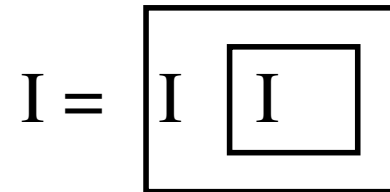


# Reflexivity

Louis H. Kauffman  
UIC, Chicago

“ I am the observed link  
between myself and  
observing myself.”

Heinz von Foerster





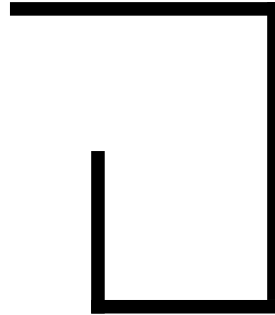
“Reflexive” is a term that refers to the presence of a relationship between an entity and itself. One can be aware of one’s own thoughts. An organism produces itself through its own action and its own productions. A market or a system of finance is composed of actions and individuals, and the actions of those individuals influence the market just as the global information from the market influences the actions of the individuals. Here it is the self-relations of the market through its own structure and the

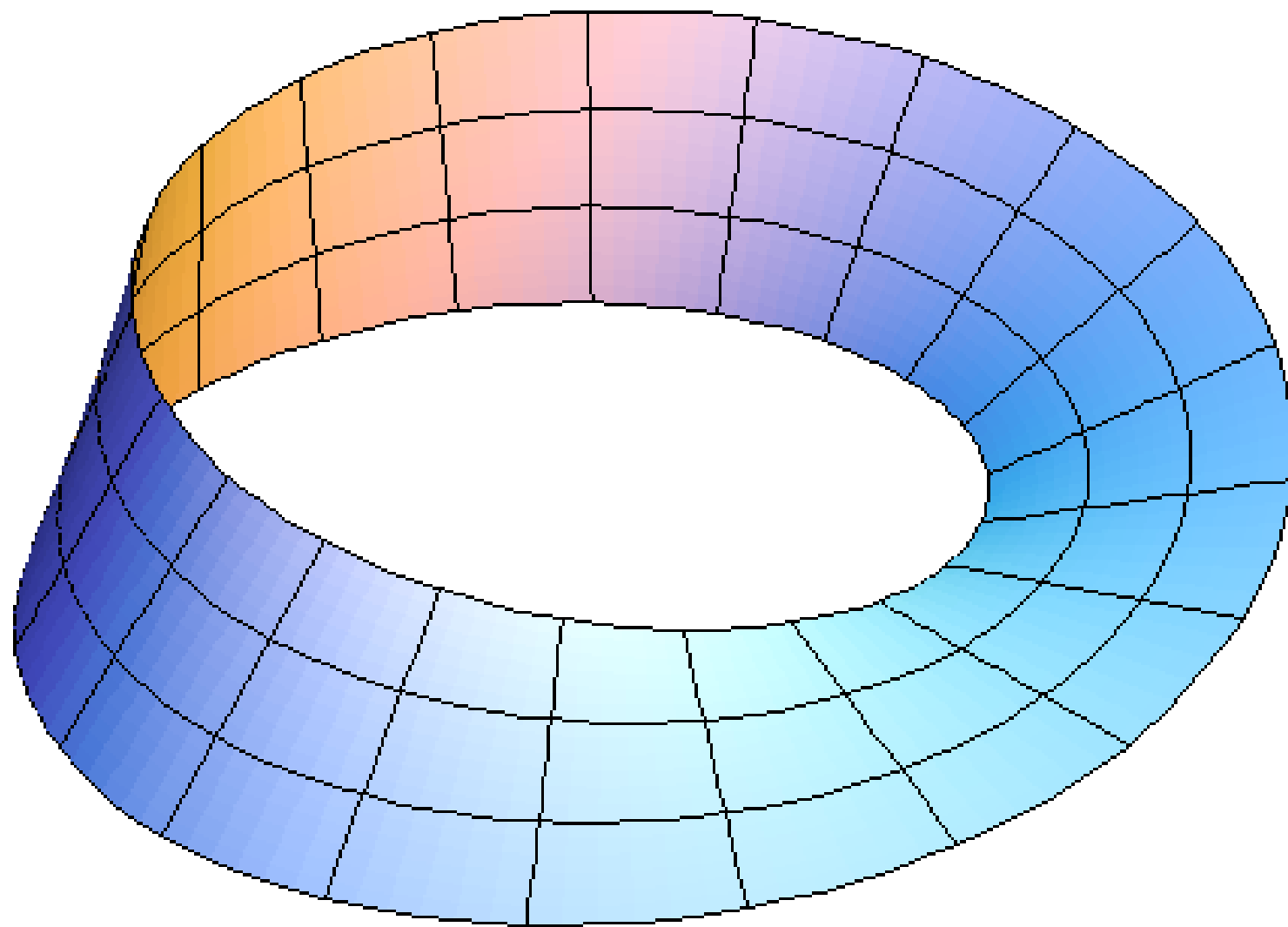
structure of its individuals that moves its evolution forward. Nowhere is there a way to cut an individual participant from the market effectively and make him into an objective observer. His action in the market is concomitant to his being reflexively linked with that market. It is just so for theorists of the market, for their theories, if communicated, become part of the action and decision-making of the market. Social systems partake of this same reflexivity, and so does apparently objective science and mathematics. In order to see the reflexivity of the practice of physical science or mathematics, one must leave the idea of an objective domain of investigation

in brackets and see the enterprise as a wide-ranging conversation among a group of investigators. Then, at once, the process is seen to be a reflexive interaction among the members of this group. Mathematical results, like all technical inventions, have a certain stability over time that gives them an air of permanence, but the process that produces these novelties is every bit as fraught with circularity and mutual influence as any other conversation or social interaction.

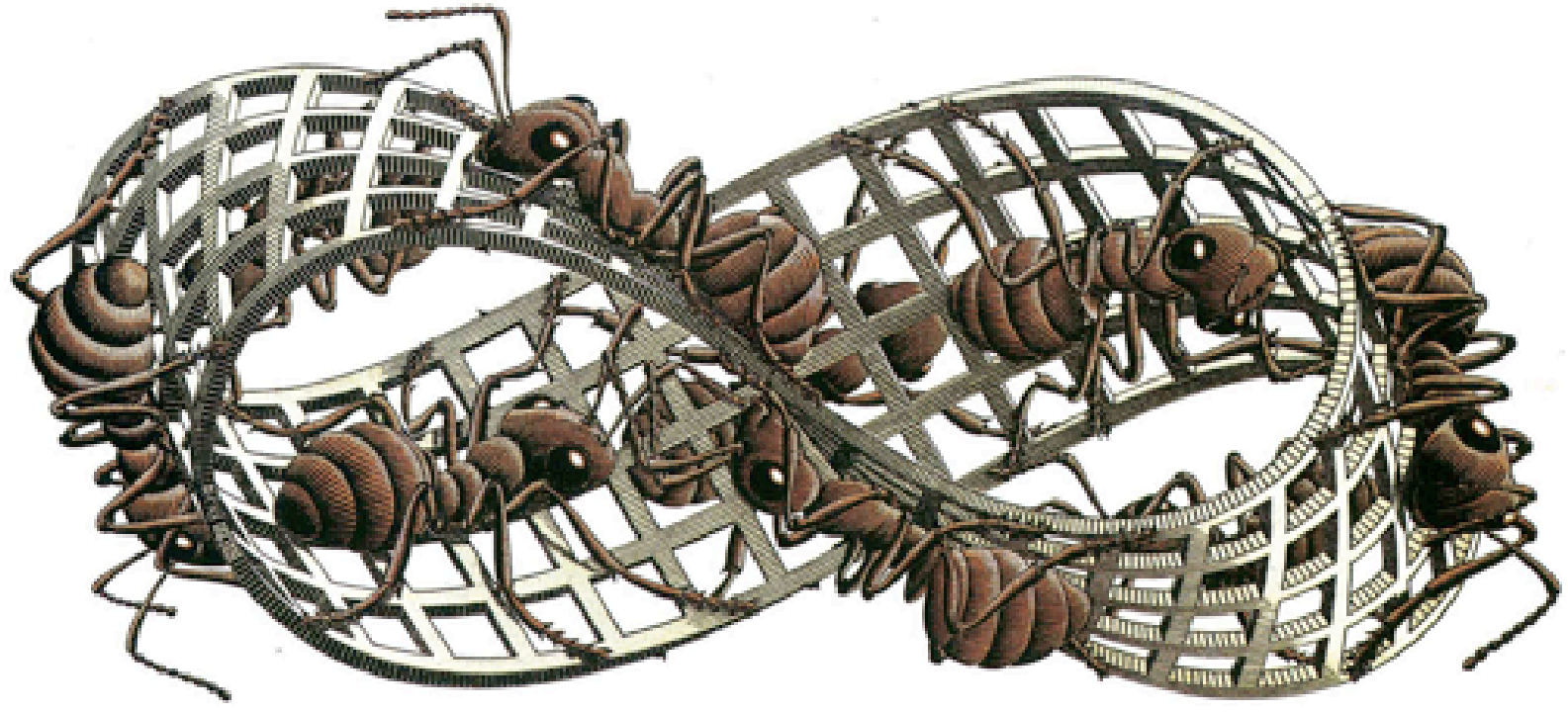
In an observing system, what is observed is not distinct from the system itself, nor can one make a complete separation between the observer and the observed. The observer and the observed stand together in a coalescence of perception. From the stance of the observing system, all objects are non-local, depending upon the presence of the system as a whole. It is within that paradigm that these models begin to live, act and enter into conversation with us.

A Form Re-enters its Own  
Indicational Space.

