

Seminar & Events Bulletin: RTG Workshops/Lectures

01-01-2013 to 06-30-2013

Friday, March 29, 2013

- 1:00pm-2:00pm **RTG Workshops/Lectures** -- Vadim Kaimanovich (U Ottawa) *Random walks and Poisson boundaries; entropy and the Liouville property*
-- B 844, East Hall
- 2:15pm-3:15pm **RTG Workshops/Lectures** -- Anders Karlsson (U Geneva) *An ergodic theorem for noncommuting products*
-- B 844
- 4:00pm-5:00pm **RTG Workshops/Lectures** -- Alex Furman (UIC) *Products of random matrices: Lyapunov exponents and stationary measures*
-- B 844

Saturday, March 30, 2013

- 9:00am-10:00am **RTG Workshops/Lectures** -- Vadim Kaimanovich (U Ottawa) *Boundary convergence and identification; applications to the mapping class group*
-- B 844
- 10:15am-11:00am **RTG Workshops/Lectures** -- Giulio Tiozzo (Harvard U) *Geodesic ray tracking for random walks on groups* -- B 844
- 11:15am-12:15pm **RTG Workshops/Lectures** -- Alex Furman (UIC) *Lyapunov exponents: positivity of the top exponent, simplicity of the spectrum, regularity*
-- B 844
- 1:30pm-2:30pm **RTG Workshops/Lectures** -- Moon Duchin (Tufts U) *Random Teichmüller geodesics*
-- B 844
- 2:45pm-3:30pm **RTG Workshops/Lectures** -- Andrew Zimmer (U Michigan) *The Poisson and Martin boundary of a harmonic manifold*
-- B 844
- 4:00pm-5:00pm **RTG Workshops/Lectures** -- Anders Karlsson (U Geneva) *An ergodic theorem for noncommuting products II*
-- B 844

Seminar & Events Bulletin: RTG Workshops/Lectures

01-01-2013 to 06-30-2013

Abstracts

RTG Workshops/Lectures

Friday, March 29, 2013, 1:00pm-2:00pm

B 844, East Hall

Vadim Kaimanovich (U Ottawa)

Random walks and Poisson boundaries; entropy and the Liouville property

We shall give a general introduction to the boundary theory of random walks on groups starting from general notions and illustrating them on concrete examples of groups with hyperbolic properties and self-similar groups.

RTG Workshops/Lectures

Friday, March 29, 2013, 2:15pm-3:15pm

B 844

Anders Karlsson (U Geneva)

An ergodic theorem for noncommuting products

In this introductory lecture I will recall some classical ergodic theorems (Birkhoff, Kingman, Oseledets) and formulate a rather general ergodic theorem for noncommuting products that appeared in my joint work with F. Ledrappier. This involves the notion of horofunctions which I will spend some time explaining.

RTG Workshops/Lectures

Friday, March 29, 2013, 4:00pm-5:00pm

B 844

Alex Furman (UIC)

Products of random matrices: Lyapunov exponents and stationary measures

In these three talks we shall focus on asymptotic characteristics of products of random i.i.d. matrices, that can be viewed as random walks on matrix groups. Writing the random product in the polar form (KAK decomposition) the behavior of the A-component is described by the Lyapunov exponents, and the distribution of the K-part by the stationary measure. These notions will be introduced in the first lecture.

RTG Workshops/Lectures

Saturday, March 30, 2013, 9:00am-10:00am

B 844

Vadim Kaimanovich (U Ottawa)

Boundary convergence and identification; applications to the mapping class group

We shall give a general introduction to the boundary theory of random walks on groups starting from general notions and illustrating them on concrete examples of groups with hyperbolic properties and self-similar groups.

Seminar & Events Bulletin: RTG Workshops/Lectures

01-01-2013 to 06-30-2013

RTG Workshops/Lectures

Saturday, March 30, 2013, 10:15am-11:00am

B 844

Giulio Tiozzo (Harvard U)

Geodesic ray tracking for random walks on groups

Given a finitely generated group G acting on a geodesic space X and a probability measure on G , one can construct a random walk by choosing at each step a random group element and letting it act on X . The natural question arises whether the sample paths can be approximated by some geodesic in X . We will prove that, in a quite general setting, the sample path and the limiting geodesic lie within sublinear distance. Our argument applies to the case of the mapping class group acting on Teichmueller space, answering a question of Kaimanovich. Another application includes the statistics of excursions of random Teichmueller geodesics in the thin part of moduli space.

RTG Workshops/Lectures

Saturday, March 30, 2013, 11:15am-12:15pm

B 844

Alex Furman (UIC)

Lyapunov exponents: positivity of the top exponent, simplicity of the spectrum, regularity

The second lecture will examine qualitative behavior of the Lyapunov exponents, and some regularity results about Lyapunov exponents and stationary measures.

RTG Workshops/Lectures

Saturday, March 30, 2013, 1:30pm-2:30pm

B 844

Moon Duchin (Tufts U)

Random Teichmüller geodesics

I'll review some of the features and pathologies of geodesics in the Teichmüller metric, including the phenomena that are obstructions to hyperbolicity. Then I'll discuss recent work with Dowdall and Masur in which we work out properties enjoyed by generic geodesics, concluding that these obstructions are quantifiably rare, and Teichmüller space is in this sense "statistically hyperbolic." One key tool, devised by Eskin and Mirzakhani, shows that geodesics are well-modeled by random walks on a net of points.

Seminar & Events Bulletin: RTG Workshops/Lectures

01-01-2013 to 06-30-2013

RTG Workshops/Lectures

Saturday, March 30, 2013, 2:45pm-3:30pm

B 844

Andrew Zimmer (U Michigan)

The Poisson and Martin boundary of a harmonic manifold

A complete Riemannian manifold is called harmonic if each geodesic sphere of sufficiently small radii has constant mean curvature. Examples of harmonic manifolds include flat spaces and rank one locally symmetric spaces. The Lichnerowicz conjecture asks if these are the only compact harmonic manifolds. In this talk we will present some evidence that this is the case. In particular, we will discuss various compactifications of non-compact non-flat simply connected harmonic manifolds. We will show that the Martin, Poisson, Busemann, and "geometric" boundaries coincide. Moreover, in this case, the harmonic measure can be identified with "visual" measure. This leads to several corollaries concerning the fundamental group of a compact harmonic manifold and the dynamics of the geodesic flow.

RTG Workshops/Lectures

Saturday, March 30, 2013, 4:00pm-5:00pm

B 844

Anders Karlsson (U Geneva)

An ergodic theorem for noncommuting products II

In the second talk I will give a proof of the noncommutative ergodic theorem and explain a few of its consequences, notably to the drift of random walks on finitely generated groups and the existence of non-constant bounded harmonic functions improving on a result of Varopoulos.