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Ph.D. Thesis Defense

Uniform Lyapunov Exponents for Products of Matrices

Abstract:

Let $M = (M_1, \dots, M_k)$ be a finite tuple of real $d \times d$ matrices. Under certain irreducibility assumptions, we give checkable criteria for deciding whether M possesses the following property: there exist two constants $\lambda \in \mathbb{R}$ and $C > 0$ such that for any $n \in \mathbb{N}$ and any $i_1, \dots, i_n \in \{1, \dots, k\}$, either $M_{i_1} \cdots M_{i_n} = \mathbf{0}$ or $C^{-1}e^{\lambda n} \leq \|M_{i_1} \cdots M_{i_n}\| \leq Ce^{\lambda n}$, where $\|\cdot\|$ is a matrix norm. The proof is based on symbolic dynamics and thermodynamic formalism for matrix products. As applications, we are able to check the absolute continuity of a class of overlapping self-similar measures on \mathbb{R} , the absolute continuity of certain self-affine measures in \mathbb{R}^d , and the dimensional regularity of a class of sofic affine-invariant sets in the plane.

Mr. Chiu Hong LO

Department of Mathematics, The Chinese University of Hong Kong

Date: 27 June 2017 (Tuesday)
Time: 8:30 p.m. – 9:30 p.m.
Venue: Room 222, Lady Shaw Building
The Chinese University of Hong Kong, Shatin

All are Welcome!