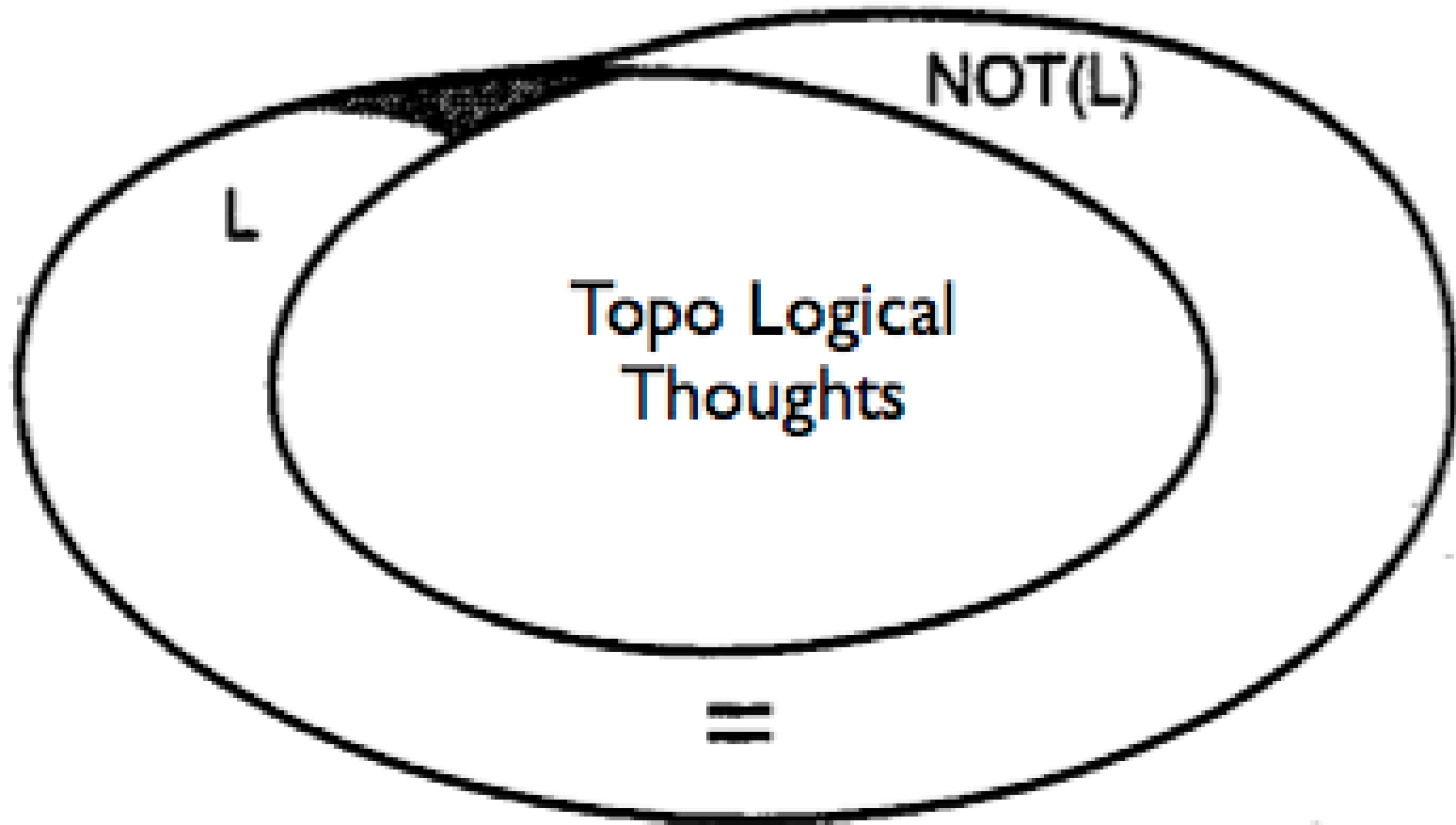




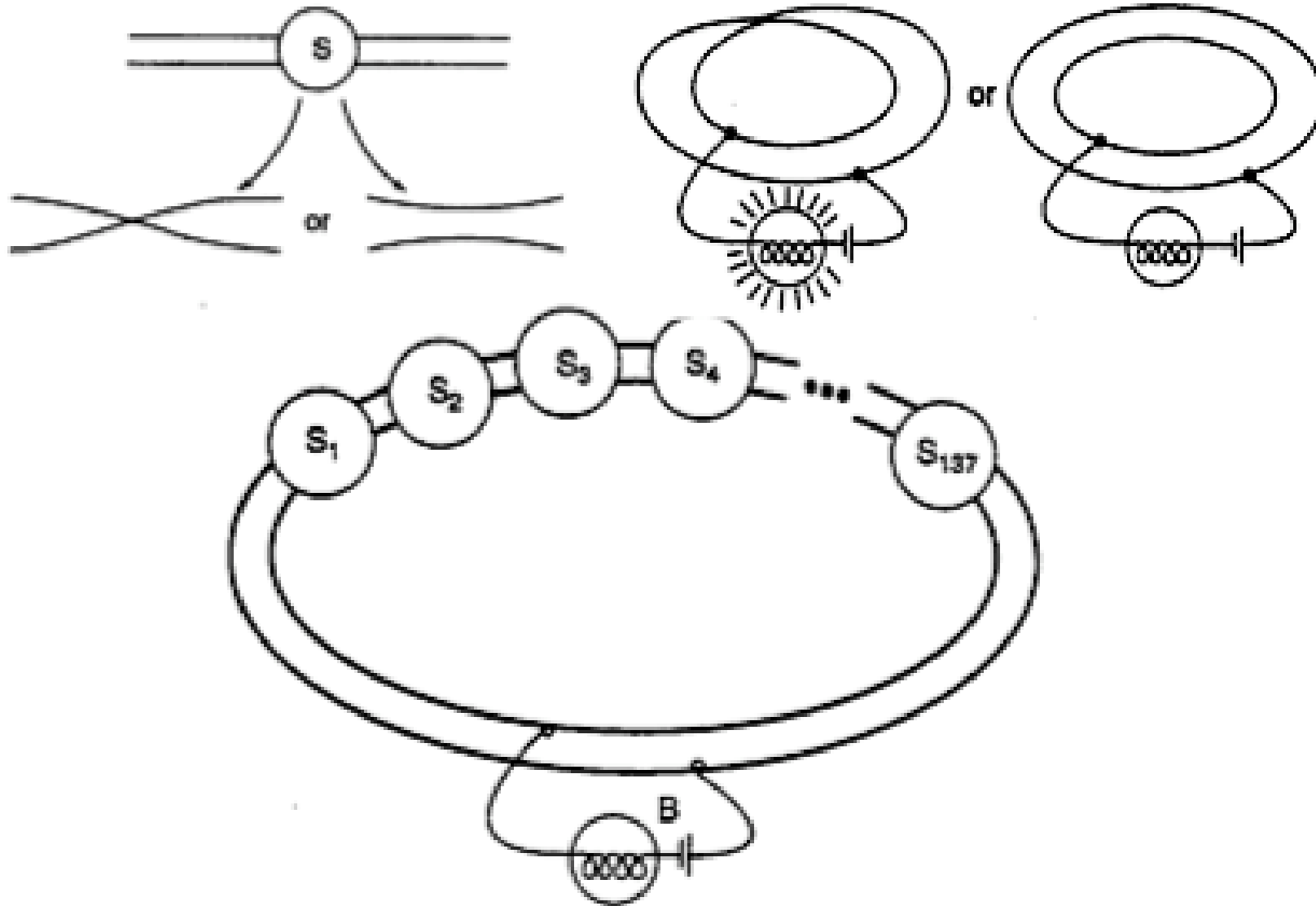


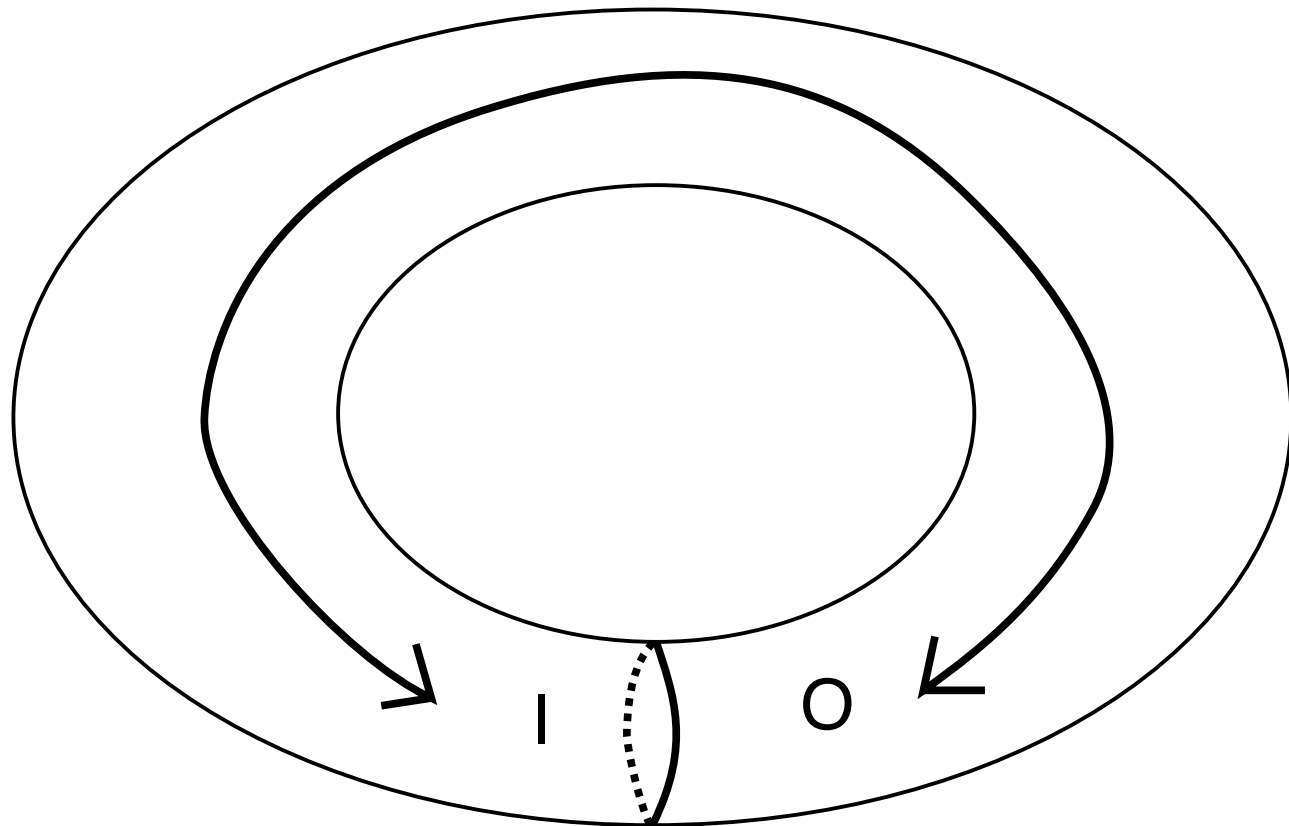


$$L \equiv \text{Not}(L)$$



# Mobius Applications Inc. (courtesy of Ricardo Uribe)

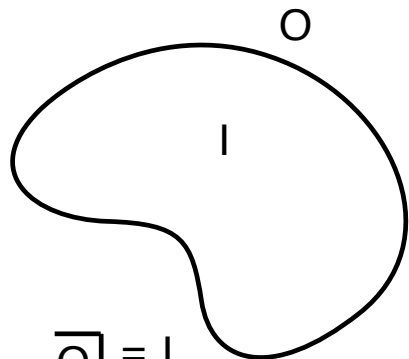




$$I = O = J$$

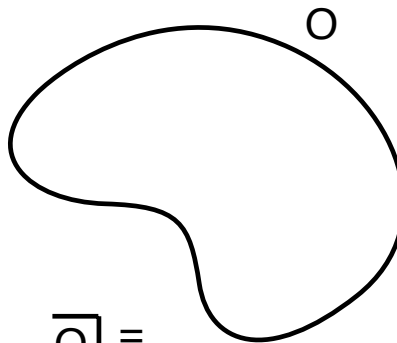
$$J = \overline{J}$$

# Descent Into the Form



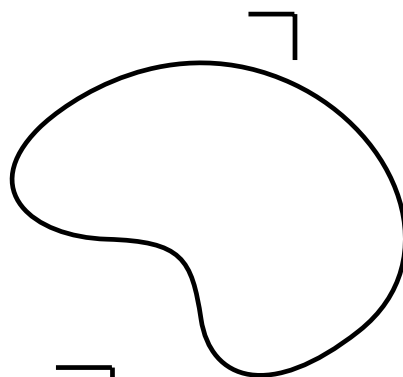
$$\overline{0} = 1$$

$$\overline{1} = 0$$

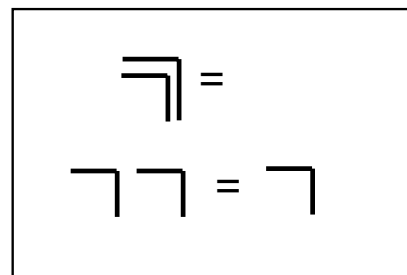
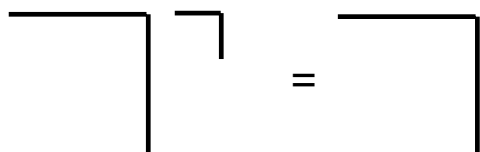


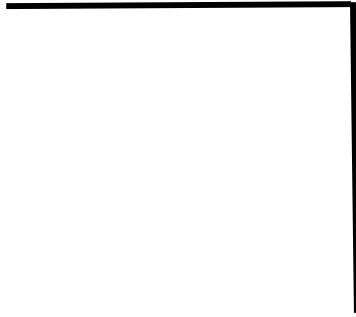
$$\overline{0} =$$

$$\overline{\quad} = 0$$



$$\overline{\quad} =$$





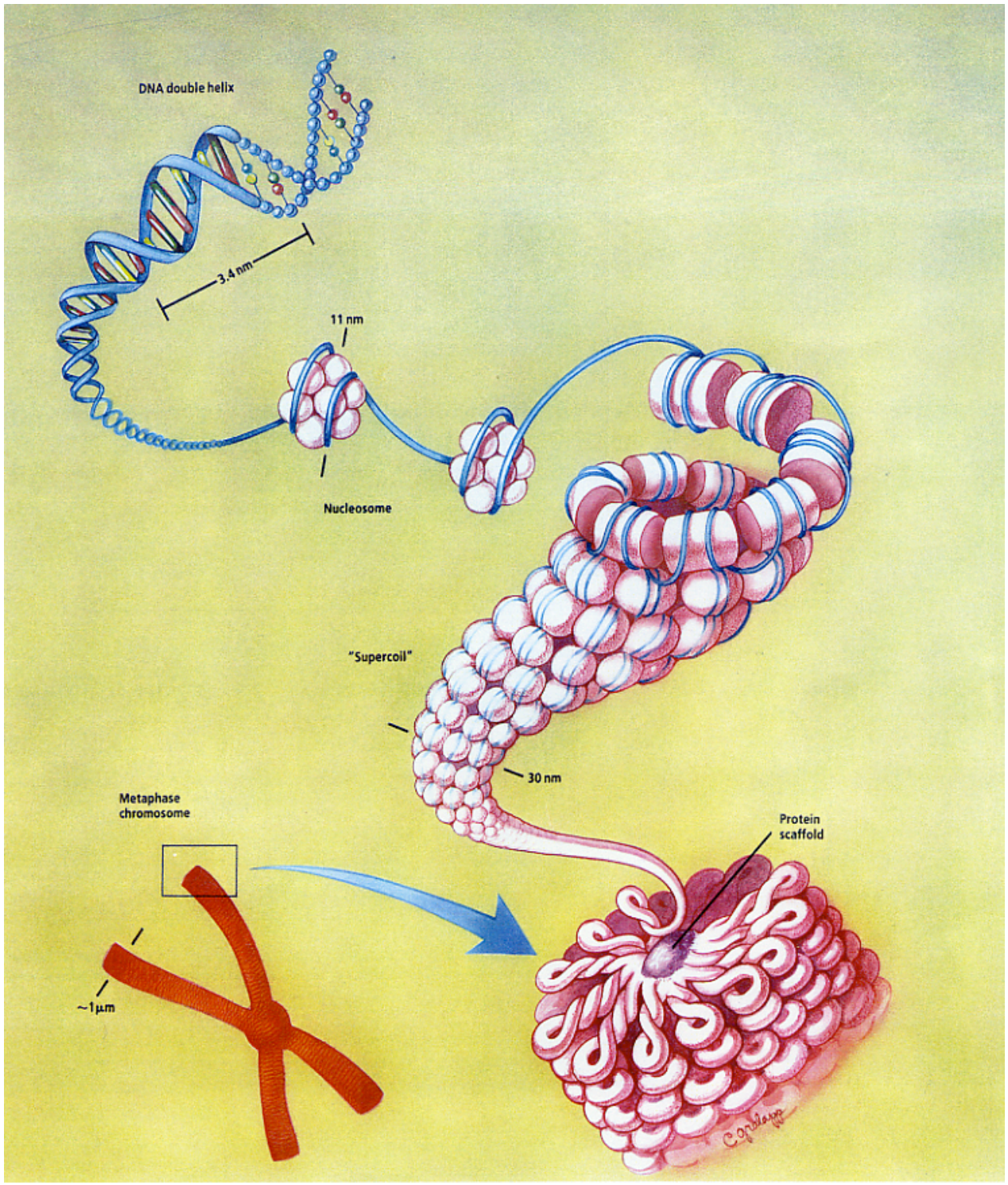
The Form  
We take to exist  
Arises  
From  
Framing  
Nothing.

