Workshop on Groups, Geometry and Dynamics
Program

Jairo Bochi (PUC-Chile)

Optimization of Lyapunov Exponents

Abstract

I'll explain some basic results about optimization of Lyapunov exponents of linear cocycles, comparing them with corresponding results on optimization of ergodic averages.

Keith Burns (Northwestern Univeristy)

Openness of accessibility with three dimensional center

Abstract

Consider partially hyperbolic diffeomorphisms with an invariant splitting into three bundles — unstable, center, and stable.

Didier showed that if the center bundle is one dimensional, then the property of accesibility is open, i.e. it persists under small pertrubations of the diffeomorphism. More recently Avila and Viana showed that same is true when the center bundle is two dimensional. The talk will describe an effort to adapt Avila and Viana's technique to show that accessibility is still open when the center bundle is three dimensional. This is joint work with Jana Rodriguez Hertz and Raul Ures.

Yaiza Canzani (University of North Carolina)

On the growth of eigenfunction averages

Abstract

In this talk we discuss the behavior of Laplace eigenfunctions when restricted to a fixed submanifold by studying the averages given by the integral of the eigenfunctions over the submanifold. In particular, we show that the averages decay to zero when working on a surface with Anosov geodesic flow regardless of the submanifold (curve) that one picks. This is based on joint works with John Toth and Jeffrey Galkowski.

Gonzalo Contreras (CIMAT)

The C^2 Mañé's Conjecture on Surfaces.

Abstract

Given a closed surface M and a convex and superlinear lagrangian L on TM, we prove that there is an open and dense set of function f in $C^2(M, R)$ such that the lagrangian $L + f$ has a unique minimizing measure supported on a hyperbolic periodic orbit

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Adriana da Luz (Universidad de la República)

Singularities and C^1 robustness of dynamical properties

Abstract

For diffeomorphisms or for non-singular flows, there are many results relating C^1-robust properties and global structures of the dynamics, as hyperbolicity, partial hyperbolicity, dominated splitting. However, a difficulty appears when a robust property of a flow holds on a set containing recurrent orbits accumulating on a singularity. With Christian Bonatti we propose a general procedure for adapting the usual hyperbolic structures to this context. This allows us to recover to some extent, the relationship between the C^1-robust properties and global structures. In thi talk we show how we can define hyperbolic structures that are compatible with the robust coexistence of singularities and regular orbits in the same chain recurrence class. We discuss the difficulties that make arise from this context that are not present in the context of diffeomorphisms and to what extent does this new definition allows us to overcome them.

Colin Guillermou (Université Paris-Sud)

The marked length spectrum of Anosov manifolds

Abstract

We show new rigidity results on the marked length spectrum of manifolds with Anosov geodesic flows and solve partially a conjecture of Burns and Katok, generalising some theorems of Croke and Otal in dimension bigger than 2. This is joint work with T. Lefeuvre.

Thomas Koberda (University of Virginia)

Diffeomorphism groups of intermediate regularity

Abstract

Let M be the interval or the circle. For each real number $\alpha \in [1, \infty)$, write $\alpha = k + \tau$, where k is the floor function of α. I will discuss a construction of a finitely generated group of diffeomorphisms of M which are C^k and whose k^{th} derivatives are τ–Hölder continuous, but which are admit no algebraic smoothing to any higher Hölder continuity exponent. In particular, such a group cannot be realized as a group of C^{k+1} diffeomorphisms of M. I will discuss the construction of countable simple groups with the same property, and give some applications to continuous groups of diffeomorphisms. This is joint work with Sang-hyun Kim.

Andrés Koropecki (Universidad Federal Fluminense)

Boundary dynamics for surface homeomorphisms

Abstract

I will talk about joint works with P. Le Calvez and M. Nassiri which describe the dynamics of a surface homeomorphism in the boundary of a simply connected invariant domain in terms of the prime ends rotation numbers. This description is particularly successful in the area-preserving setting, where a Poincaré-like classification is obtained. I will also overview other recent results about the interplay between the restricted dynamics and the topology of the boundary of such a domain.

François Ledrappier (Universidad de ParÃs-Sorbonne)

A family of stable diffusions

Abstract

We consider a compact C^∞ Riemannian manifold with negative curvature, $\overline{X}$ the geodesic spray, i.e. the vector field that generates the geodesic flow on the unit tangent bundle, $\mathcal{W}^s$ the central stable foliation of the geodesic flow. For $\lambda \in \mathbb{R}$, let $\mathcal{L}_\lambda = \Delta^s + \lambda\overline{X}$ be the generator of a leafwise diffusion on SM.

