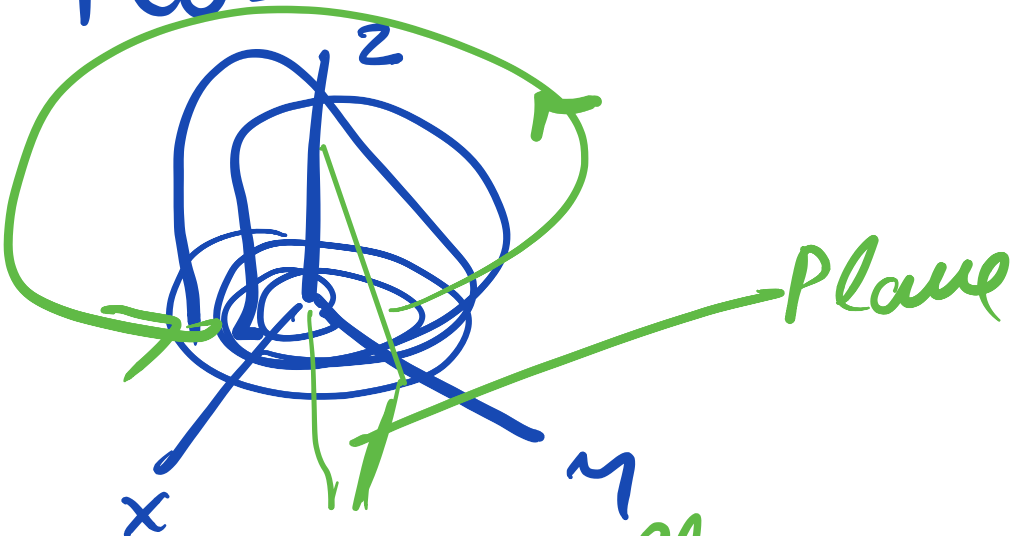
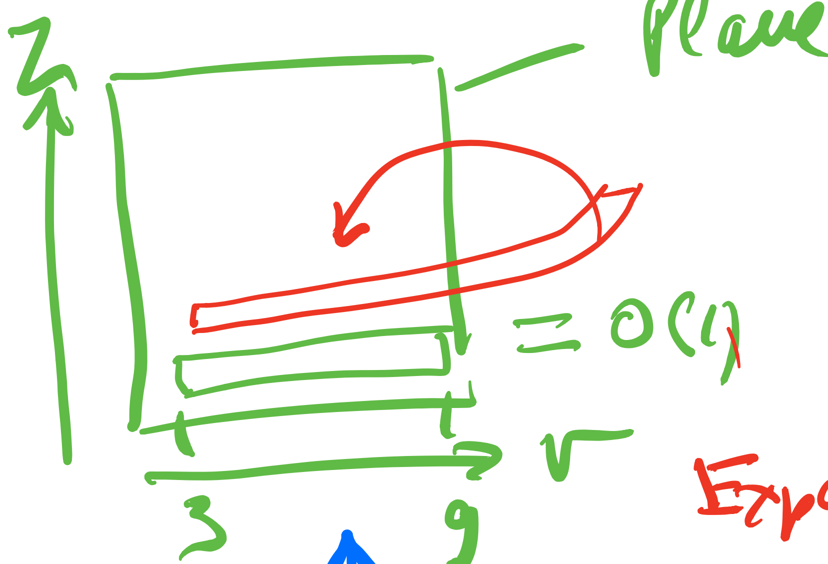
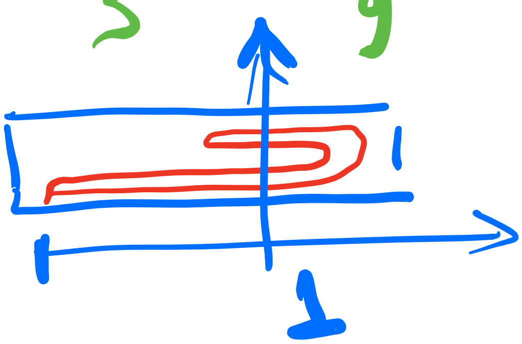
Rosler Attractor