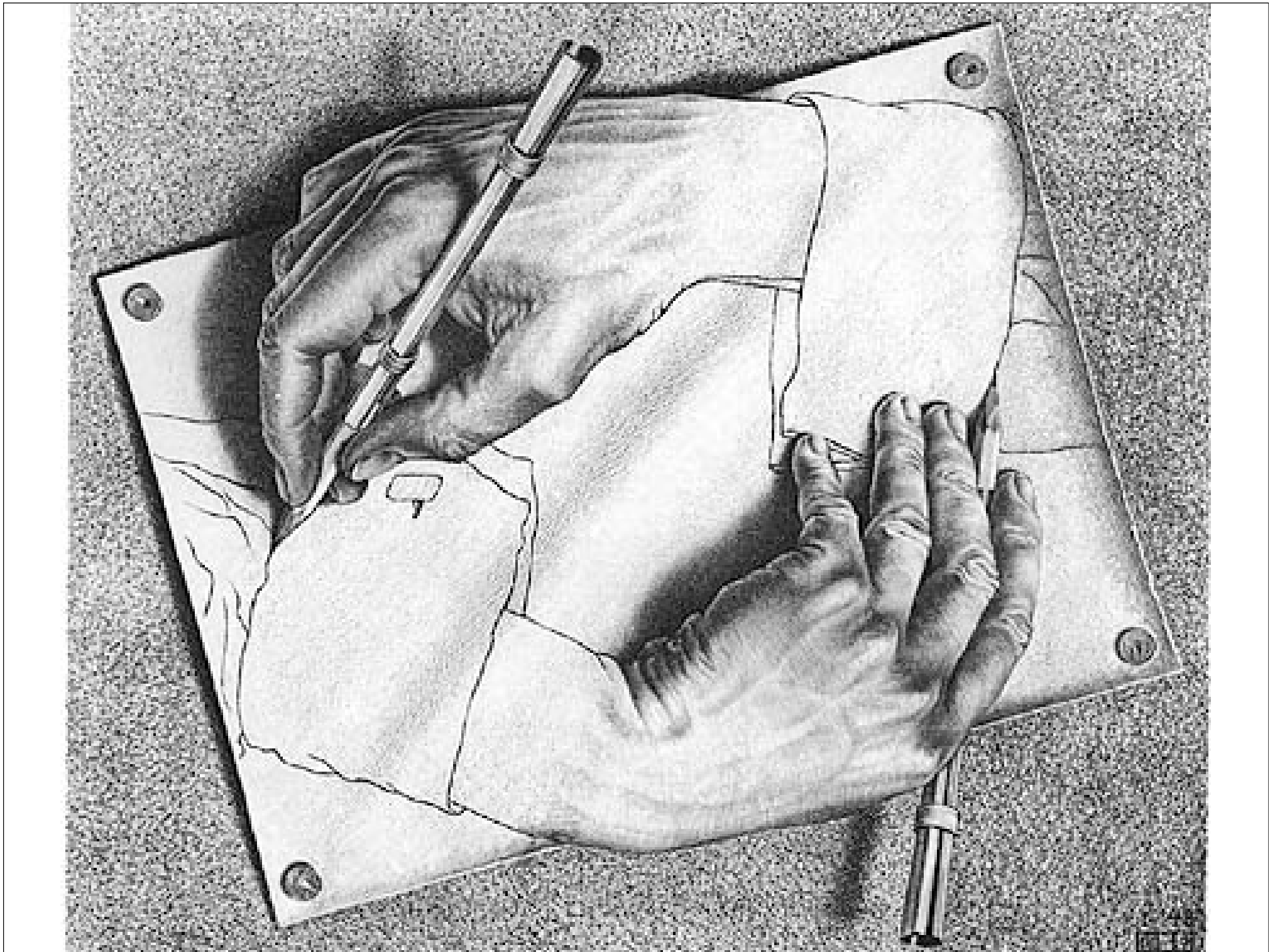
G. Spencer-Brown

“[Seemingly]  
The laws of physics, the so-called ‘laws  
of nature’, can be described by us.  
The laws of brain functions - or ever  
more generally - the laws of biology,  
must be written in such a way that the  
writing of these laws can be deduced  
from them, i.e. that they have to write  
themselves.”

HVF, Cybernetics of Epistemology  
(1973).

