EDAÍ

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59º EDAÍ 13 de novembro de 2015

Instituto de Matemática, UFRJ
Auditório Naval, sala C 208, Bloco C do Centro Technológico

Matinê: 14h00 – 14h50

Specters in the jungle of anisotropic Banach spaces

Viviane Baladi (CNRS & Institut de Mathématiques de Jussieu, Paris)

The spectrum (or, as Google translate would have it, the specter) of a (Ruelle-Perron-Frobenius) transfer operator contains valuable information on the properties of an ergodic chaotic dynamical system - but only if one lets it act on a good Banach space! In the past fifteeen years, dynamicists (and more recently semi-classically oriented mathematicians) have introduced several types of anisotropic distributions. In this non-technical presentation, we will enjoy a small tour in the jungle of these spaces, discovering the advantages and shortcomings of the various existing definitions.

Café

Palestra 1: 15h00 – 16h00

Fast mixing of Sinai billiard flows

Viviane Baladi

Sinai billiards are natural chaotic dynamical systems which are notoriously difficult to study, due to their singularities (arising from "grazing orbits"). Their first ergodic properties were obtained by Sinai over forty years ago. More recently, LSYoung obtained in 1998 exponential mixing for the Sinai billiard map (=the discrete-time dynamical system corresponding to the collision map), and Chernov and Melbourne proved independently in 2007 that the Sinai billiard flow mixes faster than any polynomial. We recently showed that two-dimensional finite-horizon Sinai billiard flow mix in fact exponentially fast. Along the way, our proof gives a description of the spectrum of the billiard flow (the Ruelle resonances). We will try to give the flavour of the method of proof, which uses transfer operators on anisotropic Banach spaces, as discussed in the first talk. (joint with Demers and Liverani)

Café: 16h00 – 16h30

Palestra 2: 16h30 – 17h30

Deformation of codimension one foliations on 3-manifolds

Hélène Eynard-Bontemps (UFF & Institut de Mathématiques de Jussieu)

A (smooth) foliation of dimension k of a manifold is a partition of this manifold into immersed surfaces of dimension k which locally "pile up nicely" in the sense that, in some well-chosen (smooth) local coordinates, it is just the partition of $\mathbb{R}^n$ by the parallel affine k-planes $\mathbb{R}^k \times \{.\}$. For example, the orbits of any non-vanishing vector field form a one dimensional foliation of the underlying manifold. In that sense, foliations are natural generalizations of (continuous) dynamical systems. In this talk, we will be interested in the more complicated case of codimension one (i.e. dimension 2) foliations of compact 3-manifolds. More complicated because this time, not every *plane field* is tangent to a foliation by surfaces (actually very few are). However, J. Wood proved in the late sixties that any plane field can be continuously deformed to one tangent to a foliation, and Thurston generalized his result to higher dimensions and codimensions. Thus, in a classification perspective, it is natural to wonder whether two foliations whose tangent plane fields are *homotopic* can be continuously deformed to one-another *through foliations*. We will show that the answer is essentially yes, starting with a complete visual account of Thurston's construction, and highlighting the deep part played in these problems by the study of *discrete* dynamical systems, through the "dual" notions of *holonomy* and *suspension*.

Confraternização: 19h00 – ∞

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