

Conférence Euro-Maghrébine de Géométrie
10 - 12 Octobre 2012

Livret des résumés

Mohammed Abouzaid
Columbia University Simons Center (USA)

On the symplectic topology of Stein manifolds

Résumé

Those complex manifolds which admit a proper embedding in affine space are called Stein. In the early 90's, Eliashberg classified the smooth manifolds of real dimension greater than 4 which admit a Stein structure, leaving open the question of whether a manifold can admit two Stein structures which are not deformation equivalent. By making full use of the modern machinery of symplectic topology (i.e. Floer theory and the Fukaya category), the last five years, starting with work of Seidel-Smith and McLean, has seen much progress on this front. I will particularly focus on the case of Stein structures on manifolds diffeomorphic to euclidean space, and explain some ideas behind the proof that, in real dimensions greater than 10, the set of equivalence classes of such Stein structures (under deformation) maps surjectively to the set of sequences of prime numbers. In particular, it is uncountable.

Ali Baklouti
Faculté des Sciences de Sfax (Tunisie)

On the geometry of discontinuous subgroups acting on solvable homogeneous spaces

Résumé

Let G be an exponential solvable Lie group and H a connected Lie subgroup of G . Given any discontinuous subgroup Γ for the homogeneous space $\mathcal{M} = G/H$ and any deformation of Γ , the deformed discrete subgroup may utterly destroy its proper discontinuous action on \mathcal{M} as H is not compact (except for the case when it is trivial). To emphasize this specific issue, we present in this talk different questions related to the geometry of the parameter and the deformation spaces of any discrete subgroup Γ acting properly discontinuously and fixed point freely on G/H for an arbitrary H . Some topological features of the related deformations are discussed, namely the rigidity conjecture for simply connected nilpotent Lie groups. We also present some positive solutions to the conjecture and discuss the more general setting of exponential solvable Lie groups.

Thierry Barbot
Université d'Avignon (France)

The geometry of spacetimes of constant curvature

Résumé

We will present the classification of spatially compact spacetimes of constant curvature, and recent results by M. Belraouti on the convergence near the origin of level sets of time functions considered as metric spaces.

Mohamed Belkhelfa

Université de Mascara (Algérie)

On Ricci pseudo-symmetry of Generalized S space form with two structure vector fields

Résumé

Generalized Sasakian space form has been defined and studied by P. Alegre, D. E. Blair, A. Carriazo [2004], as natural generalization of Sasakian space form (holomorphic sectional curvature constant). We studied and proved that any generalized Sasakian space form is Ricci pseudo-symmetric [2007, 2008]. In their paper A. Carriazo et al [2010], introduced and studied generalized S space form with two structure vector fields (two Reeb vector fields) (for $s=1$, we get Sasakian space form), as an example they gave a warped product of real line and a generalized Sasakian space form. In this talk, we study the Ricci pseudo-symmetry of Generalized S space form with two structure vector fields.

Mohammed Boucetta

Université Cadi-Ayyad de Marrakesh (Maroc)

**Solutions of the Yang-Baxter equations on orthogonal groups :
the case of oscillator groups**

Résumé

A Lie group is called orthogonal if it carries a bi-invariant pseudo-Riemannian metric. Oscillator Lie groups constitutes a subclass of the class of orthogonal Lie groups. In this paper, we determine the Lie bialgebra structures and the solutions of the classical Yang-Baxter equation on a generic class of oscillator Lie algebras. On the other hand, we show that any solution of the classical Yang-Baxter equation on an orthogonal Lie group induces a flat left invariant pseudo-Riemannian metric in the dual Lie groups associated to this solution. This metric is geodesically complete if and only if the dual are unimodular. More generally, we show that any solution of the generalized Yang-Baxter equation on an orthogonal Lie group determines a left invariant locally symmetric pseudo-Riemannian metric on the corresponding dual Lie groups. Applying this result to oscillator Lie groups we get a large class of solvable Lie groups with flat left invariant Lorentzian metric.

Reference

M.Boucetta and A.Medina *Solutions of the Yang-Baxter equations on orthogonal groups : the case of oscillator groups*, Journal of Geometry and Physics 61 (2011) pp. 2309-2320.

Gilles Carron
Université de Nantes (France)

Optimal Integral Pinching Results

Résumé

This is a joint work with V. Bour (Grenoble).

We obtain optimal cohomology vanishing based on integral curvature assumptions.

Yacine Chitour
Université de Paris-Sud (France)

Rolling manifolds on constant curvature spaces

Résumé

In this talk, I will present a joint work with M. Godoy-Molina and P. Kokkonen where we investigate the controllability of the rolling model of a Riemannian manifold onto a space of constant negative curvature. In particular, we reduce the question at stake to the study of the holonomy group of a (linear) connection on an associated vector bundle and we provide necessary and sufficient conditions to get complete controllability. The last part of the talk is devoted to the study of the infinitesimal symmetries associated to the rolling problem.