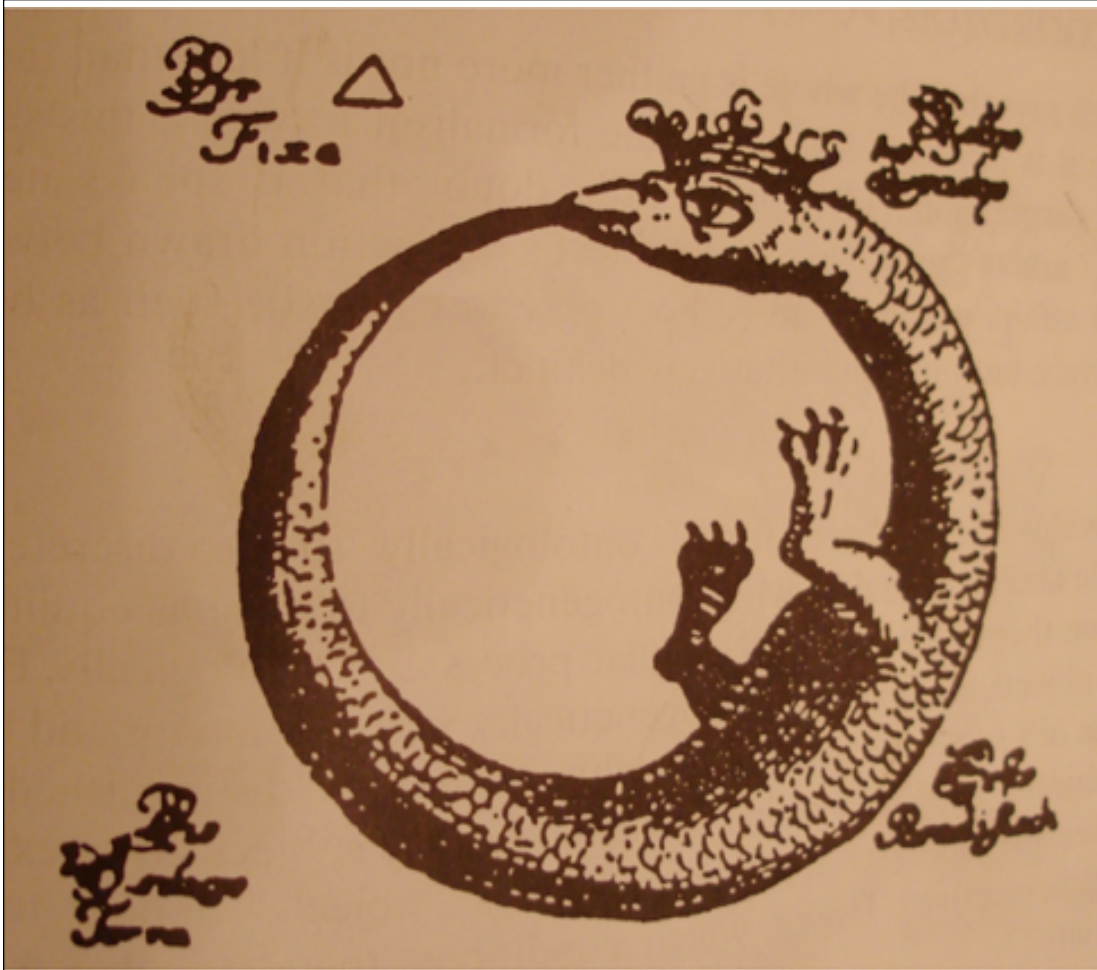






# ASC - New Logo





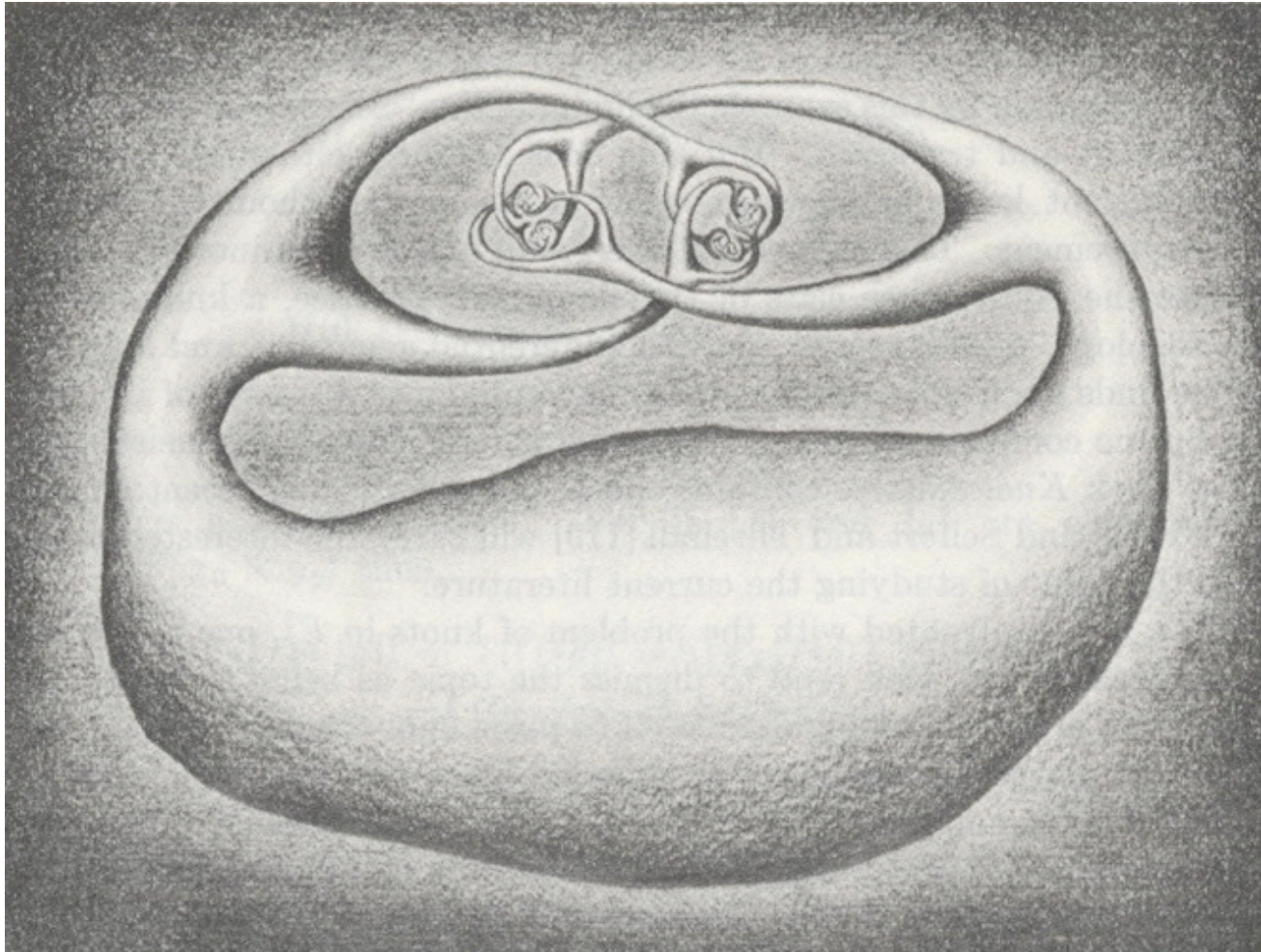
Ourobori

Ouroboros

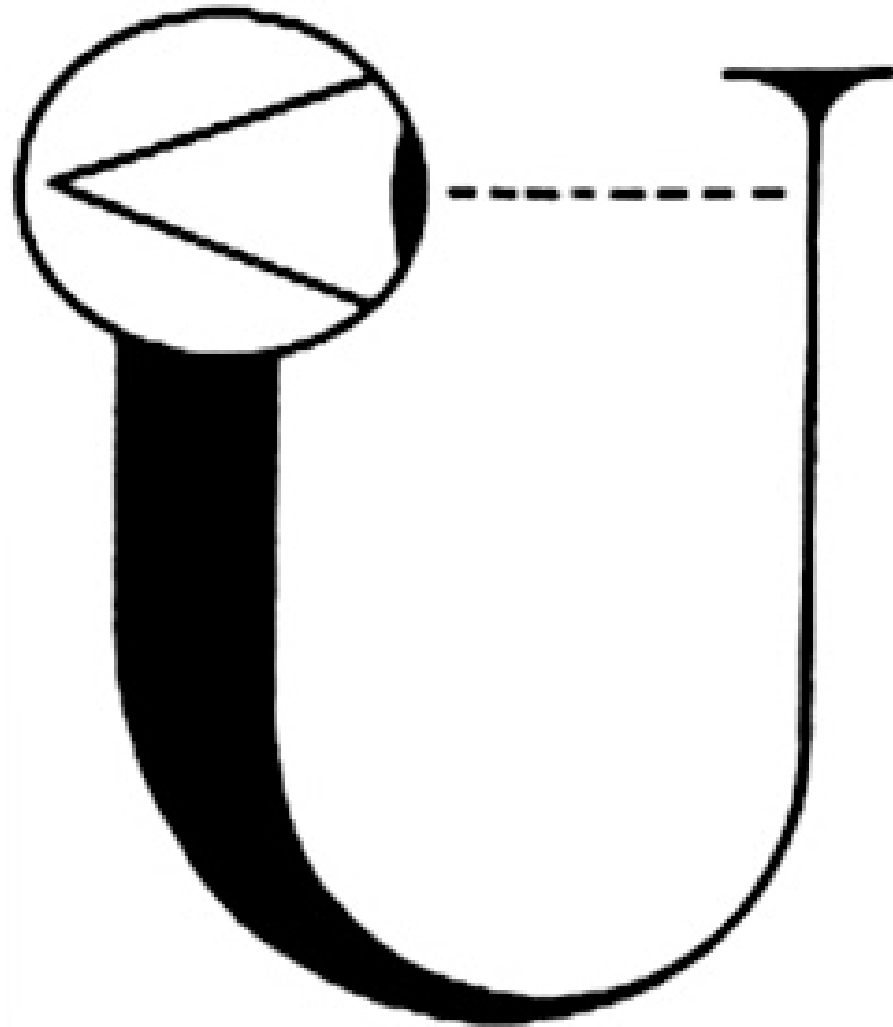




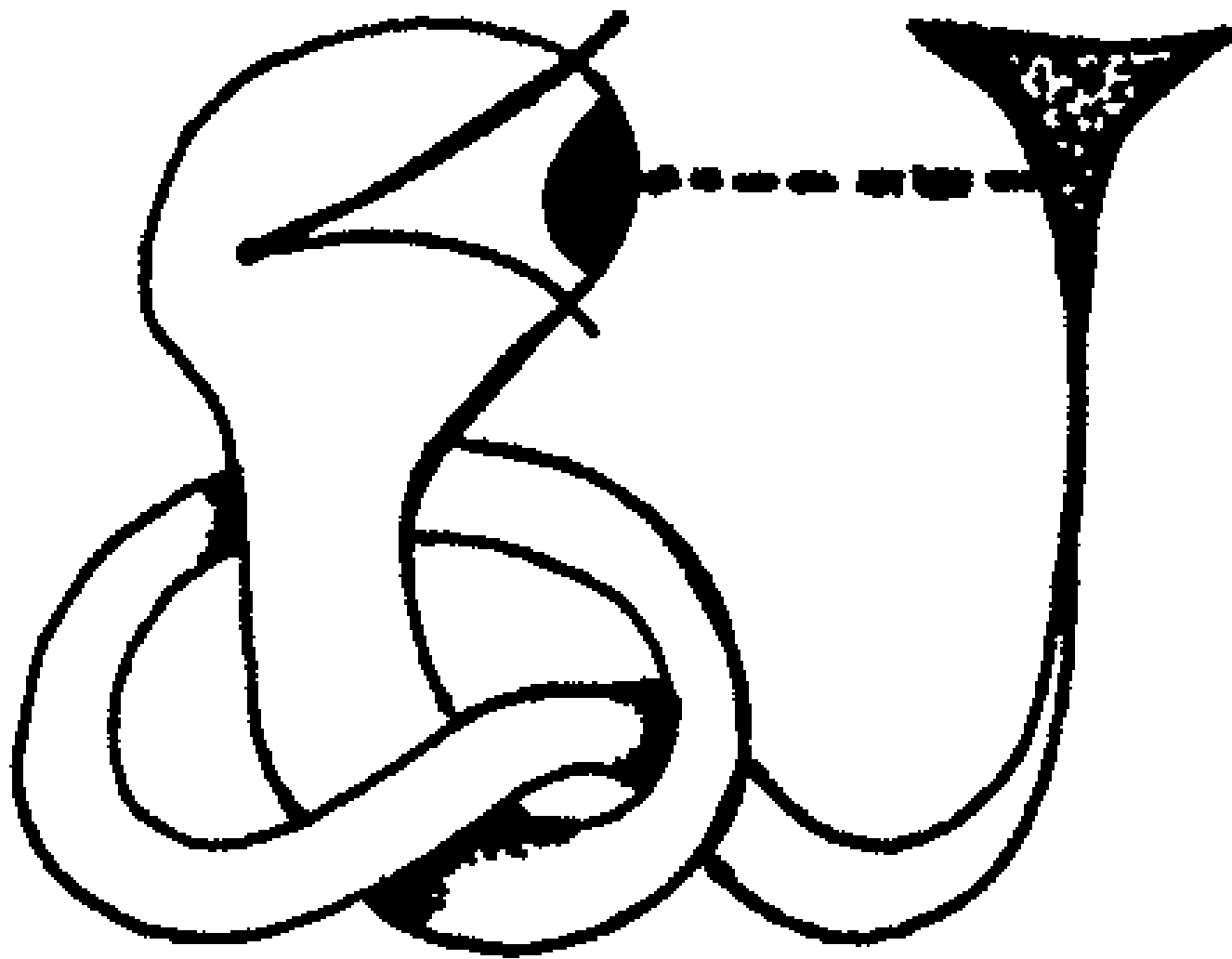
# The Alexander Horned Sphere (from “Topology” by Hocking and Young)



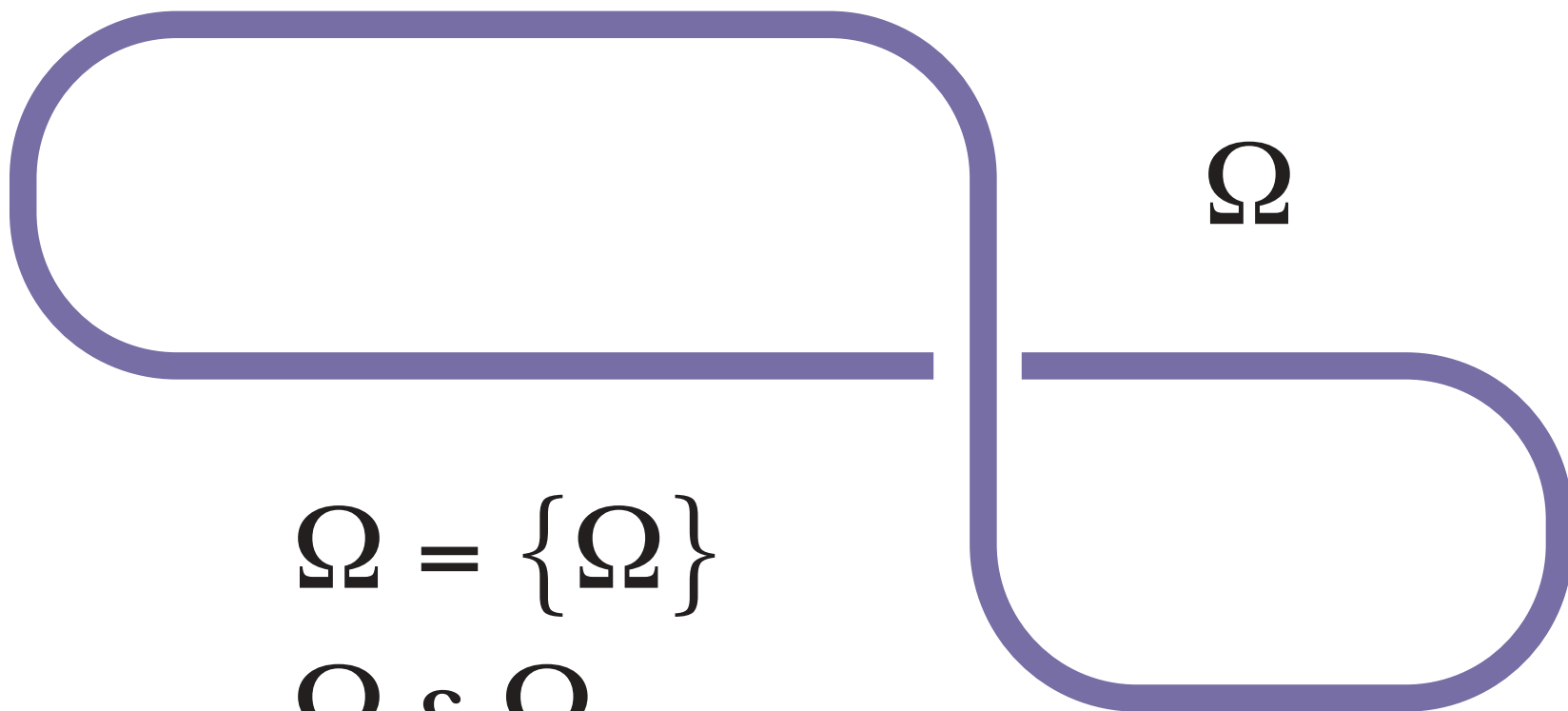
# John Wheeler's Universe as Self-Excited Circuit



# Knot Wheeler Universe



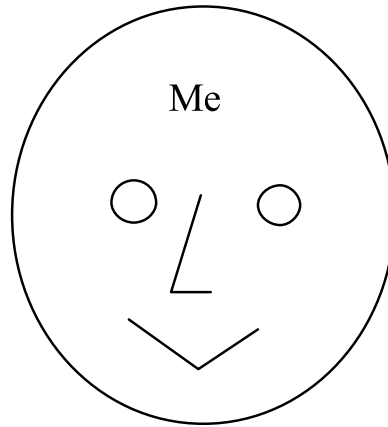




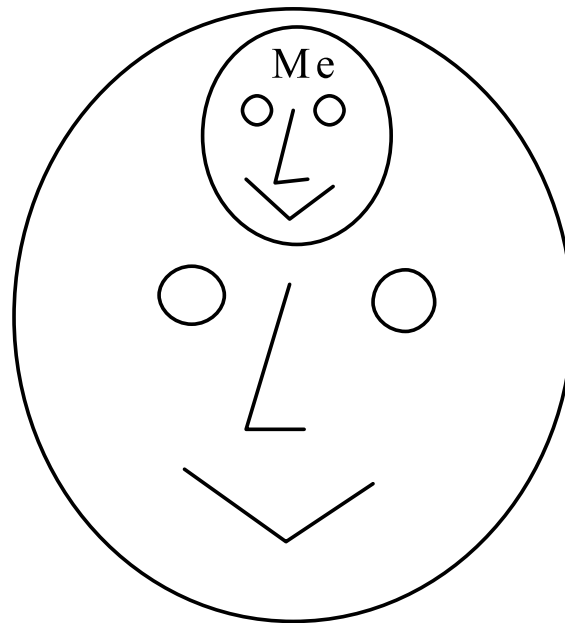
$$\Omega = \{\Omega\}$$

$$\Omega \varepsilon \Omega$$

Me =



Me =



# The Duplicating Gremlin Creates The Re-entering Mark.

$$\overline{\downarrow} A = \overline{AA}$$

$$\overline{\downarrow} \overline{\downarrow} = \overline{\overline{\downarrow} \overline{\downarrow}}$$

Hence

$$\overline{\downarrow} \overline{\downarrow} = \overline{\uparrow}$$

$$\overline{\downarrow} = \overline{\overline{\downarrow} \overline{\downarrow} \overline{\downarrow} \dots}$$

# How does Self-Reference Arise in Language?

## Two Fundamental Operations

### 1. Naming.

A becomes  $N(A)$  -----> A.

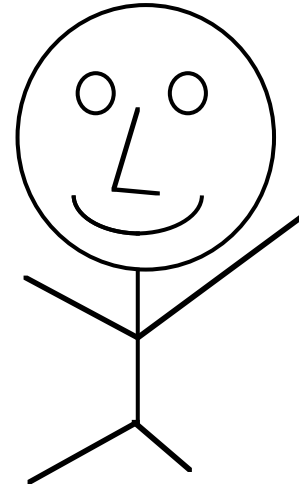
### 2. Indicative Shift.

A -----> B becomes  $\#A$  -----> AB

# The Indicative Shift

Name:

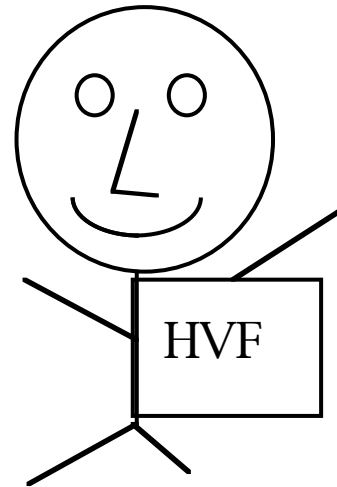
HVF



Shift:

#

HVF



When the meta-naming operation acquires a shifted name, that name refers to itself.

