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On the Fibonacci Mandelbrot set

For $\beta \in \mathbb{C}$ with $|\beta| < 1$ define the contractions

$$h_0(z) = \beta z \text{ and } h_1(z) = \beta z + 1$$

and consider the attractor A_β of the iterated function system $\{h_0, h_1\}$. In 1985 Barnsley and Harrington introduced the “Mandelbrot set for pairs of linear maps” which is the set of all β with connected attractor A_β . This set has been thoroughly studied by many authors.

In the present talk we consider a variant of this Mandelbrot

set. In particular, we consider the attractors of the

iterated function system $\{f_0, f_1\}$ given by

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$$f_0(z) = \beta z, \quad f_1(z) = 1 + \beta^2 z$$

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and study the associated Mandelbrot set $\mathcal{M}$. Among other things we show that $\mathcal{M}$ is connected.

The structure of the iterated function system $\{f_0, f_1\}$ is related to the Fibonacci Language which is the subshift of finite type over $\{0, 1\}$ defined by forbidding the occurrence of two consecutive ones. This language and its difference language play an important role in the construction.

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