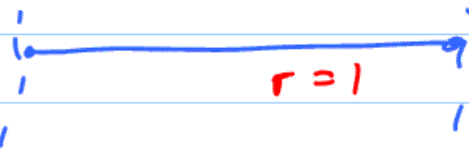


PHY100S - The Magic of Physics - Class 16

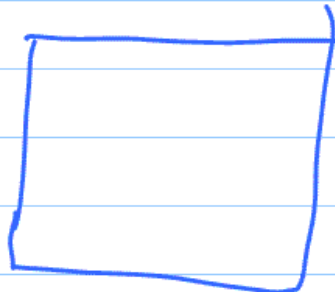
DimensionsHausdorff method.1 dimension $D = 1$ scale by factor
 r $N=1$ 

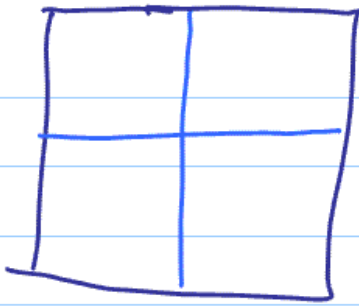
LINE

make fit

 $N=2$  $r=2$ $N = \text{number}$ $N=3$  $r=3$

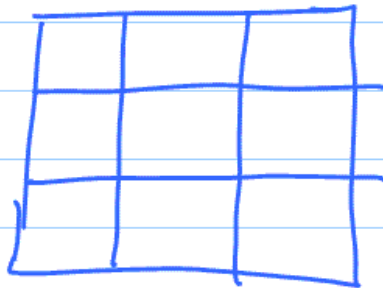
$$N = r^D$$

2 Dimensions $D = 2$  $r=1$ $N=1$



$$r = 2$$

$$N = 4$$

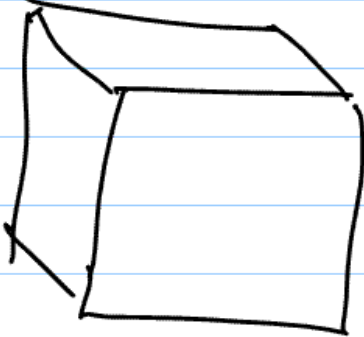


$$r = 3$$

$$N = 9$$

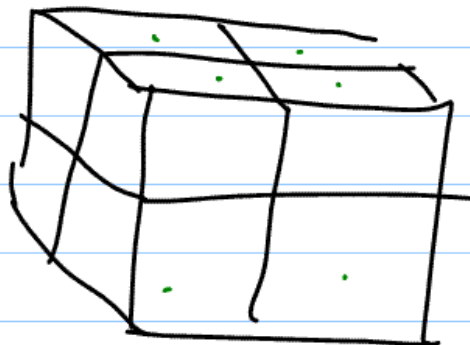
3 Dimensional $D = 3$

$$N = r^D$$



$$r = 1 \leftarrow$$

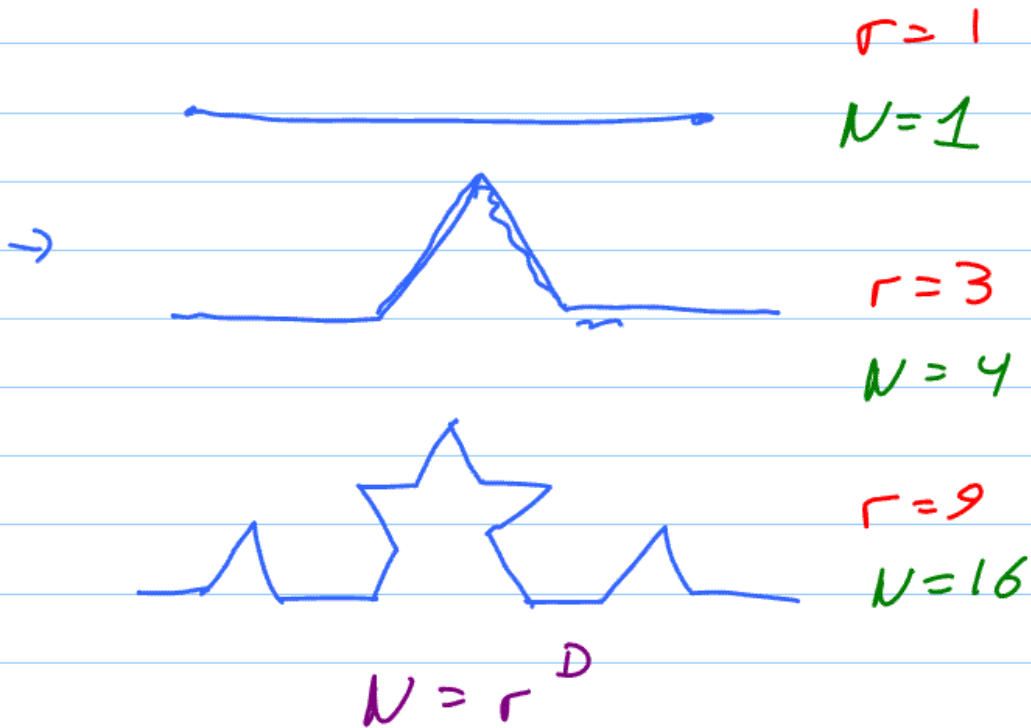
$$N = 1$$



$$r = 2 \leftarrow$$

$$N = 8$$

Koch Curve



$$D = 1.62186 \dots$$

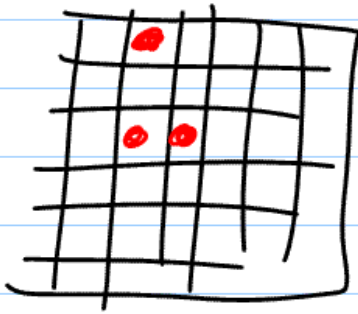
Course Notes for Today

Order From Disorder

Only for an open system

Cellular Automata

Game of Life



① Birth: unoccupied
exactly 3 occupied
neighbors
Occupied in next gen

② Survival: occupied
exactly 3 or 2 occupied
neighbors
Survives in next gen

③ Death All other cases
unoccupied in next gen

Chaotic: S D I C

Cell. Automations: generate order
from disorder