#

$N(\#) \dashrightarrow \#$

$\#N(\#) \dashrightarrow \#N(\#)$

F#

$N(F\#) \text{ -----} \rightarrow F\#$

$g \text{ -----} \rightarrow F\#$

$\#g \text{ -----} \rightarrow F\#g$

A statement F that talks about the  
indicative shift ,  
becomes a statement that talks about  
its own name.

This statement declares its own validity.

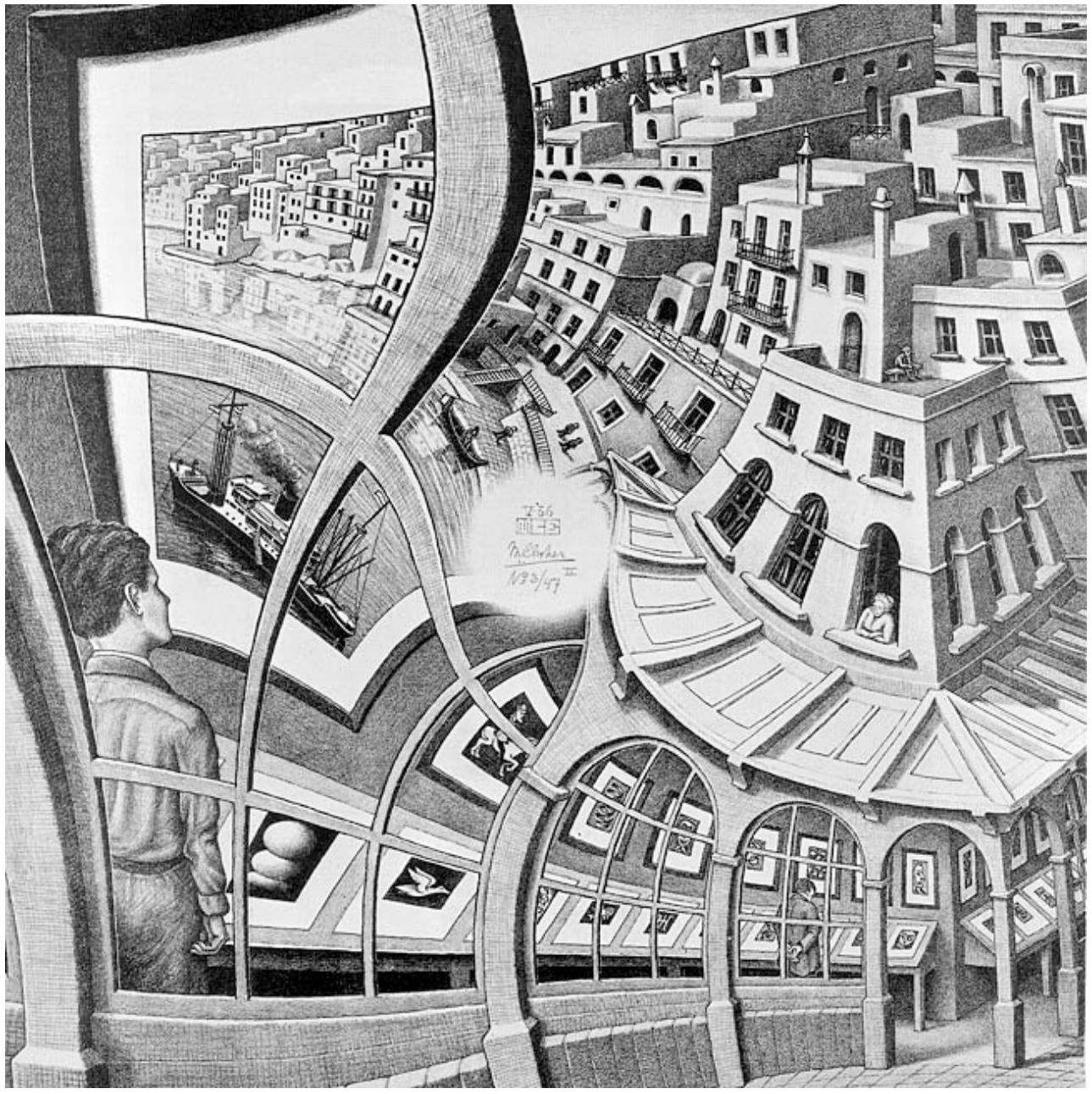
Anyone reading this statement will be unable to verify its truth.

This statement is false.

If this statement is true then Unicorns exist.

There is no proof of this statement within the formal system in which it is written.







A reflexive space  $S$  is a space where the points in  $S$  are in 1-1 correspondence with the mappings of  $S$  to itself.



# The Reflexive Existence of Fixed Points and Self-Reference.

(In a domain where entities are processes and new  
processes become new entities.)

Define:  $Gx = F(xx)$



$GG = F(GG)$

In a reflexive domain, self-reference and the logic of self-reference arise inevitably and must be taken into account. All logics and all systems of modeling that avoid this issue are incomplete reflections of the whole.

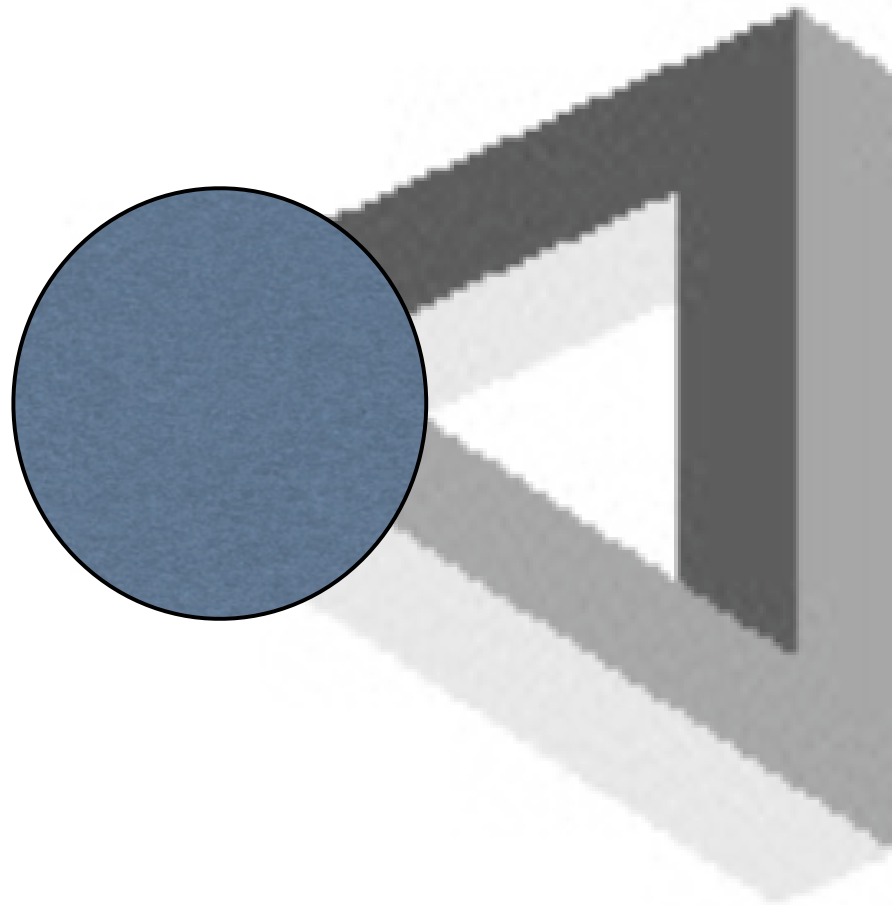
This understanding is only the beginning,  
a first step in the direction of  
creating and designing  
a reflexive world where the  
world and its models are part of a larger whole  
that is that world.

