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45º EDAÍ 23 de maio de 2014

Departamento de Matemática PUC-Rio, sala 856

Matinê: 14h00 – 15h00

Lyapunov exponents of analytic, quasi-periodic, linear cocycles

Silvius Klein (Norwegian University of Science and Technology)

We consider linear cocycles with base dynamics given by a translation on a torus of any dimension. We make appropriate arithmetic assumptions on the translation vector. Moreover, we assume that the fiber action depends analytically on the base point. The purpose of this talk is to describe a method for studying certain properties (e.g. continuity relative to input data, positivity, simplicity) of the Lyapunov exponents associated with such cocycles. The method involves an inductive procedure on the number of iterates of the cocycle, and it depends essentially on an analytic/probabilistic tool (a large deviation type estimate). The method is in some sense modular, and so we hope it could be useful for other models. [Based on joint projects with Pedro Duarte.]

Palestra 1: 15h10 – 16h10

A Variational principle for a class of discontinuous dynamical systems

Carlos Vásquez (PUC Valparaíso)

The variational principle claims that for continuous dynamical systems defined on compact metric spaces, the topological entropy is the supremum of the metric entropies associated to the invariant measures of the system.
If the transformation (or flow) is not continuous, then the existence of invariant measures is not guaranteed. The goal of this talk is to discuss the existence of a variational principle for a class of measurable discontinuous semi-flows called impulsive systems. This discussion is based on a work in progress join with J. F. Alves and M. Carvalho (Univ. of Porto).

Café: 16h10 – 16h40

Palestra 2: 16h40 – 17h40

Projections of fractal percolations

Michał Rams (IM PAN Varsóvia)

The Marstrand Theorem is one of (possibly, the) most important results in geometric measure theory. It states that for any set $X \in \mathbb{R}^2$ of Hausdorff dimension s for almost all $\theta \in \mathbb{P}^1$ the projections $\pi_\theta(X)$ (where π_θ is an orthogonal projection to a line in direction θ) have Hausdorff dimension s (if $s \leq 1$) or have positive Lebesgue measure (if $s > 1$). Many generalizations exist (higher dimensional versions, estimations on the size of the set of exceptional projections, nonlinear versions etc.).
The result I will present, joint with Karoly Simon from Budapest Technical University, is as follows. We consider a naturally defined set-valued random variable in $\mathbb{R}^2$, so called fractal percolation. We prove that almost every realization of fractal percolation satisfies the assertion of Marstrand Theorem for all (not almost all) directions. Moreover, in case $s > 1$ not only every projection has positive Lebesgue measure, it even contains an interval, The statement can be generalized for some other classes of projections. For example, if X is a realization of fractal percolation of Hausdorff dimension $s > 1$ then for every $x \in \mathbb{R}^2$ the set of angles under which X is visible from x contains an interval.

Confraternização: 19h00 – ∞ **Garota da Gavea**

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