial differential equations. It is to be expected that some methods of the theory of dynamical systems and ergodic theory can be transposed and usefully applied in the foliation theory.

Foliations can be understood as higher dimensional dynamical systems in which we have forgotten about the parametrization. Numerous topological properties of dynamical systems do not depend on parametrization, e.g. the minimality of the closures of trajectories or the so-called transverse properties. However, on a foliated manifold we can introduce a substitute of a parametrization (or "time") a covering by foliated charts, and it leads to the notion of holonomy pseudogroup, which provides us with a substitute of "discrete time". A Riemannian metric gives a substitute of continuous time.

In recent years classical methods of differential topology or geometry have not been very successful in solving problems in the theory of foliations. On the other hand, some applications of mathematical theories turned out to be of great importance. "Transverse" applications of methods of the ergodic theory and of topological dynamics have been particularly fruitful. By "transverse" we mean applied to the holonomy pseudogroup of a foliation.

We continue research into the dynamics of pseudogroup and their applications in the theory of foliations of any codimension. The central notion is "distality"; we study the properties of distal pseudogroup as well as transversely distal foliations, i.e. such foliations whose holonomy pseudogroup is distal.