UCD School of Mathematics and Statistics

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Scoil na Matamaitice agus na Staitisticí UCD

An Coláiste Ollscoile, Baile Átha Cliath
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Analysis Seminar

M. Barnsley (Canberra)

will speak on

The largest set defined by an iterated function system

Tue 1st April 2014 at 3:00PM

Location:

In this lecture I will describe recent, to me very exciting, work concerning natural extensions of attractors of iterated function systems. The results so far are largely joint work with Andrew Vince and Krystoph Lesniak. My goal will be to explain the new ideas, the motivation for them, and the shape of the final "big picture". But next, here, I quote the abstract of one of a number of recent papers on the topic, to give some flavour. (The lecture itself will be less technical.) We define and exemplify the continuations and the fast basin of an attractor of an IFS. Then we extend the standard symbolic IFS theory, concerning the dynamics of a contractive IFS on its attractor, to a symbolic description of the dynamics of a invertible IFS on a set that contains the fast basin of a point-fibred attractor. We use this description to define the fractal manifold, a new topological invariant, associated with a point-fibred attractor of an IFS. We establish relationships between the fractal manifold, the fast basin, and the set of continuations of an attractor of an IFS. We establish how sections of projections, from code space to an attractor, can be extended to yield sections of projections from code space to the f-manifold and to the basin. We use these sections to construct transformations between fractal manifolds and show how their projections extend fractal transformations between attractors to corresponding transformations between fast basins of attractors. We present practical conditions that control the topological properties, such as continuity, of these transformations. We show how a section of a projection from code space to an attractor yields a unique address for each point on the fractal manifold, and how the set of addresses provides a tiling of the manifold that project to diverse tilings of the basin. Many standard tilings, and schemes for describing them, as well as an abundance of new tilings, result from this new unified approach to fractal tiling. This work has implications to coding theory and numeration systems.

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This talk is part of the **Analysis** series. For more, see
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