

Terceiro Workshop de Sistemas Dinâmicos
Universidade Federal do Rio Grande do Sul
21 a 25 de Outubro de 2019

BOOK OF ABSTRACTS

Comitê Científico

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Porto Alegre
October 2019

Apoio:



PROGRAM

The period between 8h30 and 12h00 in the morning is reserved for discussions and group work. The talks will be in the afternoon as follows:

Monday, October 21

- 14h Patrícia Cirilo (UNIFESP)
- 15h Intervalo para o café
- 15h30 Victor Vargas (UFRGS)
- 16h30 Intervalo para o café
- 17h Ignacio Garcia (UNMDP – Argentina)

Tuesday, October 22

- 14h Isabel Rios (UFF)
- 15h Intervalo para o café
- 15h30 Martin Sambarino (UDELAR- Uruguai)
- 16h30 Intervalo para o café
- 17h Godofredo Iommi (PUC-Chile)

Wednesday, October 23

- 14h Veronica de Martino (UDELAR- Uruguai)
- 15h Intervalo para o café
- 15h30 Alejandro Kocsard (UFF)
- 16h30 Sessão de pôsteres + Café
- 18h Confraternização

Thursday, October 24

- 14h Luna Lomonaco (USP)
- 15h Intervalo para o café
- 15h30 Fagner Rodrigues (UFRGS)
- 16h30 Intervalo para o café
- 17h Pablo Lessa (UDELAR- Uruguai)

Friday, October 25

- 14h Ana Anušić (USP)
- 15h Intervalo para o café
- 15h30 Artur Lopes (UFRGS)
- 16h30 Discussão sobre problemas em aberto + Café

ABSTRACTS

Cocycles over hyperbolic systems and periodic approximation

Alejandro Kocsard (UFF)

Abstract: It is well-known that uniformly hyperbolic dynamical systems have infinitely many periodic orbits and, in general, these orbits concentrate almost all “dynamical information” of the system.

In this talk we shall concern with cocycles over hyperbolic systems with values in transformation groups and shall discuss the possibility of studying certain structures of the cocycles by their restrictions to periodic orbits.

Topology of unimodal inverse limit spaces

Ana Anušić (USP)

Abstract: Let I be the unit interval and for $s \in [0, 2]$, let $T_s: I \rightarrow I$ be a tent map $T_s(x) = \min\{sx, s(1-x)\}$, $x \in I$. We study topological properties of the family of subspaces of the Hilbert cube:

$$X_s := \varprojlim(I, T_s) = \{(x_0, x_1, x_2, \dots) : T_s(x_i) = x_{i-1}, i > 0\}.$$

There is a continuous family of planar homeomorphisms H_s with global attractors X_s varying continuously in the Hausdorff topology (Barge, Martin 1990, Boyland, de Carvalho, Hall 2013). However, for $s > 1$ all X_s are non-homeomorphic (Barge, Bruin, Štimac 2012).

We will discuss how the dynamics of the underlying map T_s affects the topology of the space X_s . For example, X_2 is homeomorphic to the attractor of the Smale horseshoe. If the critical orbit of T_s is periodic of period n , then the space is locally homeomorphic to the Cantor set of arcs, except in an n -periodic orbit of endpoints. Such points of inhomogeneity will be present in all X_s (actually in all interval inverse limits), implying the lack of uniform hyperbolicity on the attractor (Williams 1970). For contrast to the previous example, it can happen (and it happens for dense G_δ set of parameters $s \in (\sqrt{2}, 2)$) that every open neighbourhood in X_s contains a copy of every other unimodal inverse limits, so in these cases every point is an inhomogeneity.

We will describe the structure and prevalence of different local inhomogeneities of X_s in terms of the dynamics of T_s . The talk will be based on the recent results obtained in collaboration with Lori Alvin (Furman University, USA), Henk Bruin (University of Vienna, Austria), and Jernej Činč (It4Innovations Ostrava and AGH Krakow).

A formula for the Entropy of the Convolution of Gibbs probabilities on the circle

Artur Lopes (UFRGS)

Abstract: We consider the action of the transformation $2x \pmod{1}$ on the circle. For two Gibbs invariant probabilities μ_1 and μ_2 (with respectively Hölder Jacobians J_1 and J_2) we show that the convolution of μ_1 and μ_2 is also a Gibbs probability μ with a Hölder Jacobian J . We present a formula for J in terms of J_1 and J_2 . We also show (for Hölder Jacobians) that the convolution of measures increase entropy.

Full metric mean dimension is generic on a compact manifold

Fagner Rodrigues (UFRGS)

Abstract: In this talk we prove that the upper metric mean dimension of C^0 -generic homeomorphisms, acting on a compact smooth boundaryless manifold with dimension greater than one, coincides with the dimension of the manifold. In the case of continuous interval maps we also show that each level set for the metric mean dimension is C^0 -dense in the space of continuous endomorphisms of $[0, 1]$ with the uniform topology.

This is a joint work with Maria Carvalho and Paulo Varandas-Universidade do Porto.

Escape of entropy for countable Markov shifts

Godofredo Iommi (PUC-Chile)

Abstract: In the context of countable Markov shifts I will present a result that relates the escape of mass, the measure theoretic entropy and the entropy at infinity of the system. This relation has several consequences. For example, that the entropy map is upper semi-continuous for finite entropy Markov shifts. This is joint work with Mike Todd and Anibal Velozo.