Sorin Dumitrescu
Université Nice Sophia Antipolis (France)

Quasihomogeneous analytic affine connections on surfaces

Résumé

We classify germs at the origin of torsion free real analytic affine connections on \mathbb{R}^2 which are *quasihomogeneous*, in the sense that they are *locally homogeneous* on an open set containing the origin in its closure, but not locally homogeneous in the neighborhood of the origin. We deduce the classification of torsion free real analytic affine connection on *compact* oriented real analytic surfaces which are locally homogeneous on a nontrivial open set, without being locally homogeneous on all of the surface.

This is a joint work with Adolfo Guillot (Unam, Cuernavaca, Mexico).

Vincent Guedj

Université de Toulouse (France)

Kaehler-Einstein fillings

Résumé

Given a bounded strictly pseudo-convex domain of \mathbb{C}^n , we construct a Kaehler-Einstein metric with positive Einstein constant which is conformal to the Levi form at the boundary.

This is joint work with B. Kolev and N. Yeganefar.

Mohammed Labbi

University of Bahrain (Bahreïn)

Highly connected manifolds of positive p -curvature

Résumé

We show that positive 2-curvature is preserved under surgery of codimension at least 5. Consequently, we prove that a compact 3-connected string manifold of dimension at least 9 that is string-cobordant to a manifold of positive 2-curvature has a metric with positive 2-curvature. We show that a compact non-string 3-connected manifold of dimension at least 7 and with vanishing α -genus has always a metric with positive 2-curvature. Finally, we discuss some interactions between a natural geometrical genus on the string-bordism ring which characterises positive 2-curvature and the Witten genus. This is a joint work with Boris Botvinnick.

Habib Marzougui

Université de Bizerte (Tunisie)

Hypercyclicity in linear dynamics

Résumé

We give a complete characterization of existence of a somewhere (resp. dense) orbit for any abelian semigroup of matrices on \mathbb{R}^n (resp. \mathbb{C}^n). For finitely generated semigroups, this characterization is explicit and it is used to determine the minimal number of matrices in normal form over \mathbb{C} (resp. \mathbb{R}) which form a hypercyclic abelian semigroup on \mathbb{C}^n and \mathbb{R}^n . This is a joint work with A. Ayadi.

Nordine Mir
Université de Rouen (France)

Algebraic approximation in CR geometry

Résumé

We will describe a recent CR version of Artin's approximation theorem for holomorphic mappings between real-algebraic sets in complex space.

Nabila Torki-hamza
Université de Kairouan (Tunisie)

On Magnetic Schrödinger operators on graphs

Résumé

After a brief survey on finite graphs, we define Schrödinger operators on an infinite locally finite weighted graph by the data of a magnetic field, some weights on the vertices and some weights on the edges.

Then we discuss essential self-adjointness of such operators in the case of metrically complete graphs with bounded degree. It is a continuation of the similar problem studied in the non magnetic case, for metrically complete graphs as well as for non complete ones.

The work was done in collaboration with Yves Colin de Verdière and Françoise Truc at Institut Fourier at Grenoble and by the financial support of the research unit "Mathematics and Applications" of Sciences Faculty at Bizerte.

Constantin Vernicos
Université de Montpellier (France)

Volume Entropy of Hilbert Geometries

Résumé

Hilbert geometries are simple metric spaces defined in the interior of a convex set using cross-ratios in the same way one defines the projective model of the Hyperbolic geometry inside a Euclidean ball. They are naturally endowed with a Finsler structure which might not be very regular. The last decade has seen a lot of reknown interest in their study from different viewpoints. The present talks will survey the question of Volume entropy, what is known and how it study led us to link it to other invariants on convex sets, such as centro-affine area and approximability.

Planning des exposés

	Mercredi 10 Octobre	Jeudi 11 Octobre	Vendredi 12 Octobre
09h45-10h30	Accueil des participants	Y. Chitour	C. Vernicos
10h30-11h00		Pause café	Pause café
11h00-11h45	V. Guedj	M. Abouzaid	H. Marzougui
11h45-12h30	N. Turki-Hamza	M. Labbi	G. Carron
13h00-14h00	Repas	Repas	Repas
14h30-15h15	M. Belkhelfa	M. Boucetta	Fin du Colloque
15h15-16h00	T. Barbot	A. Baklouti	
16h00-16h30	Pause café	Pause café	
16h30-17h15	N. Mir	S. Dumitrescu	
		DINER	

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- Laboratoire Euro-Maghrébin de Mathématiques et de leurs Interactions
- Laboratoire J.A. Dieudonné
- Institut Universitaire de France