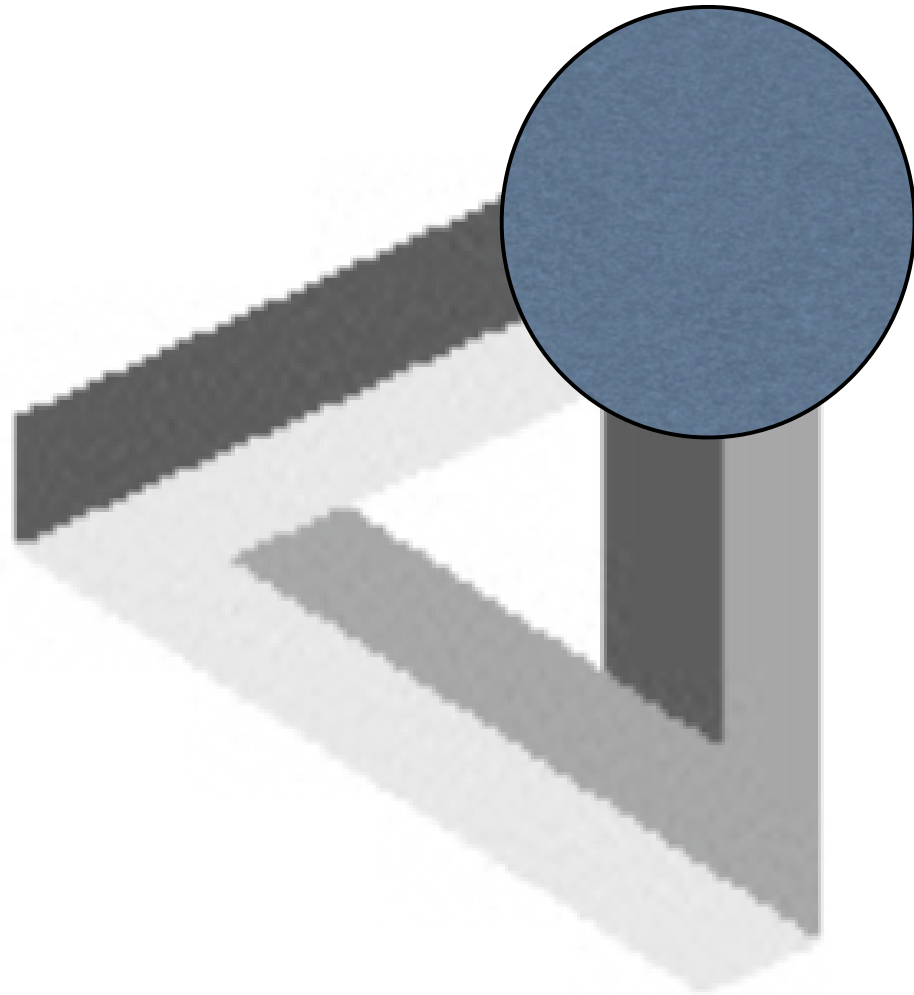
**Imaginary State**

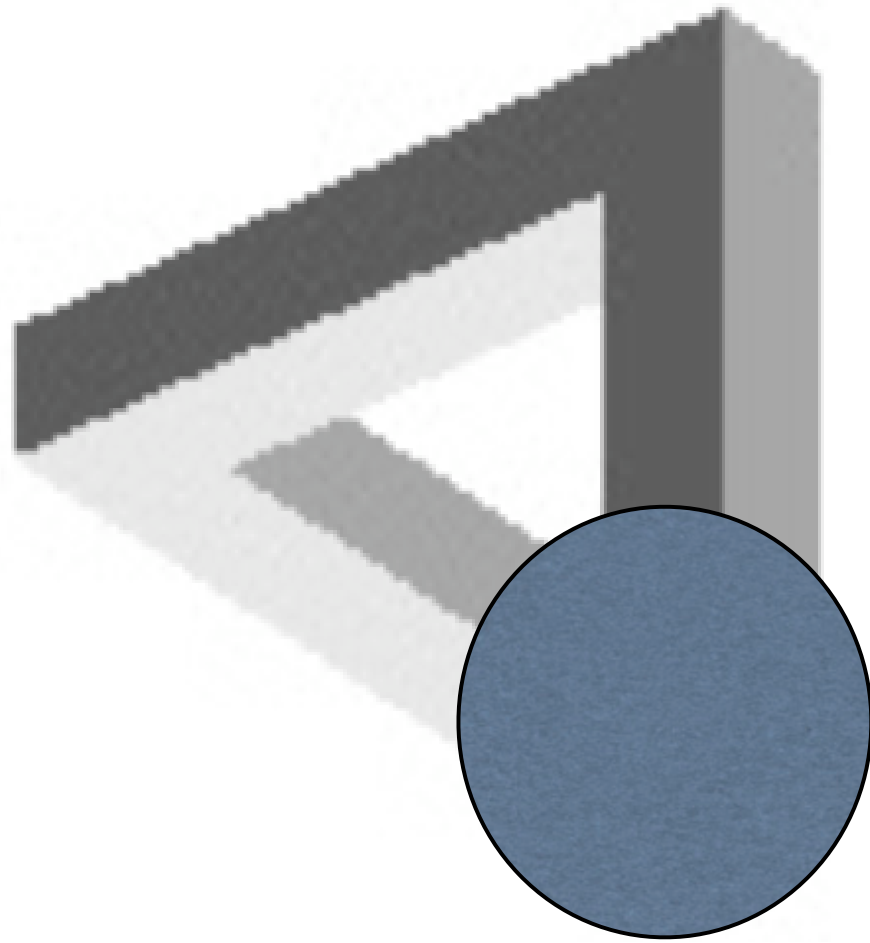
# The Non-Locality of Impossibility

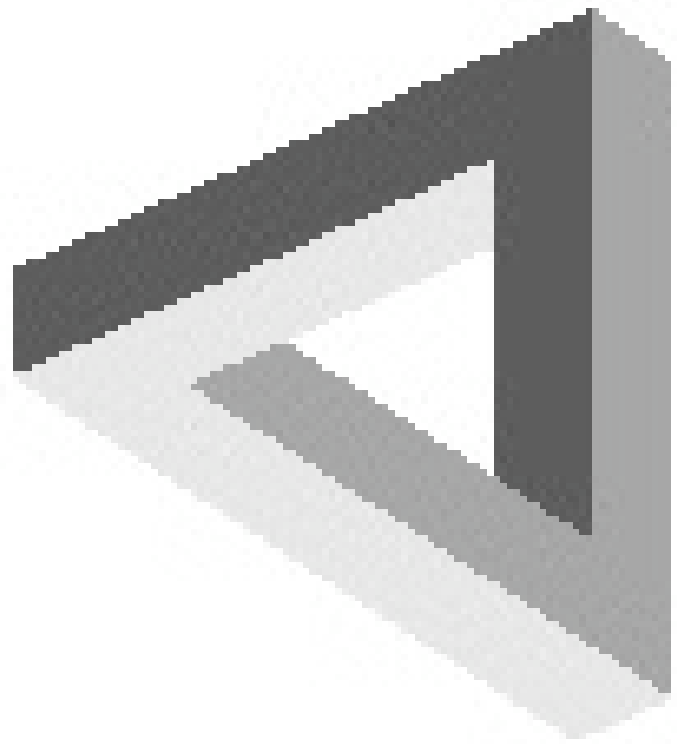


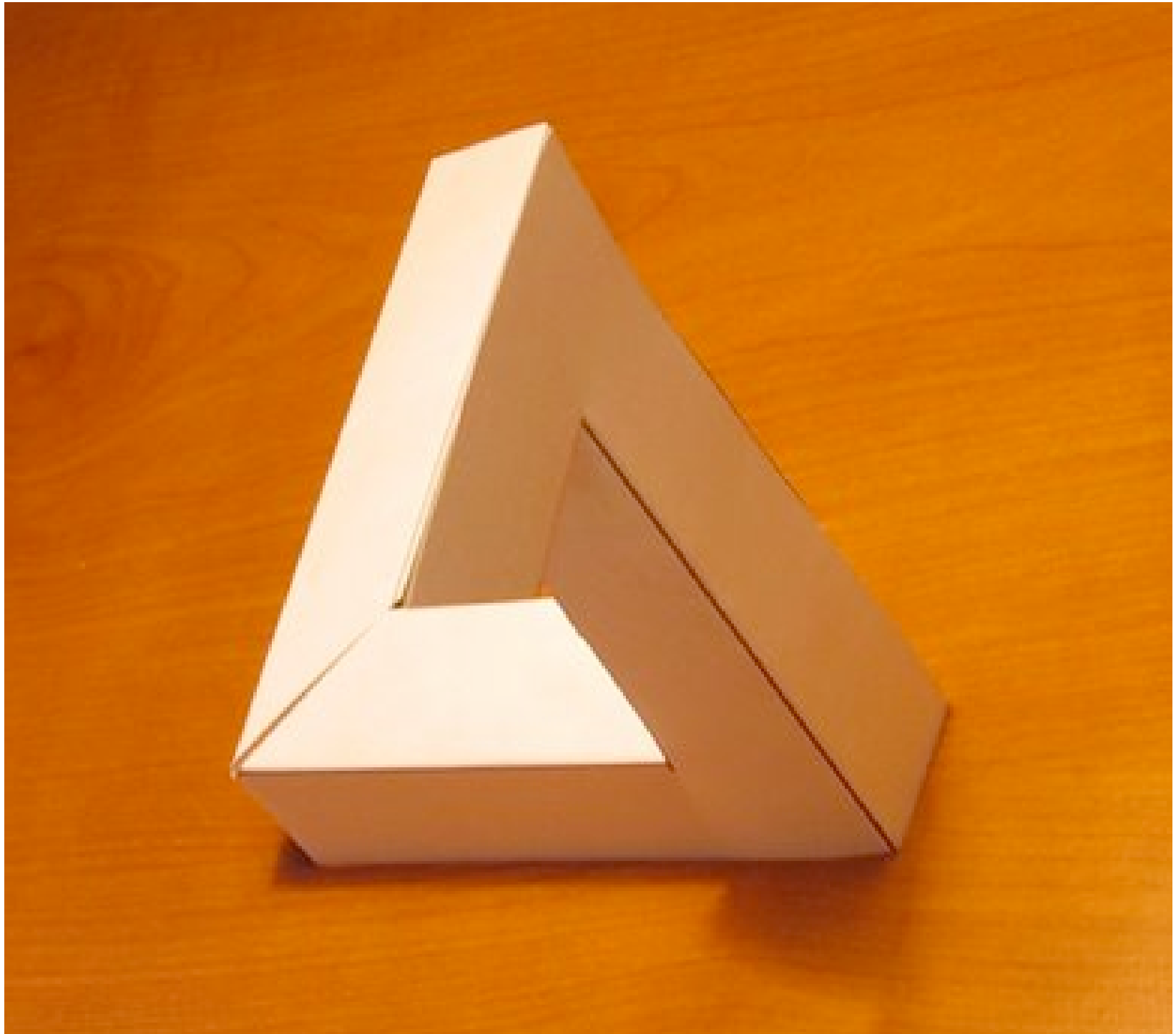


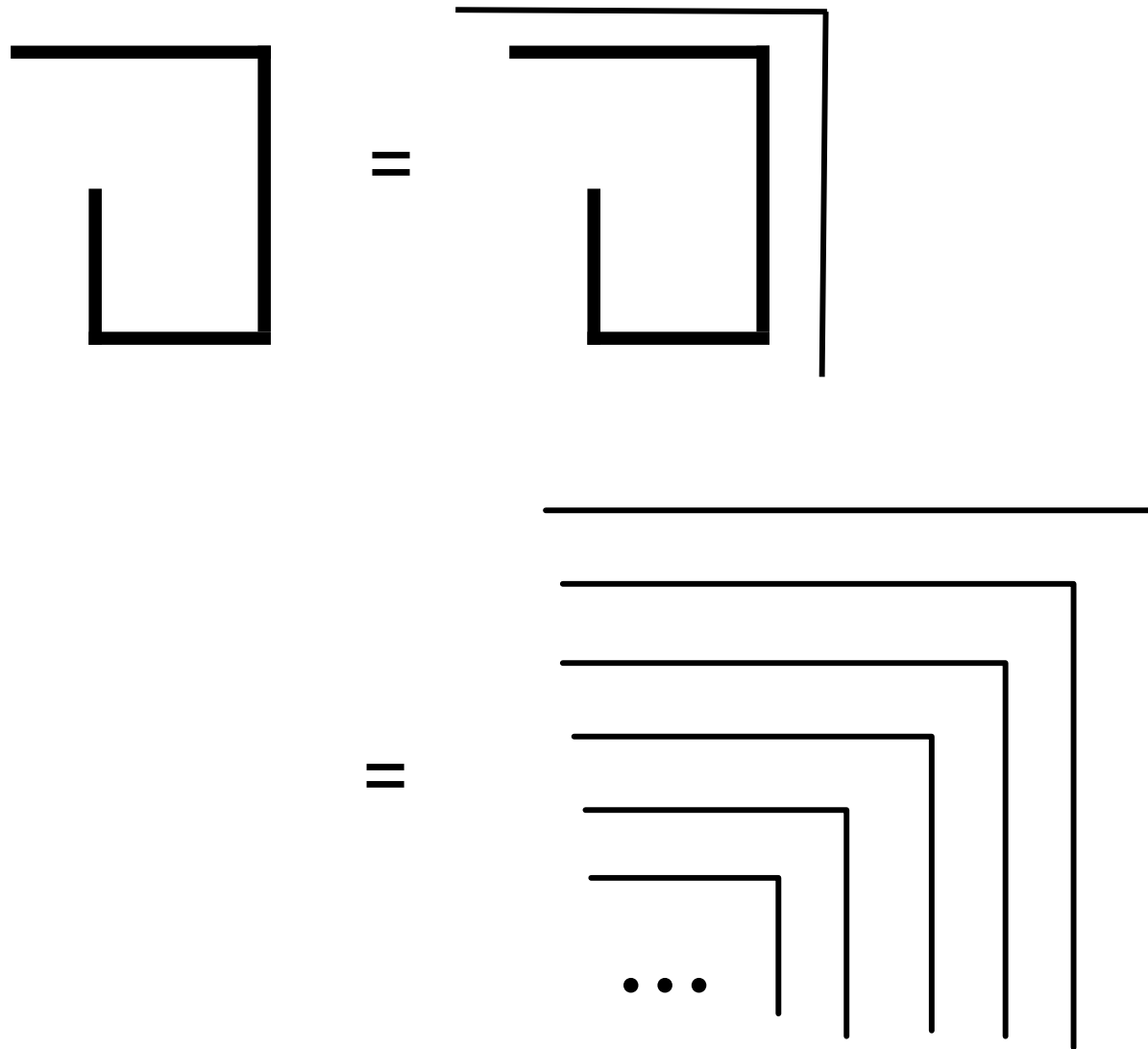












A Fixed Point at Infinity

# Fixed Points (Eigenforms) Exist

*Theorem.* Every recursion has a fixed point.

*Proof.* Let the recursion be given by an equation of the form

$$\mathbf{X}' = \mathbf{F}(\mathbf{X})$$

where  $\mathbf{X}'$  denotes the next value of  $\mathbf{X}$  and  $\mathbf{F}$  encapsulates the function or rule that brings the recursion to its next step. Here  $\mathbf{F}$  and  $\mathbf{X}$  can be any descriptors of actor and actant that are relevant to the recursion being studied. Now form

$$\mathbf{J} = \mathbf{F}(\mathbf{F}(\mathbf{F}(\mathbf{F}(\dots))))),$$

the infinite concatenation of  $\mathbf{F}$  upon itself.

Then, we see that

$$\mathbf{F}(\mathbf{J}) = \mathbf{F}(\mathbf{F}(\mathbf{F}(\mathbf{F}(\mathbf{F}(\dots)))))) = \mathbf{J}.$$

Hence,  $\mathbf{J}$  is a fixed point for the recursion and we have proved that every recursion has a fixed point. QED □

# The Duplicating Gremlin Creates The Re-entering Mark.

$$\overline{\downarrow} A = \overline{AA}$$

$$\overline{\downarrow} \overline{\downarrow} = \overline{\overline{\downarrow} \overline{\downarrow}}$$

Hence

$$\overline{\downarrow} \overline{\downarrow} = \overline{\uparrow}$$

$$\overline{\downarrow} = \overline{\overline{\downarrow} \overline{\downarrow} \overline{\downarrow} \overline{\downarrow} \dots}$$



# The Reflexive Existence of Fixed Points

(In a domain where entities are processes and new processes become new entities.)

$$Gx = F(xx)$$



$$GG = F(GG)$$

We can explore this fixed point theorem from many angles.

1. The process of  $F(F(F(F(\dots F(*))))))$ .
2. The forms that emerge from a process.
3. The symbolic forms that emerge from a process.
4. The discoveries of new forms related to the creativity of a process.
5. The nature of process itself.

$$\text{New } X = F(X).$$

$$\text{New } X = \text{Old } X + G(X).$$

(Conservation Plus Difference in the circularity.)

6. The nature of changing process in the course of process.

## Process and Bios

The next few slides illustrate examples of what H. Sabelli and LK call biotic process or bios. These are processes that are created via bipolar feedback as in

$$A(t+1) = A(t) + g \sin(A(t)).$$

The key point about such recursion is that there is both conservation ( $A(t)$  is part of the production of  $A(t+1)$ ) and feedback. The feedback depends non-trivially on the previous stage, and it is bipolar.

Bipolar feedback processes of this sort are fundamental, and they produce more than just chaos. They produce highly self-correlated states that we call bios, as the patterns of bios occur in many biological situations (such as the measurement of heartbeat intervals).

Bios occurs in many natural and human circumstances and is characterized by exhibiting creativity in that its recurrence rate is less than random and a particular complexity that can be seen in recurrence plots and other tests.

More generally, we are concerned with  
fundamental creative process and underlying  
principles related to the mathematical concepts of

Order

Algebra

Topology

## Order -- Assymetry, Lattice, Time

Algebra - Forms of combination, polarity, yin-yang, unity of opposites, creation from opposites.

Topology - connection, continuity, change.