Assouad dimension of self-similar sets with overlaps in \mathbb{R}^d

Ignácio Garcia (UNMdP-Argentina)

Abstract: For self-similar sets in \mathbb{R} , it was shown by Fraser, Henderson, Olson and Robinson that the Assouad dimension satisfies the following dichotomy: if the weak separation property (WSP) holds, then the Hausdorff and Assouad dimensions of the set coincide, while if WSP is not satisfied, then the Assouad dimension is 1. In \mathbb{R}^d , they show that if the self-similar set is in general position and the WSP is satisfied, then Hausdorff and Assouad dimensions still coincide, while if WSP does not hold then the Assouad dimension is at least 1. For this class of sets, we present

a formula for the Assouad dimension, that considers the overlapping directions, and clarifies why the above dichotomy does not hold. A lower bound for the Assouad dimension of the set is given by the dimension of the vector space spanned by these directions, with strict inequality if the dimension is smaller than d .

Decreasing entropy in the destruction of horseshoes via internal tangencies

Isabel Rios (UFF)

Abstract: We will show the decreasing of entropy in the destruction of horseshoes via internal tangencies.

The Mandelbrot set and its Satellite copies

Luna Lomonaco (USP)

Abstract: For a polynomial on the Riemann sphere, infinity is a (super) attracting fixed point, and the filled Julia set is the set of points with bounded orbit. Consider the quadratic family $P_c(z) = z^2 + c$. The Mandelbrot set M is the set of parameters c such that the filled Julia set of P_c is connected. Douady and Hubbard proved the existence of homeomorphic copies of M inside of M , which can be primitive (roughly speaking the ones with a cusp) or a satellite (without a cusp). Lyubich proved that the primitive copies of M are quasiconformally homeomorphic to M , and that the satellite ones are quasiconformally homeomorphic to M outside any small neighbourhood of the root. The satellite copies are not quasiconformally homeomorphic to M , but are they mutually quasiconformally homeomorphic? In a joint work with C. Petersen we prove that this question has in general a negative answer.

Homoclinic intersections for conservative surface dynamics

Martin Sambarino (Udelar-Uruguai)

Abstract: Let S be a compact boundaryless surface and let $Diff_\omega^r(S)$ be the set of C^r diffeomorphisms of S preserving an area form ω . We show that, for any $r \geq 1$ there is a residual set $\mathcal{R} \subset Diff_\omega^r(S)$ such that if $f \in \mathcal{R}$ then every hyperbolic periodic point has a transverse homoclinic orbit. This is a joint work with Patrice Le Calvez.

Right angle walks in hyperbolic space

Pablo Lessa (Udelar-Uruguai)

Abstract: We characterize the distances for which a walker in hyperbolic space, constrained to advance and turn right angles, can only access a discrete set of points. This is joint work with Ernesto García.

Dynamics of generalized hyperbolic linear operators

Patrícia Cirilo (Unifesp)

Abstract: It is introduced an open class of linear operators on Banach spaces such that their non-wandering set is an infinite dimensional topologically mixing subspace. In certain cases, it coincides with the whole space. One of the most interesting dynamical consequences is that for that class of operators the non-wandering set is an infinite dimensional robustly transitive set and we also characterized when the non-wandering coincides with the whole space.

We will provide during the talk a series of examples that are generalized hyperbolic.

This result is a joint work with Bryce Gollobit and Enrique Pujals.

Uniform compactness of foliation by center leaves

Verónica de Martino (Udelar-Uruguai)

Abstract: The topic to be discussed in this talk has two main motivations.

First, the classification problem for partially hyperbolic dynamics. Second, this old and classical conjecture which states that, a flow in a compact manifold for which each orbit is periodic should be periodic after reparametrization. This conjecture is known to be false (due to a counterexample given by Sullivan in 1976), but it still makes sense to wonder about uniform compactness of a dynamically defined compact foliation in a compact manifold.

We wonder what can be said in these terms about the center foliation of a partially hyperbolic diffeomorphism, making some extra dynamical and topological assumptions.

In this talk we will discuss some classification results that fit in the two previously mentioned contexts. This is a joint work with S. Martinchich.

O operador de Ruelle para β -shifts simetricos

Victor Vargas (UFRGS)

Abstract: Considere $m \in \mathbb{N}$ e $\beta \in (1, m + 1)$. Assuma que $a \in \mathbb{R}$ pode ser representado em base β usando um desenvolvimento em series da forma $a =$

$\sum_{n=1}^{\infty} x(n)\beta^{-n}$, onde a sequência $x = (x(n))_{n \in \mathbb{N}}$ atinge valores no alfabeto $\mathcal{A}_m := \{0, \dots, m\}$. A expressão acima é chamada de β -expansão do número real a .

Estamos interessados em sequências $x = (x(n))_{n \in \mathbb{N}} \in \mathcal{A}_m^{\mathbb{N}}$ associadas a todos os possíveis valores de $a \in \left(\frac{m}{\beta-1} - 1, 1\right)$ com uma única expansão. A partir desse conjunto é possível definir um conjunto invariante pela aplicação shift, conhecido como β -shift simétrico associado ao par (m, β) .

Dado um potencial Hölder contínuo $A : X_{m,\beta} \rightarrow \mathbb{R}$, demonstramos que o operador de Ruelle \mathcal{L}_A está bem definido quando os parâmetros m e β satisfazem condições adequadas, provamos existência de uma auto-função positiva ψ_A e uma auto-probabilidade ρ_A associadas a um auto-valor λ_A . Além disso, mostramos que o estado de Gibbs $\mu_A = \lambda_A \rho_A$ é um estado de equilíbrio associado ao potencial A . Por último, demonstramos que a família de entropias $(h(\mu_{tA}))_{t>1}$ converge quando $t \rightarrow \infty$.