

Dynamics in Valparaiso

Celebrating ten years of the Dinámica Porteña seminar

December 10 – 14, 2018

<http://ima.ucv.cl/congreso/dynamics-in-valparaiso>

Program

	Monday	Tuesday	Wednesday	Thursday	Friday
9:00	Registration				
10:00	Pollicott	Fisher	Luzzatto	Cipriano	Hammerlindl
11:00	Coffee	Coffee	Coffee	Coffee	Coffee
11:30	Marin	Carrasco	Lizana	Burns	Sambarino
12:30	Lunch	Lunch	Lunch	Lunch	
14:30	Ures	Tahzibi	Cheragui	Vilarinho	
15:30	Coffee	Coffee & Posters	Coffee & Posters	Coffee	
16:00	Kalinin (till 17:00)			Gogolev (until 17:00)	
16:30		Bufetov	Berger		
Evening	Cocktail (18:00)			Dinner (20:00)	

Abstracts of the talks

TBA

Pierre Berger (Université Paris 13, France)

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Alexander Bufetov (Steklov Institute, Moscow)

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Keith Burns (Northwestern University, USA)

Simple models for partially hyperbolic diffeomorphisms in dimension three

Pablo Carrasco (UFMG, Brazil)

Starting with a conjecture from E. Pujals in the beginning of 2000, the classification problem of partially hyperbolic diffeomorphisms on three manifolds has remained a very active research area in dynamical systems. Roughly speaking, Pujals' conjecture proposed that a three dimensional partially hyperbolic diffeomorphism could be catalogued in essentially three large classes: a skew-product over an Anosov map, a time-one map of an Anosov flow or a DA (that is, isotopic to hyperbolic). In the recent years the conjecture was proven to be false, and efforts to salvage a general classification conjecture has also proven to be unsuccessful. This is due to the recent zoo of intricate examples that have appeared in the literature, which don't seem to fit in well defined categories.

The purpose of this talk is to present a simple scheme to classify partially hyperbolic diffeomorphism in a restricted class, by assuming a strong rigid behavior on the derivative. Nonetheless, it is plausible that these type of systems are "building pieces" for more general classes (modulo isotopy), and we'll try to present evidence of such behavior. This is ongoing work with E. Pujals and F. Rodriguez-Hertz.

Quasi-periodic dynamics in complex dimension one

Davoud Cheraghi (Imperial College, UK)

Quasi-periodic dynamics in one complex variable reveals fascinating interplays between complex analysis and Diophantine approximations. The question of whether a quasi-periodic dynamics is conjugate to an irrational rotation (linearization) dates back to more than a century ago, with remarkable contributions by C. Siegel, A. Brjuno, and J.-C. Yoccoz. In contrast to the linearisable case, the local dynamics near non-linearizable maps is very complicated. Indeed, there is not a single example of a non-linearizable map whose dynamics is completely understood. There is major recent advances on this problem which is lead to a complete description of the topological behaviour of typical orbits. This is an introductory talk to demonstrate some of these results.

Time change for flows

Italo Cipriano (PUC Chile)

This talk is motivated by the following question: How do ergodic properties of flows vary with a time change? I will be interested in studying this question in the case of suspension flows over countable Markov shifts.

I will start by introducing the results we require on thermodynamic formalism for countable Markov shifts. I will then give a topological description of the space of suspension flows according to certain thermodynamic quantities and I will explain the analytic tools we use to construct examples with prescribed thermodynamic behaviour. Finally, I will explain some properties that allow us to show, for example, that the set of suspension flows defined over the full shift on a countable alphabet having finite entropy is open. This is joint work with Godofredo Iommi.

A dichotomy for measures of maximal entropy

Todd Fisher (BYU, USA)

I will discuss recent joint work with Jerome Buzzi and Ali Tahzibi. We show that there are open sets of partially hyperbolic diffeomorphisms arbitrarily close to the time- t map of an Anosov flow for which there is a dichotomy for the measures of maximal entropy; either all of the measures of maximal entropy are non-hyperbolic, or there are exactly two ergodic measures of maximal entropy where one has a positive central exponent and the other has a negative central exponent.

Local rigidity of toral automorphisms

Andrey Gogolev (Ohio State University, USA)

I will discuss rank one rigidity for hyperbolic toral automorphisms. Classically such rigidity results rely on coincidence of eigendata at periodic points. However, one can of course consider other invariant measures. Recently Saghin and Yang established local rigidity from coincidence of volume Lyapunov exponents. One remarkable consequence of this breakthrough is that one can now address partially hyperbolic setting (where periodic points do not exist for granted). This approach was further pursued by myself, Kalinin and Sadovskaya.

