Computing the conformal dimension of Julia sets by graphs

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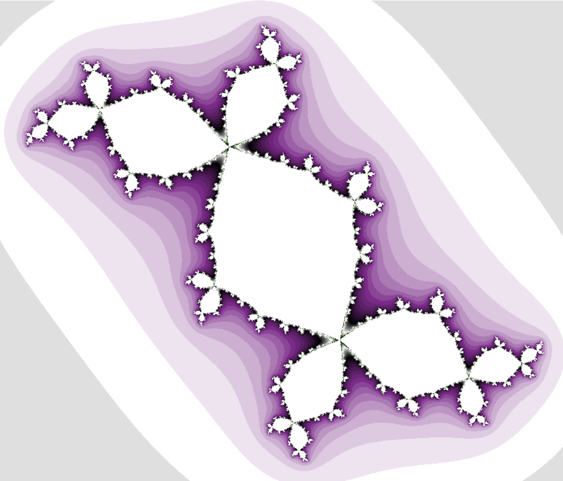
Celebration of Tan Lei, 1963–2016

Joint with K. Pilgrim

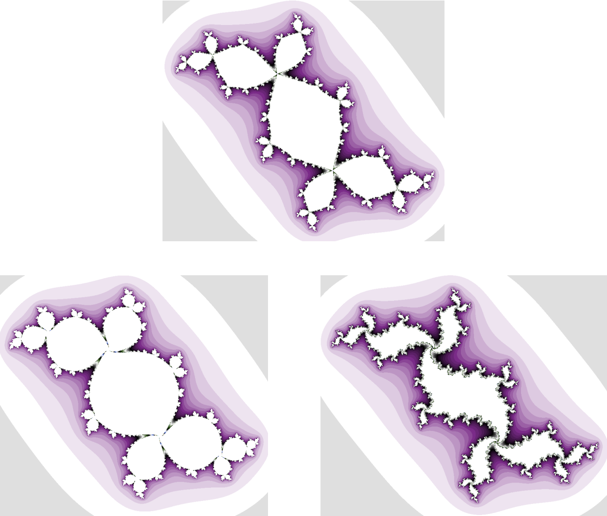
Oct. 24, 2017, U. d'Angers

The rabbit



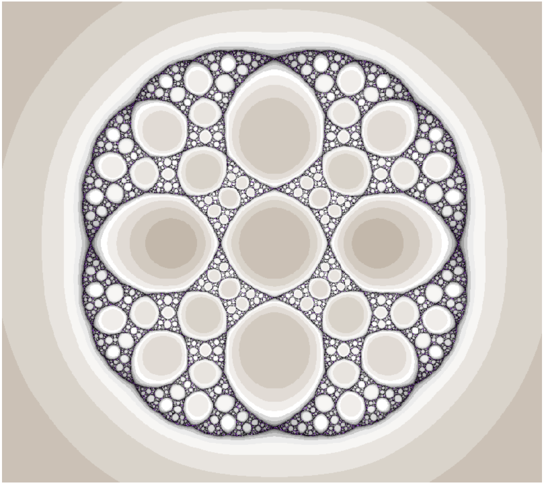
The Rabbit Julia set.

More Rabbits



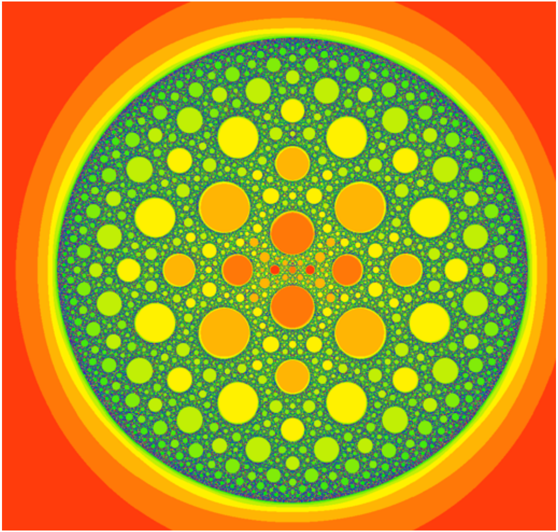
Natural to view metric up to quasi-symmetry.

Rational maps



$f(z) = \frac{z^2-1}{z^2+1}$. Ahlfors regular conformal dimension is 1.

Sierpiński Carpets

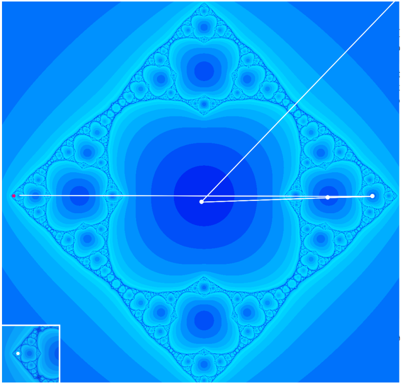


Barycentric subdivision Julia set: $f(z) = \frac{4}{27}\frac{(z^2-z+1)^3}{(z(z-1))^2}$. $1 < \text{ARconfdim} < 2$.

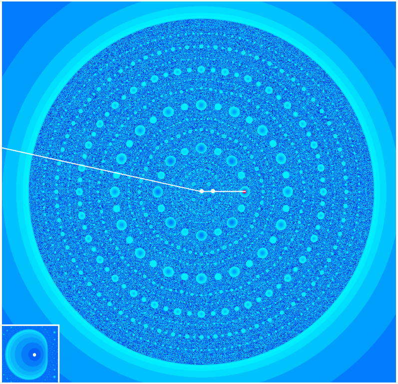
More carpets

Theorem (Pilgrim-T.)

There are families of Sierpiński carpets in the Devaney family $f(z) = z^2 + \lambda/z^2$ *with Ahlfors regular conformal dimension approaching* 1 *and approaching* 2*.*



ARconfdim $\to 1$



ARconfdim $\to 2$

Theorem (Based on work by Morris-Shepard)

The Ahlfors regular conformal dimension of the barycentric subdivision Julia set $\mathcal{J}$ satisfies

$$\frac{1}{1-\log_6(2)} \approx 1.63 < \mathrm{ARconfdim}((J)) < 1.76.$$