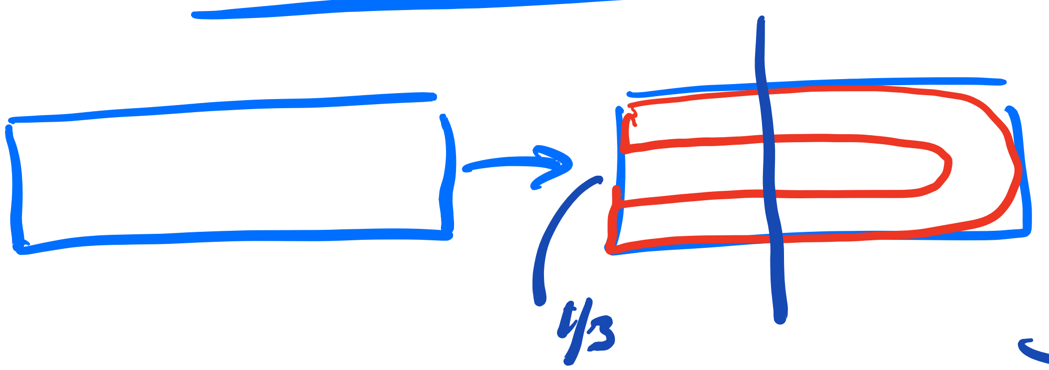
Expansion
~ 1.5
Contractn: 2 dec
$\sim 10^{10}$

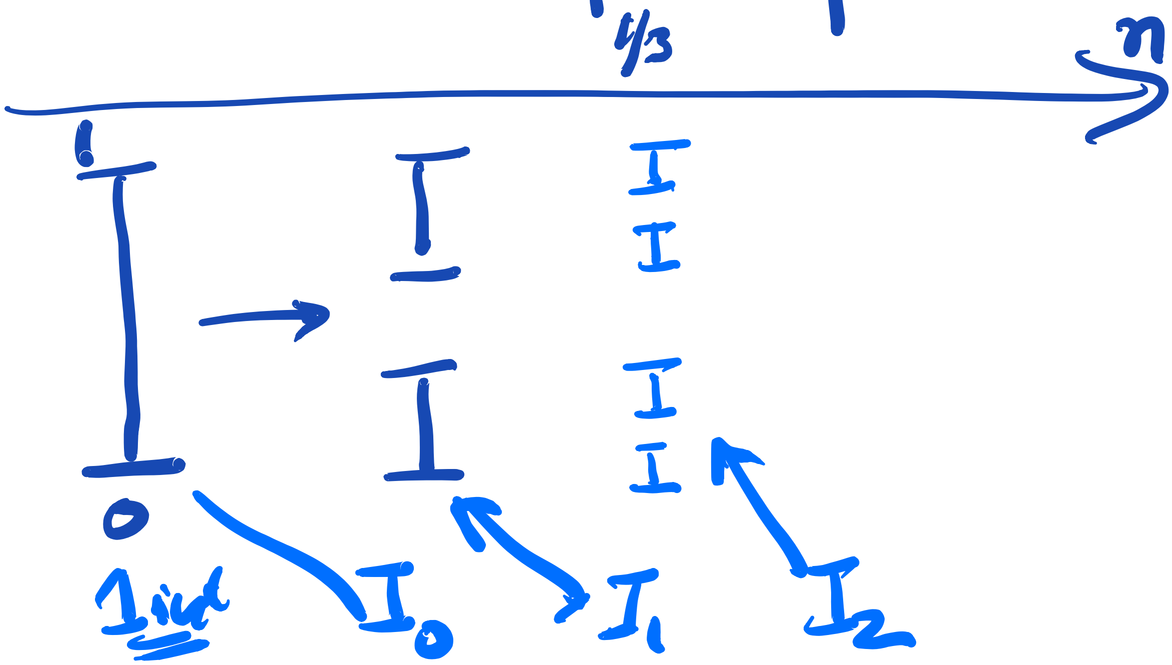
Equs

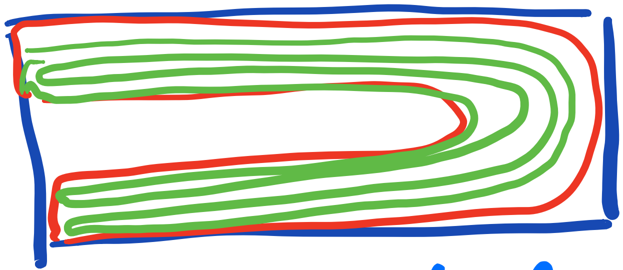
$$\boxed{\begin{aligned} \dot{x} &= -y - z \\ \dot{y} &= x + ay \\ \dot{z} &= b + z(x-c) \end{aligned}}$$

