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50° EDAÍ 17 de outubro de 2014

Departamento de Matemática PUC-Rio
Auditório RDC, PUC-Rio Marquês de S. Vicente 225, Gávea, Rio de Janeiro

☞ Atenção: Sessão Especial EDAI – Início às 10h30.

10h30 – 11h25

Sylvain Crovisier

(Laboratoire de Mathématiques, Université Paris-Sud)

On the density of singular hyperbolic three-dimensional vector fields

11h35 – 12h30

Pablo Shmerkin

(Dep. Matemáticas y Estadística, Universidad Torcuato di Tella, Buenos Aires)

Absolute continuity of Bernoulli convolutions and other fractal families

Almoço

14h30 – 15h25

Ferran Valdez

(Centro de Ciencias Matemáticas, Universidade Nacional Autónoma de México)

Computing the Teichmüller Polynomial

15h35 – 16h30

Fabio Tal

(Departamento de Matemática Aplicada, Universidade de São Paulo)

Homotopically transverse paths for surface homeomorphisms isotopic to the identity

Café

17h00 – 17h55

Jacob Palis

(Instituto Nacional de Matemática Pura e Aplicada)

Dinâmica e Atratores: Uma Conjectura Global

Confraternização



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S. Crovisier **On the density of singular hyperbolic three-dimensional vector fields**

We propose an extension to local fibered flows of Mañé and Pujals-Sambarino's theorems about the uniform contraction of one-dimensional dominated bundles. This allows to answer a conjecture by Palis for vector fields on three-dimensional manifolds: those who are singular hyperbolic or exhibit a homoclinic tangency form a dense subset of the space of C^1 -vector fields. This is a joint work with D. Yang.

Ferran Valdez **Computing the Teichmüller Polynomial**

The Teichmüller polynomial of a fibered 3-manifold, introduced by McMullen at the end of the 90's, plays a useful role in the construction of mapping classes with small entropy (small stretch factor). In this talk, we explain what this polynomial is and we provide an algorithm that computes the Teichmüller polynomial of the fibered face associated to a pseudo-Anosov mapping class of a disc homeomorphism. This algorithm is based on the results of Penner and Papadopoulos on train tracks (folding and splitting). This is joint work with Erwan Lanneau, from IF @ Grenoble.

Pablo Shmerkin **Absolute continuity of Bernoulli convolutions and other fractal families**

The Bernoulli convolution ν_λ is the distribution of the random sum $\sum_n \pm \lambda^n$, where the signs are chosen independently with equal probabilities. The study of these measures goes back to two pioneering papers of Erdős in 1939/1940. The key, and still open, question is: for what values of $\lambda \in (1/2, 1)$ is ν_λ singular? Based on a recent breakthrough of M. Hochman, I was able to show (with a one page proof) that the set of singular parameters has Hausdorff dimension 0, improving previous results by Erdős, Solomyak, Peres-Schlag, and Hochman. I will also discuss some recent improvements and generalizations obtained in joint work with B. Solomyak

Fabio Tal **Homotopically transverse paths for surface homeomorphisms isotopic to the identity**

We discuss some newly developed topological techniques in the study of the dynamics of surface homeomorphisms. Given a homeomorphism f of a oriented surface S homotopic to the identity, by a result of Le Calvez it is always possible to find a subset X of the fixed points of f and a foliation \mathcal{F} of $W = S \setminus X$ such that, if \tilde{f} is the lift of f to the universal cover \tilde{W} of W , then \tilde{f} is a Brouwer homeomorphism, and \mathcal{F} lifts to a foliation of \tilde{W} by Brouwer lines.

Given this framework, we introduce the concept of homotopically transverse paths for these foliations. We show how, given a collection of orbit segments, this concept allow us to associate a subshift of finite time that is directly related to the original dynamics which, in many instances, ensure the existence of an abundance of periodic orbits and positive topological entropy.

Furthermore, we present some direct applications of this concept to homeomorphisms of the torus, solving some open problems in rotation theory like a first case of the Franks-Misiurewicz Conjecture and the strong form of the Boyland's conjecture.

Joint work with Patrice Le Calvez

Jacob Palis **Dinâmica e Atratores: Uma Conjectura Global**