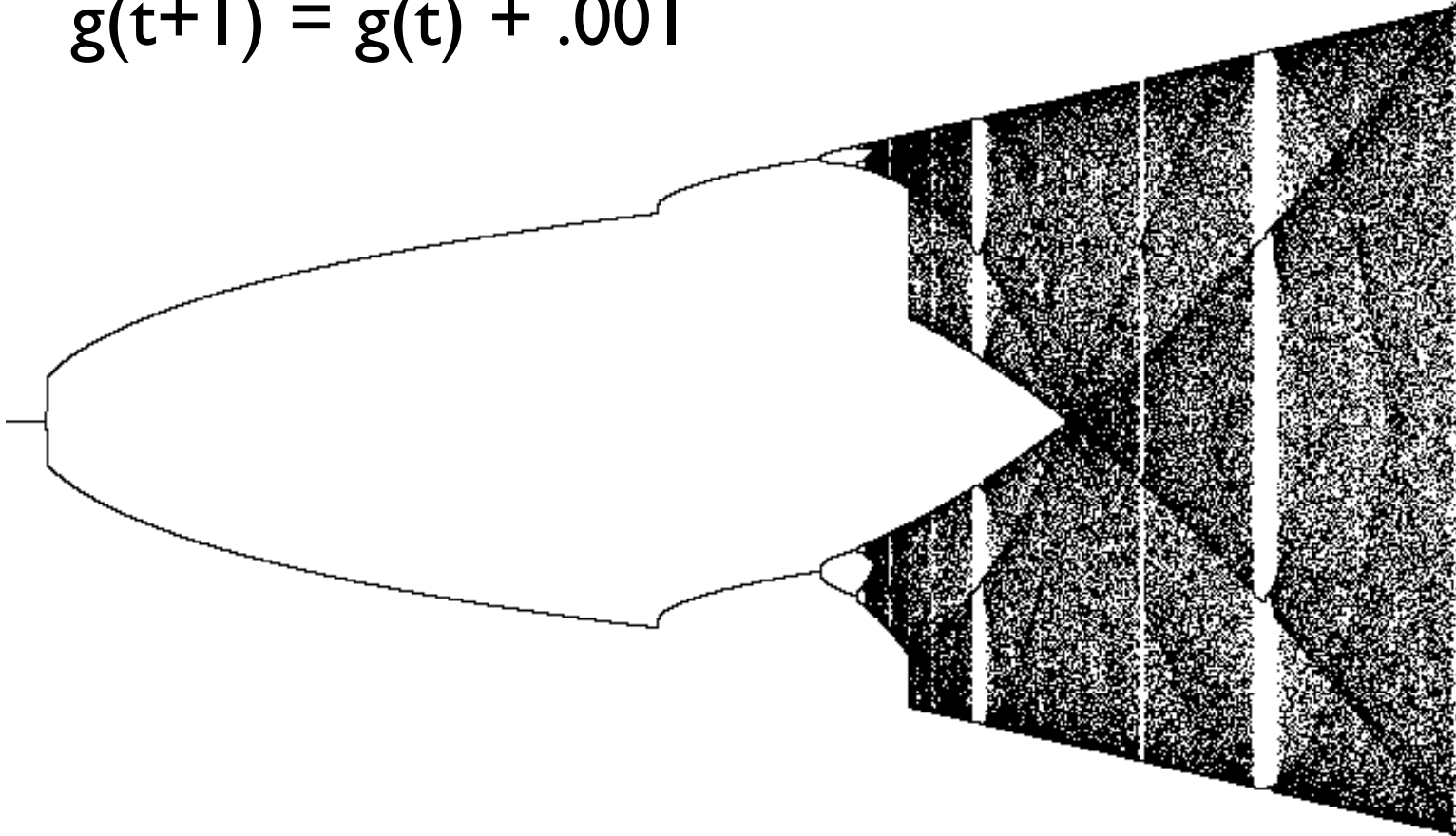
Even simple mathematical recursions exhibit creativity in this sense. The world is fundamentally creative and we partake in that creatvity and diversity.

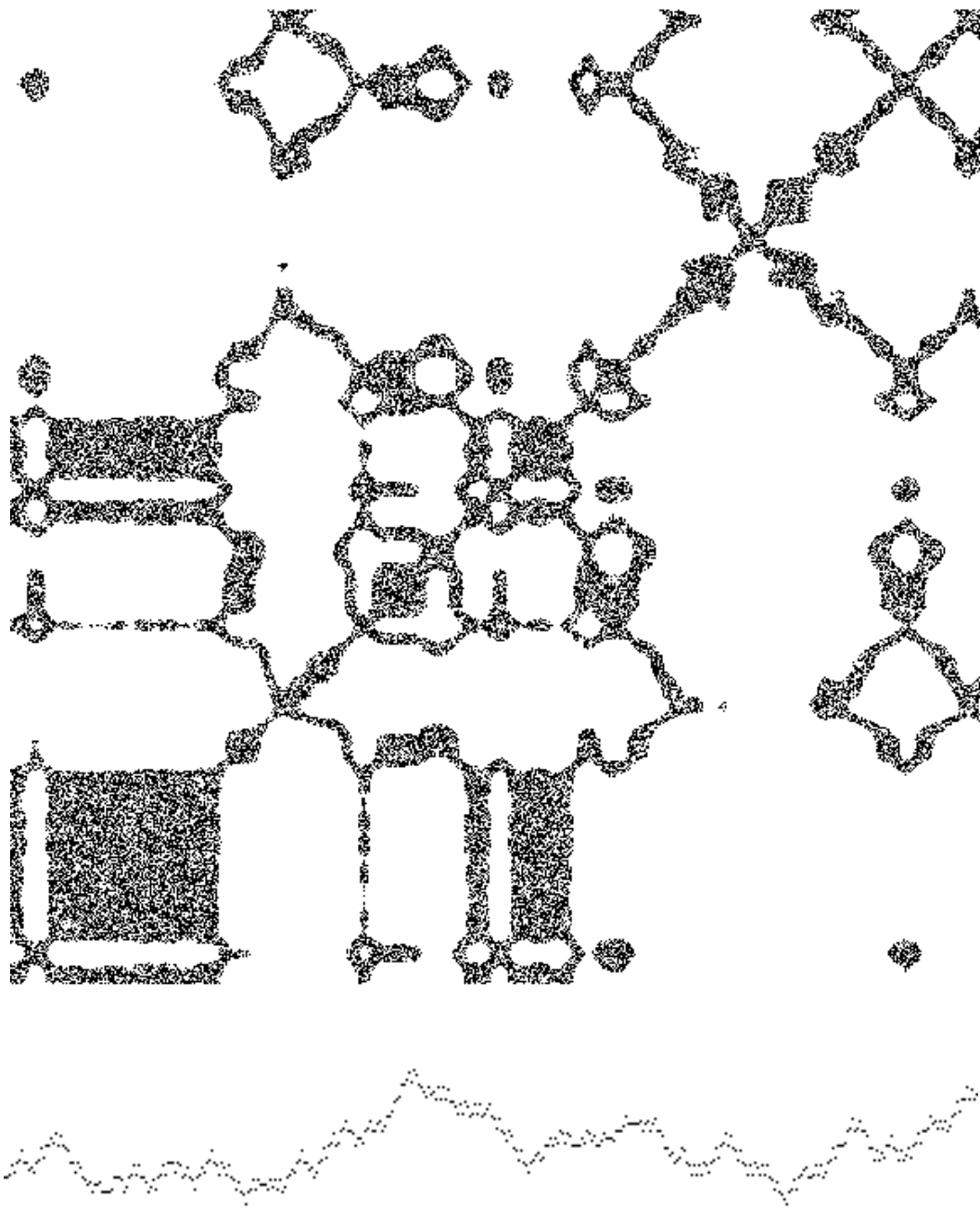
All processes have  
 $\text{Action} = \text{Energy} \times \text{Time}.$

