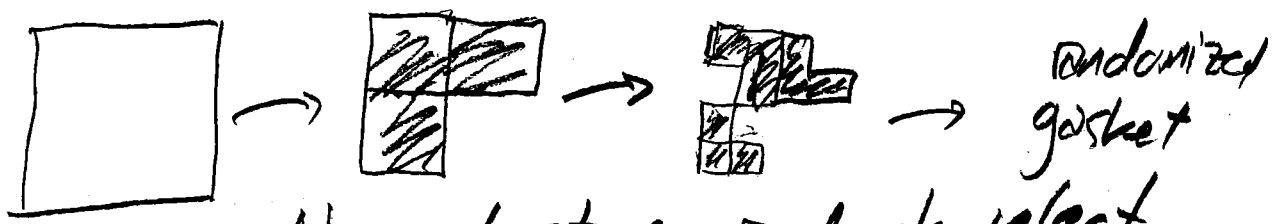
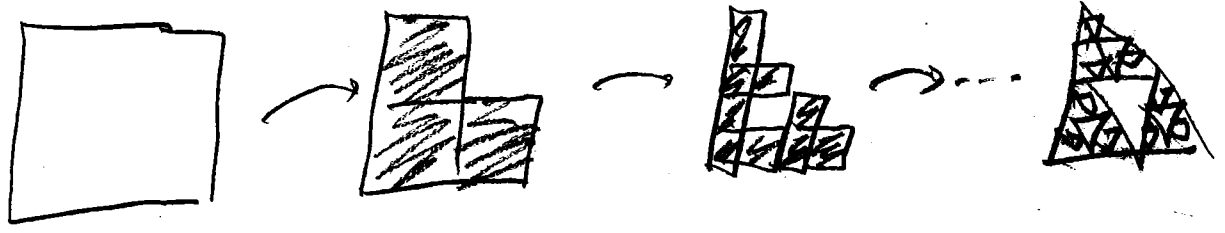


Oct 23 rev

Randomized Fractal constructions



At each stage, randomly select which of the four corners to

remove

The result is statistically self-similar
Can't compute similarity dimension:
not self-similar.

Can compute the box-counting dimension

$$N(1/2) = 3$$

$$N(1/4) = 9$$

$$N(1/2^n) = 3^n$$

$$d_b = \frac{\log 3}{\log 2}$$

Randomized Cantor Set: At each stage, replace each interval by two pieces, L and R,

L is scaled by $1/3$ with prob $1/2$, and $1/9$ with prob $1/2$

R is scaled by $1/3$ with prob $3/4$ and $1/9$ with prob $1/4$

Randomized Moran eq :

Average value of r_L^d
+ Average value of $r_R^d = 1$

$$\frac{1}{2} \cdot \left(\frac{1}{3}\right)^d + \frac{1}{2} \left(\frac{1}{9}\right)^d + \frac{3}{4} \left(\frac{1}{3}\right)^d + \frac{1}{4} \left(\frac{1}{9}\right)^d = 1$$

Average of r_L^d

Average of r_R^d

Let $x = \left(\frac{1}{3}\right)^d$. Then $\left(\frac{1}{9}\right)^d = x^2$

$$\frac{1}{2}x + \frac{1}{2}x^2 + \frac{3}{4}x + \frac{1}{4}x^2 = 1$$

$$\frac{5}{4}x + \frac{3}{4}x^2 = 1$$

$$5x + 3x^2 = 4$$

$$3x^2 + 5x - 4 = 0$$

$$x = \frac{-5 \pm \sqrt{25 - 4 \cdot 3 \cdot (-4)}}{2 \cdot 3}$$

$$= \frac{-5 \pm \sqrt{73}}{6}$$

$$x = \frac{-5 + \sqrt{73}}{6}$$

$$d = \frac{\log\left(\frac{-5 + \sqrt{73}}{6}\right)}{\log\left(\frac{1}{3}\right)}$$