Partial hyperbolicity on Seifert fiber spaces

Andy Hammerlindl (Monash University, Australia)

I will discuss partial hyperbolicity on Seifert fiber spaces, with a focus on which manifolds and isotopy classes support partially hyperbolic systems and the construction of new examples.

This is joint work with Mario Shannon, Rafael Potrie, Christian Bonatti, and Andrey Gogolev.

Non-stationary normal forms for uniform and non-uniform contractions

Boris Kalinin (Penn State, USA)

We consider a diffeomorphism f of a compact manifold M which contracts an invariant foliation W with smooth leaves. If the differential of f on TW has narrow band spectrum, there exist coordinates $H_x : W_x \rightarrow T_x W$ in which $f_W(x)$ is a polynomial in a finite-dimensional Lie group G . We construct H_x that depend smoothly on x along the leaves of W and give an atlas with transition maps in G . Our results apply, in particular, to any C^1 -small perturbation of an algebraic systems. More generally, we construct similar normal forms on a stable foliation of an arbitrary measure preserving diffeomorphism f . This yields an f -invariant structure of a G homogeneous space on almost every leaf.

Topological obstructions for robustly transitive endomorphisms on surfaces

Cristina Lizana (UFBA, Brazil)

We address the problem of necessary conditions and topological obstructions for the existence of robustly transitive maps on surfaces. Concretely, we show that partial hyperbolicity is a necessary condition in order to have C^1 robustly transitive endomorphisms with critical points on surfaces, and the only surfaces that admits robustly transitive maps are either the torus or the Klein bottle. Moreover, we show that every robustly transitive endomorphism is homotopic to a linear map having at least one eigenvalue with modulus larger than one. This is a joint work with Wagner Ranter.

Recent progress on the Viana conjecture

Stefano Luzzatto (ITCP, Italy)

I will discuss some questions related to the Viana conjecture on the existence of SRB measures for systems with non-zero Lyapunov exponents. In particular I will state a new result on the existence of SRB measures for surface diffeomorphisms under quite weak non-uniform hyperbolicity conditions. The proof involves a new technique for the construction of Young Towers and a key technical point is a new general result on the hyperbolic properties of pseudo-orbits in non-uniformly hyperbolic sets. This is joint work with V. Climenhaga and Y. Pesin.

Non-uniform hyperbolicity among partially hyperbolic diffeomorphisms

Karina Marin (UFMG, Brazil)

In this talk we are interested in the C^r topological properties of the set of non-uniform hyperbolic diffeomorphisms as a subset of partially hyperbolic systems. We present a survey of recent results obtained as a consequence of the Invariance Principle of Ledrappier and Avila-Santamaria-Viana.

Entropy and volume growth in graphs and translation surfaces

Mark Pollicott (University of Warwick, UK)

Manning and Margulis considered volume growth on the universal covers of negatively curved manifolds. We will discuss some analogues for graphs and translation surfaces. This is joint work with Paul Colongese.

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Martín Sambarino (U. de la República, Uruguay)

**Atomic conditional measures and equilibrium states for
partially hyperbolic diffeomorphisms**

Ali Tahzibi (USP, São Carlos, Brazil)

In this talk we consider the disintegration of invariant measures along central foliation of derived from Anosov diffeomorphisms and study the problem of uniqueness or finiteness of equilibrium states.

**Invariant manifolds for Random Dynamical Systems
exhibiting weak dichotomies on Banach spaces**

Helder Vilarinho (Universidade da Beira Interior, Portugal)

We discuss the existence of measurable invariant manifolds for small perturbations of linear Random Dynamical Systems evolving on a Banach space and exhibiting a generalized dichotomy in the linear component, both for continuous and discrete time. These dichotomies include, in particular, the most relevant cases in the literature: (non)uniform hyperbolic and pseudohyperbolic dichotomies. We see moreover that the asymptotic behavior along the invariant manifold is similar to that of the linear Random Dynamical System.

**Robust transitivity and mostly expanding
diffeomorphisms**

Raúl Ures (Southern University of Science and Technology, China)

We show that if f is a partially hyperbolic diffeomorphism with mostly expanding center and its stable foliation is minimal, then the stable foliation is C^1 -robustly minimal. This is a consequence of a more general theorem where the condition of mostly expansiveness is replaced by a weak form of expansion along the center direction.

These results allow us to present new examples of robustly transitive diffeomorphisms. For instance, we show that for a generic volume preserving perturbation of the time-one map of the geodesic flow of a surface with constant negative curvature, either the strong stable or the strong unstable foliation is robustly minimal in its dissipative neighborhood.

The talk is based in a joint work with Marcelo Viana and Jiagang Yang.