$a = b = 0.2$ & $2 < c < 6$

1) Vertical structure







1 int. of length 1 I_0
2 int. of length 1/3 I_1
4 int. of length 1/9 I_2
2^n int. of " $1/3^n$ I_n

"Attractor" $C_a = \bigcap_{0}^{\infty} I_n$

Cantor set ~ $\boxed{190x}$

length $I_n = (2/3)^n$

length of $C_a = 0$

Natural # {1, 2, 3, ------}

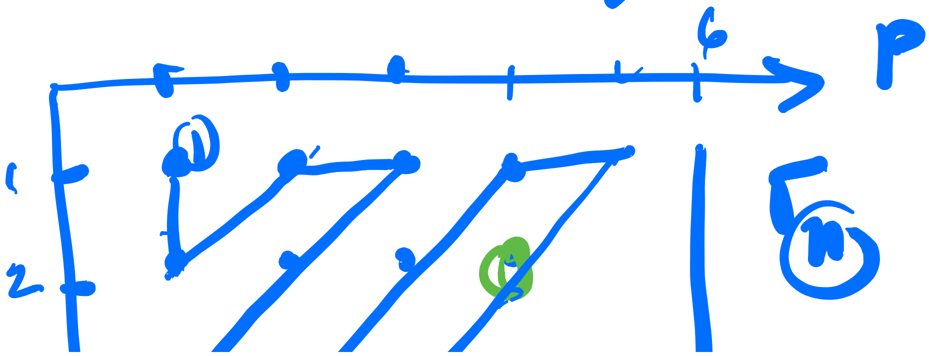
Cardinal # $\omega_0 \sim N$

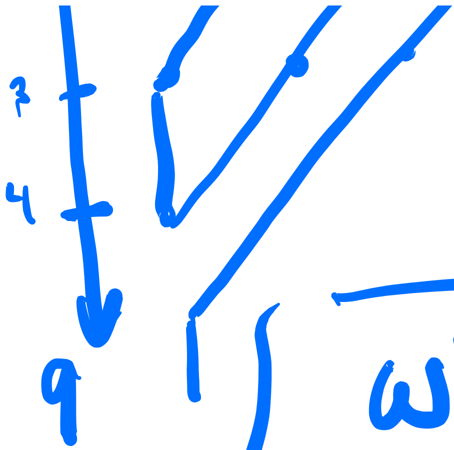
$N_0 = \{0, 1, 2, ------\}$.

$N_e = (0, 2, ------\}$.

