Department of Mathematics
The Chinese University of Hong Kong

數學系
香港中文大學

Mini-Course

Random and Deterministic Conformal Fractals

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Abstract: The mini-course consist of three parts. In the first two parts, we consider random self-similar sets and in the third one we study deterministic self-conformal sets and measures.

Can we find a self-similar set on the line with positive Lebesgue measure and empty interior? Currently, we do not have the answer for this question for deterministic self-similar sets. We consider two different families of random self-similar sets. In the first one the answer to the previous question is positive in the second one it is negative.

First we consider a special one-parameter family of d-dimensional random, homogeneous self-similar iterated function systems (IFSs) where the ramdomness in the construction is similar to that of in the case of the famous Mandelbrot percolation sets. The object of our study is the positivity of Lebesgue measure and the existence of interior points in these random sets and in particular the existence of an interesting parameter interval where the attractor has positive Lebesgue measure, but empty interior almost surely conditioned on the attractor not being empty. This part is joint with V.Oroványi.

Secondly, we consider ramdom self-similar sets which are obtained by applying an analogous construction to the deterministic self-similar case but by adding an independent random error in each step of the cosntruction. In this case we prove that if the attractor has postive Lebesgue measure then it has non-empty interior. This part is joint with M. Dekking, B. Székely and N. Szekeres.

The third part consists of the study of the dimension and Lebesgue measure of deterministic self-conformal measures. This part is joint with B. Bárany, B. Solomyak and A. Spiewak.

Date and Time:
Part (I): **17 January 2025 (Friday) at 2:30 p.m. – 4:30 p.m.**
Part (II): **20 January 2025 (Monday) at 9:30 a.m. – 11:30 a.m.**
Part (III): **20 January 2025 (Monday) at 2:30 p.m. – 4:30 p.m.**
Venue: Rm 219, Lady Shaw Building,
         The Chinese University of Hong Kong, Shatin

All are Welcome!