Workshop on Dynamics & Geometry

Date: Wednesday, 20 November 2019

Time: 10:00 AM – 5:30 PM

Venue: Department of Mathematics

S17-04-04, Seminar Room 3

Organizers: Tien Cuong Dinh and Lucas Kaufmann

SPEAKERS

Fabrizio Bianchi (Lille)
Le Tu Quoc Thang (Georgia Tech)
Viet-Anh Nguyen (Lille)
Yusuke Okuyama (Kyoto)
Tan Ser Peow (Singapore)

NUS
National University
of Singapore

Department of Mathematics
Faculty of Science

Programme

10.00am – 10.50am	**A probabilistic/combinatorial approach to McShane's identity**
	Tan Ser Peow *National University of Singapore*
10.50am – 11.10am	Break @ Venue
11.10 am – 12.00pm	**Entropy of pseudo-Anosov maps and growth of torsion homology**
	Le Tu Quoc Thang *Georgia Tech*
12.00pm – 2.00pm	Lunch
2.00pm – 2.50pm	**Negative Lyapunov exponent for singular holomorphic foliations**
	Viet Anh Nguyen *University of Lille*
2.50pm – 3.10pm	Break @ Venue
3.10pm – 4.00pm	**Bifurcations in families of polynomial skew products**
	Fabrizio Bianchi *University of Lille*
4.00pm – 4.20pm	Break @ Venue
4.20am – 5.10am	**Equidistribution and finiteness in the moduli space of complex dynamics**
	Yusuke Okuyama *Kyoto Institute of Technology*

Abstract

Bifurcations in families of polynomial skew products

Fabrizio Bianchi, University of Lille

(Quadratic) polynomial skew-products are maps of the form $F(z, w) = (p(z), q(z, w))$, where p and q are polynomials of degree 2. These maps give the simplest non-trivial examples of endomorphisms of P2(C). In this talk, we investigate the natural parameter space of these maps, with emphasis on the stability-bifurcation dichotomy. In particular, we describe the geometry of the bifurcation current near infinity, and we give a partial classification of hyperbolic components. One of the tools we use is a generalisation to this setting of the one-dimensional equidistribution of some dynamically defined hypersurfaces of the parameter space towards the bifurcation current.

This is a joint work with Matthieu Astorg, Orléans.

Entropy of pseudo-Anosov maps and growth of torsion homology

Le Tu Quoc Thang, Georgia Tech

We discuss some results/conjectures on the growth of torsion homology of 3-manifolds and their relations to hyperbolic volume bounds (Kojima-McShane inequality) and stretch factors of pseudo-Anosov maps (McMullen homological stretch factor conjecture).

Negative Lyapunov exponent for singular holomorphic foliations

Viet Anh, University of Lille

Let F be a holomorphic foliation by Riemann surfaces defined on a compact complex projective surface X satisfying the following two conditions:
 • the singular points of F are all hyperbolic;
 • F is Brody hyperbolic.

 Then we establish a cohomological formula for the Lyapunov exponent of an extremal positive harmonic current tangent to F.

 If, moreover, there is no nonzero positive closed current tangent to F, then we show that the Lyapunov exponent lambda(F) of F, which is, by definition, the Lyapunov exponent of the unique normalised positive harmonic current tangent to F, is a negative nonzero real number.

Abstract

Equidistribution and finiteness in the moduli space of complex dynamics

Yusuke Okuyama, Kyoto Insitute of Technology

The (d-th) moduli space of complex dynamics parametrizes all the dynamics of rational functions of degree d>1 on the projective line up to Mobius conjugacies, and there the bifurcation currents and measure are defined as generalizations of the Mandelbrot set in the parameter space C of the quadratic unicritical polynomials family. We would talk about some complex analytic results on this dynamical moduli space including a quantitative equidistribution of hyperbolic components towards the bifurcation measure and an improved finiteness of the multiplier spectra on this moduli space. This talk is based on our joint works with Thomas Gauthier and Gabriel Vigny.

A probabilistic/combinatorial approach to McShane's identity

Tan Ser Peow, National University of Singapore

We give a probabilistic interpretation of McShane's identity in terms of the probability of going along certain infinite paths along some combinatorial tree. This follows ideas of Bowditch in the case of the once punctured torus and is joint work with Francois Labourie.