$N_0 \times 2 \longrightarrow N_e$

Rational N# $\frac{p}{q}$





$$\omega_0^2 = \omega_0$$

$$2\omega_0 = \omega_0$$

$$\omega_0^3 = \omega_0$$

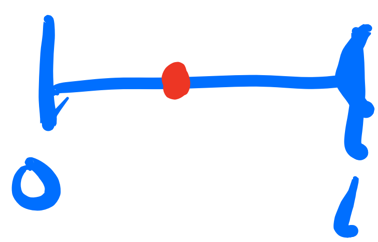
$$\omega_0 < \omega_1$$

$$\omega_1 = \#[\text{real}\#]$$

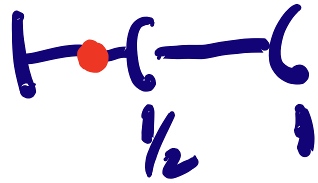
$$\omega_1 = 2^{\omega_0}$$

$$\omega_0 \le \omega_1$$

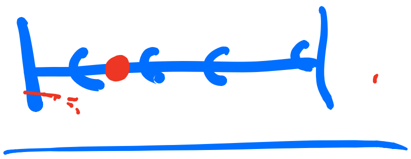
$$\omega_0 < \omega_1$$



$$0 \le r < 1$$



0.0



0.01

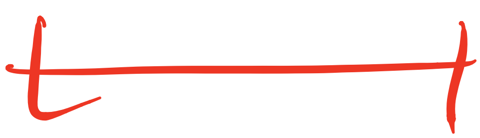
1111

0.01011 01 01 –

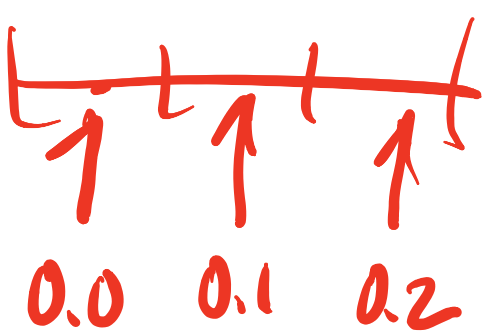
1 11 1

Real # are complete !!

Continuum !



0.



0.0

99999

Nat # $\xrightarrow{\text{bijection}}$ Real #

Not allowed

Say possible

r_4

r_1 r_2 r_3 - ———

r_1 | 0 0 1 2 2 1

r_2 | 1 2

r_3 | ——— 1

1 1 2 0

ω_0 = cardinal of Nat. #

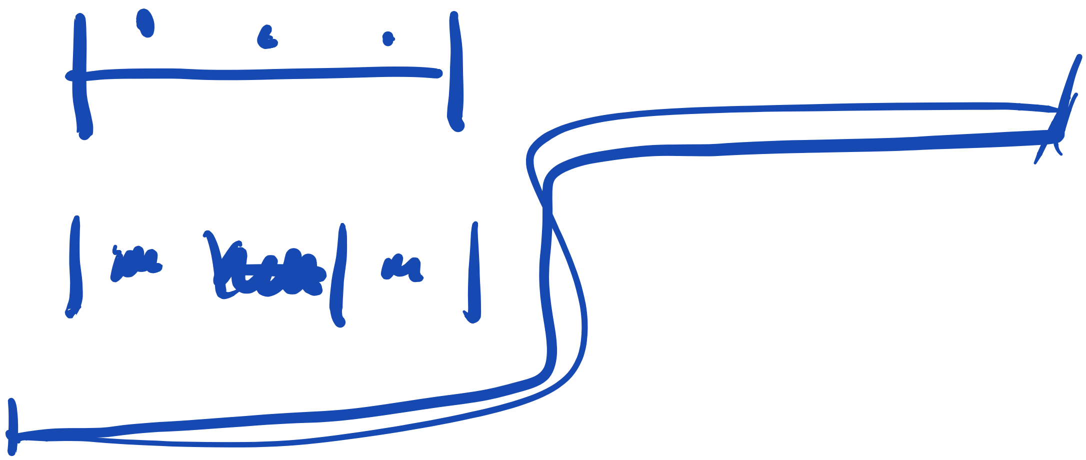
ω_1 = " " Real #

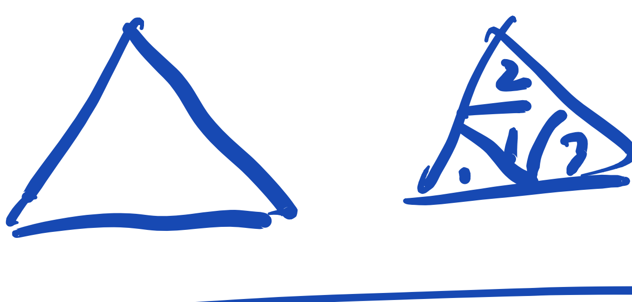
1

Hypothesis of the Continuum

There is none!

