

Abstract

Derong Kong 10:30-11:30

Title: Hausdorff dimensions and typical points of univoque sets

Given a positive integer M and a real number $q > 1$, we consider the univoque set \mathcal{U}_q of reals which have a unique q -expansion over the alphabet $\{0, 1, \dots, M\}$. In this talk we investigate the Hausdorff dimension of \mathcal{U}_q , and show that the dimension function behaves like a Devil's staircase.

Moreover, we show that for any $x \in \mathcal{U}_q$ and any sufficiently small $\varepsilon > 0$ the Hausdorff dimension $\dim_H \mathcal{U}_q \cap (x - \varepsilon, x + \varepsilon)$ equals either $\dim_H \mathcal{U}_q$ or zero. In particular, we give a complete description of the typical points $x \in \mathcal{U}_q$ which satisfy

$$\dim_H \mathcal{U}_q \cap (x - \varepsilon, x + \varepsilon) = \dim_H \mathcal{U}_q \quad \text{for any } \varepsilon > 0,$$

and prove that the set of typical points of \mathcal{U}_q has full Hausdorff dimension.

This is a joint work with Vilmos Komornik, Wenxia Li and Fan Lü.

Simon Baker 11:30-12:30

Title: Inhomogeneous self similar sets with overlaps

Abstract: Inhomogeneous self similar sets are simple generalisations of the classical self similar sets. It is a result due to Fraser that if the underlying similarities satisfy the open set condition, then the upper box dimension of the inhomogeneous self similar set satisfies the "expected formula". In this talk I will discuss recent work in which it is shown that if the open set condition fails, then this "expected formula" does not hold. Our main source of counterexamples is based upon Bernoulli convolutions. (Joint work with Jon Fraser)

Rafael Alcaraz Barrera 2:00-3:00

Title: On the dynamics of a map with a hole

We investigate the attractor of the doubling map when a hole consisting in one component is introduced. Using some properties of the binary expansion of the end points, Lorenz maps and symbolic dynamics we will describe when an attractor is transitive, has the specification property and when it is intrinsically ergodic.

Kan Jiang 3:00-4:00

Title: Subshift of finite type and self-similar sets

Let $K \subset \mathbb{R}$ be a self-similar set generated by some iterated function system. In this paper we prove under some assumptions that K can be

identified with a subshift of finite type. Using this result we can calculate the Hausdorff dimension of K and the set of elements in K with unique codings simultaneously in terms of Mauldin and Williams' work. We give two applications of our main idea. Firstly we generalize one result of de Vries and Komornik. Secondly, we partially answer one problem posed in the PhD thesis of Barrera concerning the doubling map with holes. Our idea has some further potential applications in fractal geometry. This is joint work with Karma Dajani.