EDAÍ

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91º EDAÍ 2 de setembro de 2022

Em homenagem aos 60 anos de Pedro Duarte

Salão Pedro Calmon, Palácio Universitário da Praia Vermelha UFRJ

10h00 – 11h00

A robust $\mathcal{C}^1$ class of endomorphisms: questions and problems

Pablo Carrasco (Federal University of Minas Gerais, Brazil)

A central result is smooth ergodic theory is that for diffeomorphisms of compact surfaces, either they are Anosov or they can be approximated by maps having zero exponents. This is consequence of the Bochi-Mañé's theorem from around 2000, and is a cornerstone of several developments. But what about endomorphisms? Does something similar hold for say, non-singular endomorphisms of surfaces?

Together with M. Andersson and R. Saghin we found out that the answer is negative, and in fact we established the existence of a large $\mathcal{C}^1$ open class $\mathcal{U}$ of area preserving endomorphisms of the 2-torus (the only orientable surface that admits endomorphisms without critical points) satisfying

- every $f \in \mathcal{U}$ is non-uniformly hyperbolic: one positive and one negative Lyapunov exponent a.e.
- essentially every homotopy class intersects $\mathcal{U}$ (in particular, there are expanding maps that can be deformed in order to "flip" one exponent)
- the (integrated) exponents vary continuously in $\mathcal{U}$
- if the linear part of $f \in \mathcal{U}$ us transitive and f is $\mathcal{C}^2$, then f is Bernoulli.

In view of the above, $\mathcal{U}$ behaves much like the uniformly hyperbolic class for diffeomorphisms, and I'd like to propose that this is a natural analogue for endomorphisms of that class. I'm going to present a quick description and then focus and what remains to be done.

11h15 – 12h15

Hölder continuity of the Lyapunov exponents for cocycles over hyperbolic maps

Mauricio Poletti (Federal University of Ceará, Brazil)

Given a hyperbolic homeomorphism on a compact metric space, consider the space of linear cocycles over this base dynamics which are Holder continuous and whose projective actions are partially hyperbolic dynamical systems. We prove that locally near any typical cocycle, the Lyapunov exponents are Holder continuous functions relative to the uniform topology. This is a joint work with P. Duarte and S. Klein.

Almoço: 12h15 – 14h00

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14h00 – 15h00

On the thermodynamical formalism for expanding measures

Vilton Pinheiro (Federal University of Bahia, Brazil)

Let $f : M \to M$ be a non-flat $C^{1+\alpha}$ map defined on a Riemannian manifold M. A f-invariant probability μ is called expanding if all its Lyapunov exponents are positive, i.e., $\lim_{n\to+\infty} \frac{1}{n} \log |Df^n(x)\vec{v}| > 0$ for μ-almost every $x \in M$ and every $\vec{v} \in T_xM \setminus \{0\}$. Let $\mathcal{E}(f)$ be the set of all f-invariant expanding probability. A f-invariant probability μ is called an *expanding equilibrium state for* φ if $\mu \in \mathcal{E}(f)$ and

$$h_\mu(f) + \int \varphi d\mu = \sup \left\{ h_\nu(f) + \int \varphi d\nu \,;\, \nu \in \mathcal{E}(f) \right\}.$$

The map f is called *strongly transitive* if $\bigcup_{n\geq 0} f^n(A) = M$ for every open set $A \subset M$.

Theorem. Suppose that f is strongly transitive.

1. f has at most one expanding equilibrium state for a given Hölder potential φ.
2. If f has an expanding equilibrium state for $\varphi \equiv 0$ then f has one and only one expanding equilibrium state μ_ψ for any given Hölder potential ψ with small variation.

Corollary. A Viana map has one and one equilibrium state for every Hölder potential with small variation.

15h00 – 16h00

The chaotic hypothesis and linear response

Caroline Wormell (Sorbonne University, France)

Rigorously, not much is known about complex chaotic systems that lack strong geometrical conditions such as uniform hyperbolicity. Instead, they are typically hypothesised to behave like Axiom A, i.e. uniformly hyperbolic, systems, at least at large scales: the so-called chaotic hypothesis of Gallavotti and Cohen. In this talk I will discuss a physically relevant class of examples which can nevertheless at large scales approximate arbitrary dynamics; on the other hand, I will present mechanisms by which large enough systems can nevertheless recover the nice statistical properties of uniformly hyperbolic systems, specifically in the realm of response theory.

Café: 16h00 – 16h30

16h30 – 17h30

On the complex Henon family

Artur Avila (IMPA, Brazil and University of Zurich, Switzerland)

Recepção: 18h00 – ∞

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