Cardinal (Cantor) $= \omega_1$





Koch curve

K_0 $\qquad$ K_1

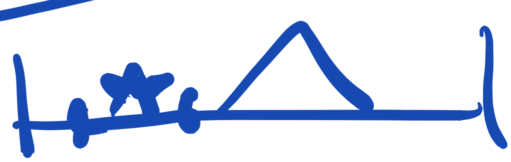
K_2

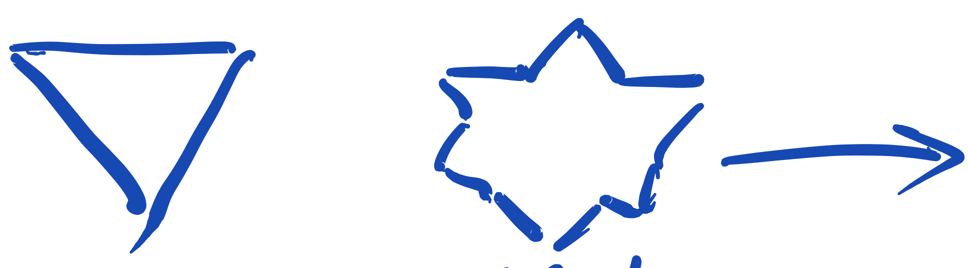
$K_1 = 4$ unit of $\frac{1}{3}$

$K_2 = 16$ unit of $\frac{1}{9}$

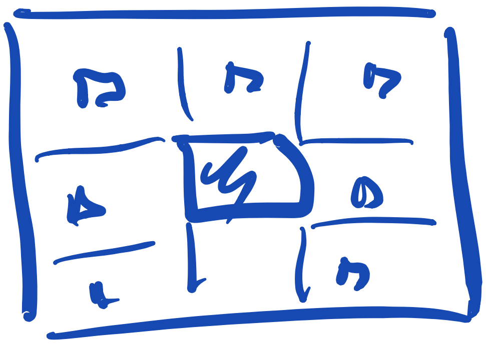
$K_n \sim$ length $\left(\frac{4}{3}\right)^n$

$\boxed{\text{K is defined as limit of these}}$

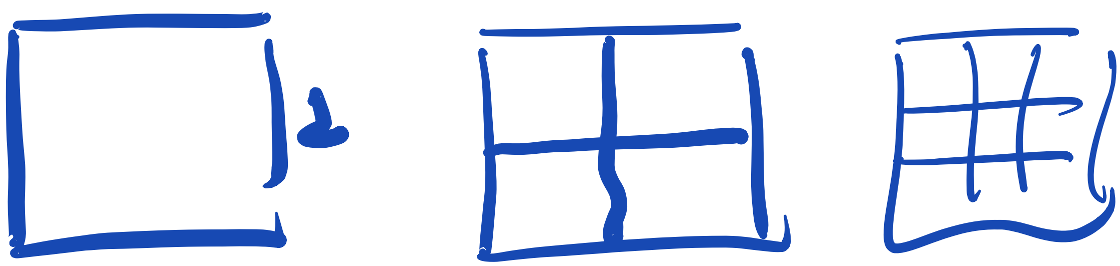




Koch Snowflake



Sierpinsky Gasket



1

d = length scale

$d=1$

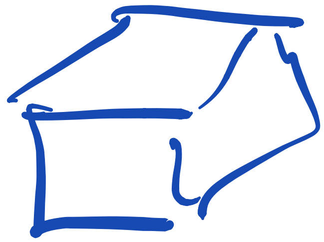
$d = \frac{1}{2}$

$d = \frac{1}{3}$

$N = 4$

$N = 9$

$$\boxed{N = d^{-2}}$$



$d = \frac{1}{2}$ $\quad$ $d = 1/3$

$N = 8$ $\quad$ $N = 27$

$N = d^{-3}$

Self similar dim

$N = d^{-n}$ $\quad$ $n = \text{dim.}$

Cantor set $\quad d = 1/3,\ \frac{1}{9},\ \frac{1}{27}$

$d = \frac{1}{3^{\ell}}$ $\quad$ $N = 2^{\ell}$

$$2^{\ell} = \left(\frac{1}{3^{\ell}}\right)^{n}$$

$$\ell \log 2 = -n\,\ell \log 3$$

$$\boxed{n = \frac{\log 2}{\log 3}}$$

Koch Curve $d = \frac{1}{3^{\ell}}$ $N = 4^{\ell}$

$$1 \le n = \frac{\log 4}{\log 3} < 2$$