As $\lambda \to -\infty$, the unique stationary probability measure of the diffusion $\mathcal{L}_\lambda$ converges to the normalized Liouville measure. This is a joint work (in preparation) with Lin Shu.

Yash Lodha (EPFL-Lausanne)

Group actions on 1-manifolds by piecewise diffeomorphisms.

Abstract

Group actions on $1-$manifolds by homeomorphisms that are diffeomorphisms (of desired regularity) outside a countable closed set provide important examples of groups with various exotic features.

Examples of such groups include groups of piecewise linear and piecewise projective homeomorphisms.

It is natural to inquire whether such an action is smoothable, i.e. topologically conjugate to an action by C^∞-diffeomorphisms. It is also natural to inquire whether such groups can have property (T). This is a question raised by Navas. I will present recent results (joint works with Matte Bon and Triestino, and with Bonnatti and Triestino) that answer these questions.

I will also briefly discuss the construction of a continuum family (up to isomorphism) of finitely generated simple groups of homeomorphisms of the real line (joint work with James Hyde.) This resolves a 1980 question of Rhemtulla concerning the existence of such groups.

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Leonardo Macarini (Universidad Federal do Rio de Janeiro)

Periodic orbits on symmetric spheres and dynamical convexity

Abstract

I will survey some results on the multiplicity and stability of periodic orbits of Reeb flows on the standard contact sphere. After that, I will discuss recent results, obtained in an ongoing joint work with V. Ginzburg, on the multiplicity of periodic orbits on symmetric strongly dynamically convex spheres and examples of dynamically convex spheres in $\mathbb{R}^{2n}$ ($n > 2$) that are not equivalent to convex ones via symplectomorphisms that commute with the antipodal map.

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Kathryn Mann (Brown University)

Rigidity of geometric surface group actions

Abstract

An action of a finitely generated group G on a manifold M is called "geometric" if it comes from an embedding of G as a lattice in a Lie group acting transitively on M. In this talk, I will explain recent joint work with Maxime Wolff that characterizes geometric actions of surface groups on the circle by (a strong form of) topological rigidity.

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Andrés Navas (Universidad de Santiago de Chile)

Discrete sets of points as geometric and dynamical objects

Abstract

We will analyze discrete sets of points of the plane (including the vertices of the Penrose tiling) from a geometric viewpoint. We will see that this set can be sent to $\mathbb{Z}^2$ via a bi-Lipschitz homeomorphism of the plane, yet some other sets with the same dynamical properties (repetitive sets) cannot.

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Gabriel Paternain (University of Cambridge)

An incursion into Ricardo's work on Lagrangian systems

Enrique Pujals (IMPA)

The stability conjecture: One of Mañé's journeys

Jean François Quint (University Bordeaux I)

Spectral gap and absolute continuity

Abstract

I will present questions and problems related to the use of spectral gap properties in group theory and dynamical systems.

Andrés Sambarino (Université Paris VI)

Frenet representations and Hausdorff dimension

Abstract

The purpose of the talk is to study the Hausdorff dimension of limit sets of certain discrete subgroups Γ of $\mathsf{SL}_d(\mathbb{R})$ (or $\mathsf{SL}_d(\mathbb{C})$) that verify a property that we call *Frenet*. This is an open property in the space $\hom(\Gamma, \mathsf{SL}_d)$ that implies some form of conformality of the group action when restricted to its limit set.

This is joint work with B. Pozzetti and A. Wienhard

Pablo Shmerkin (Universidad Torcuato di Tela)

Furstenberg's conjecture on the intersections of $\times 2, \times 3$ invariant Cantor sets

Abstract

In the 1960s Furstenberg made several conjectures formalizing, in different ways, the heuristics that "expansions in bases 2 and 3 have no common structure". I will talk about my recent solution of one of these conjectures, asserting that the intersection of Cantor sets invariant under $\times 2$ and $\times 3$ is never "larger than expected". If time allows I will mention some other consequences of the method.

Maxime Wolff (Université Paris VI)

Bending deformations for representations of surface groups in the group of homeomorphisms of the circle.

Abstract

In joint work with Kathryn Mann we classified the rigid representations of surface groups in the group of homeomorphisms of the circle. I will discuss the main lines of the proof, involving the classical idea of bending deformations of representations in (higher) Teichmüller theory.