# Process Equation - Kinetic Plot

$$A(t+1) = A(t) + g \sin(A(t))$$

$$g(t+1) = g(t) + .001$$



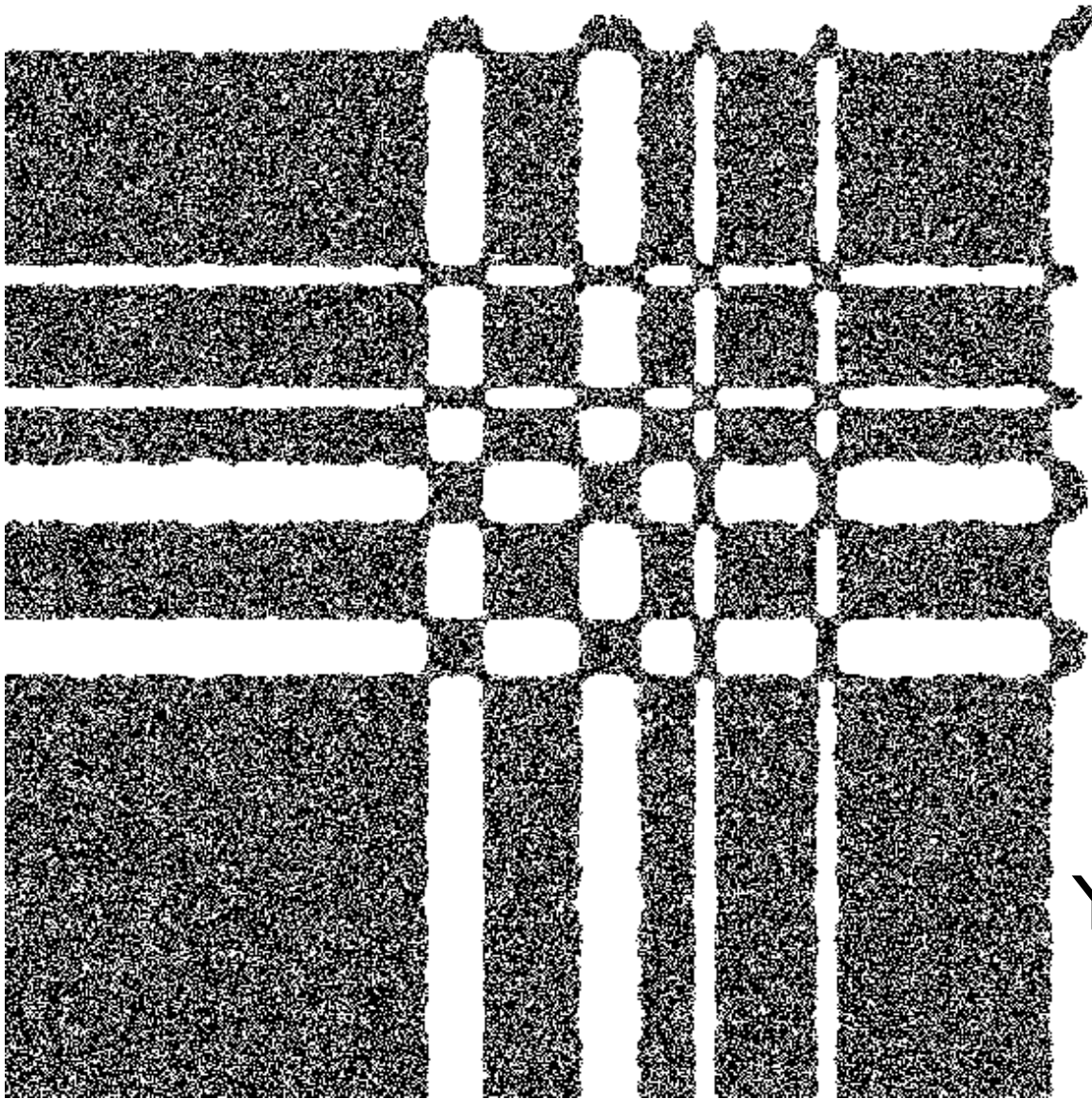


Bios

Recurrence Plot

$$Y(t+1) = Y(t) + g \sin(Y(t))$$
$$g = 4.8$$

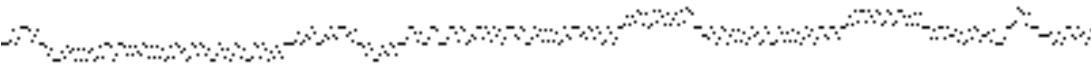


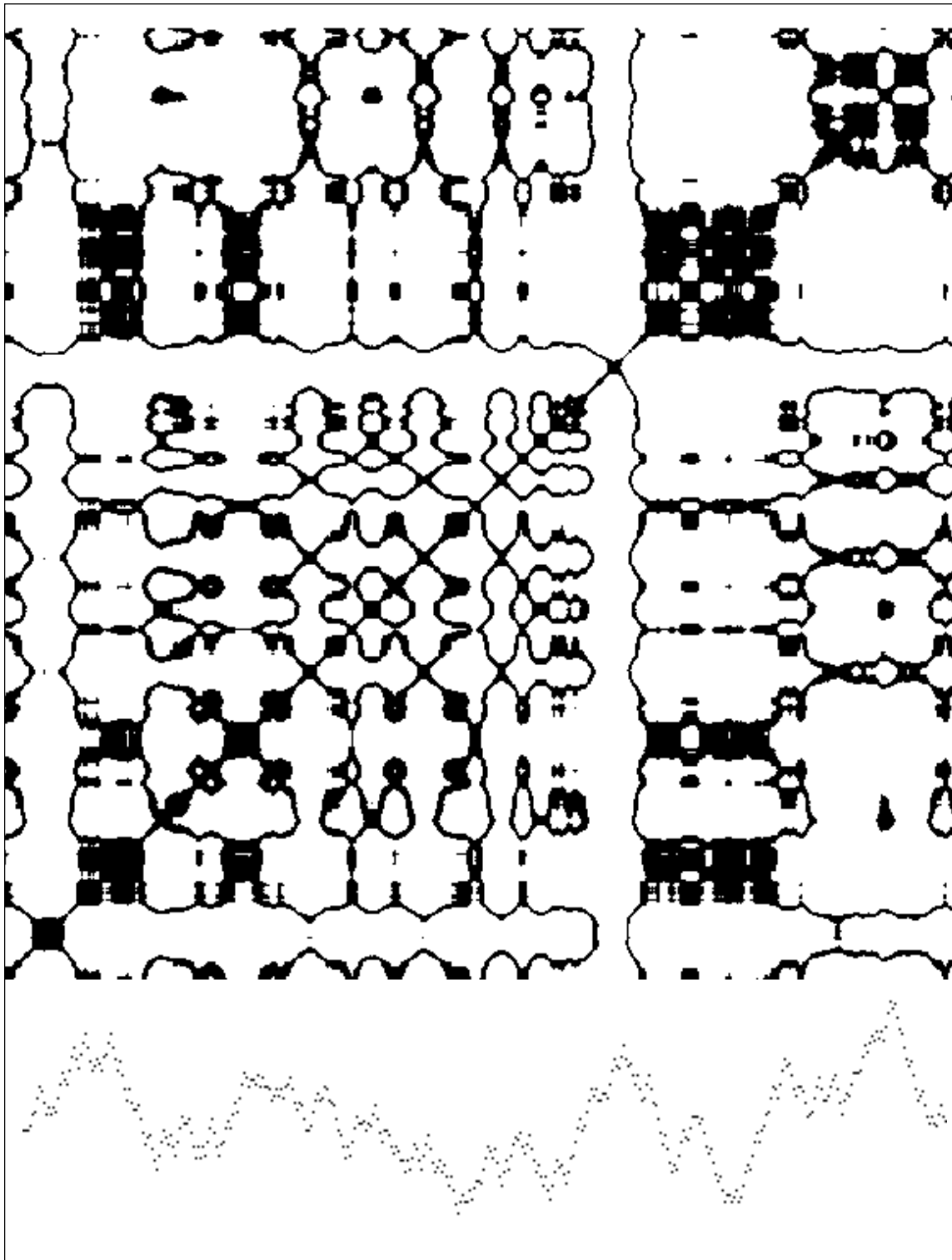


Recurrence Plot

pre-biotic state

$$Y(t+1) = Y(t) + g \sin(Y(t))$$
$$g = 4.63$$



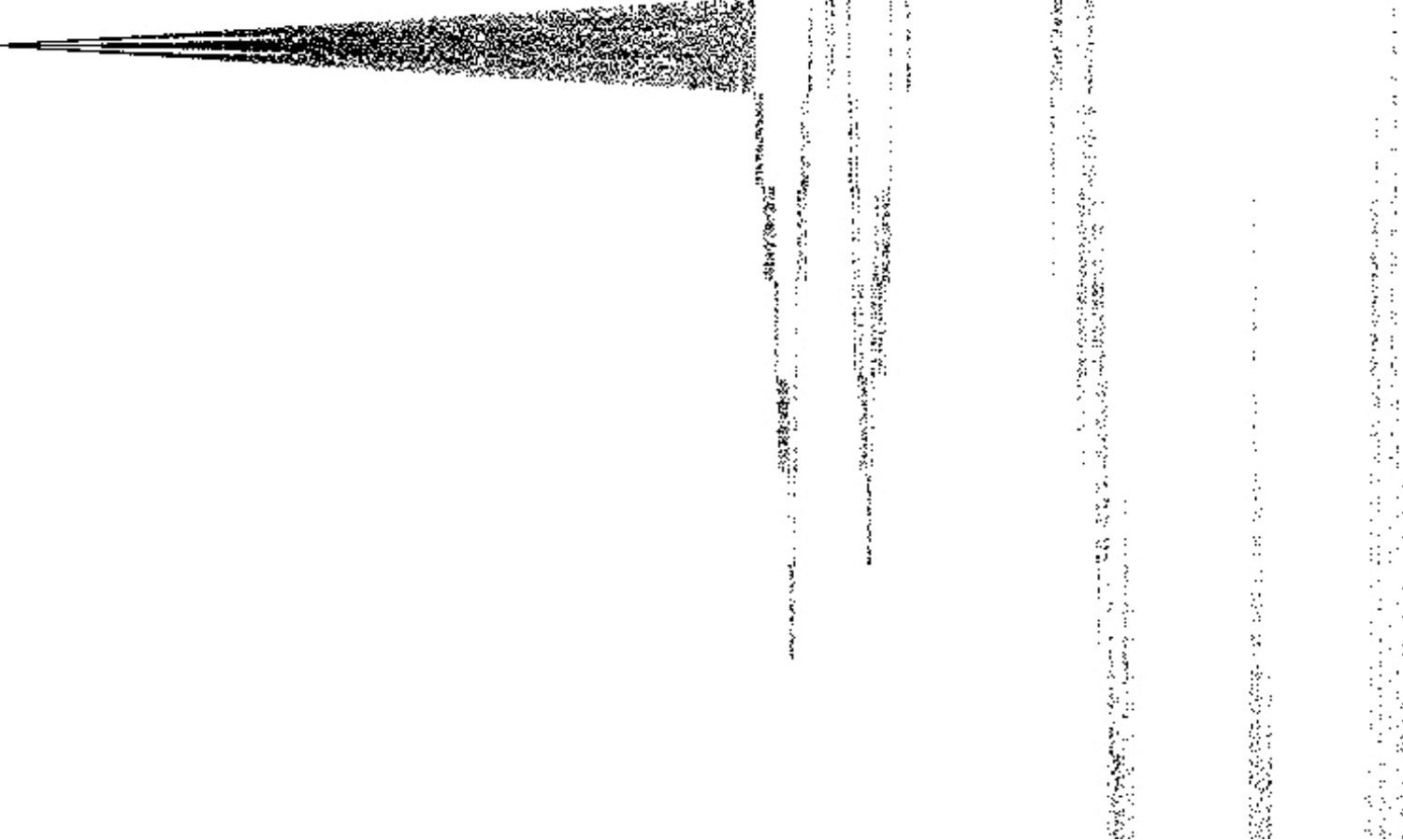


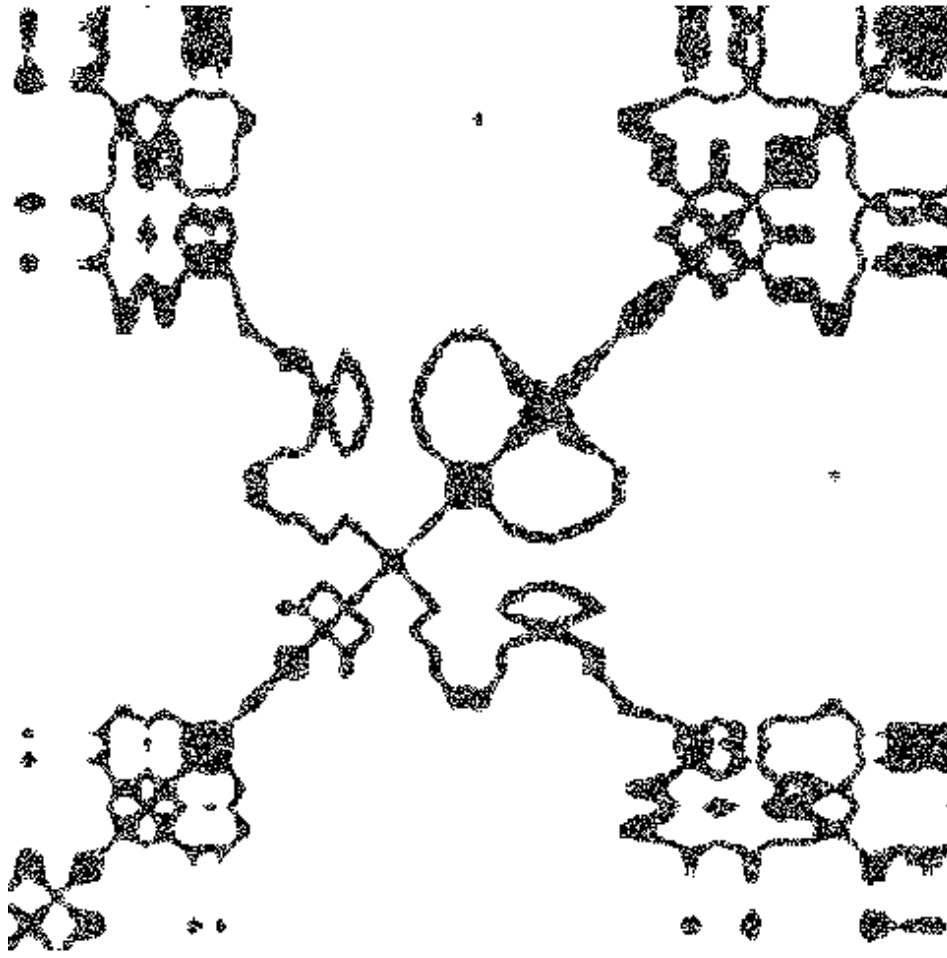
Bios

Recurrence Plot

$$Y(t+1) = Y(t) + g \sin(Y(t))$$
$$g = 6$$

# Circle-Line Process

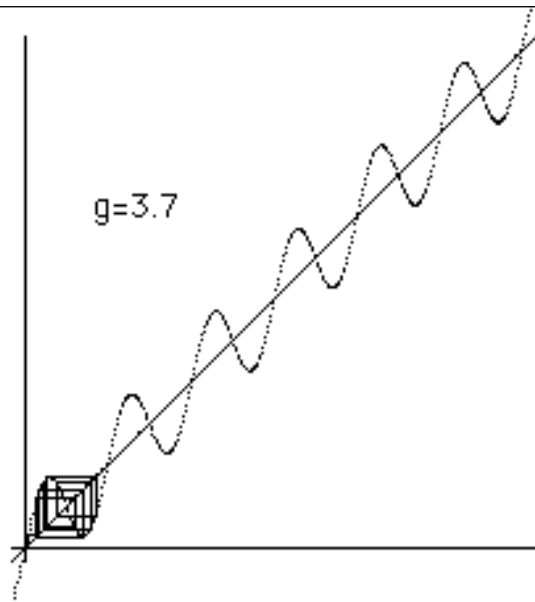




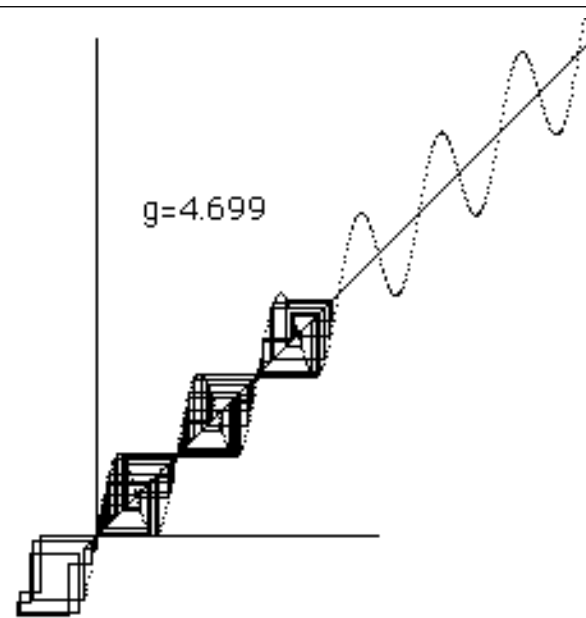
Prime Process:

$$A(t+1) = A(t) + \text{Sin}(P(t))$$

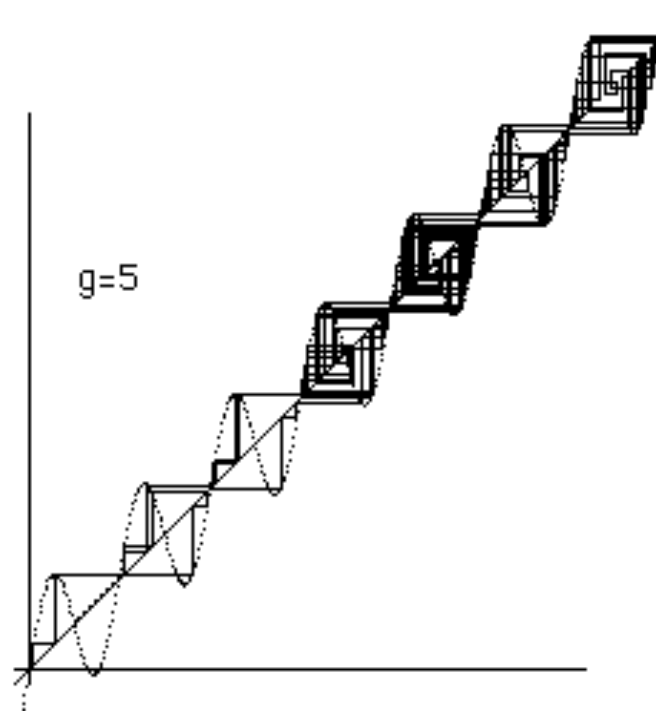
$P(t)$  = Number of Prime Numbers Less Than  $t$



**PreBiotic Phase**



**Transition to Biotic Phase**



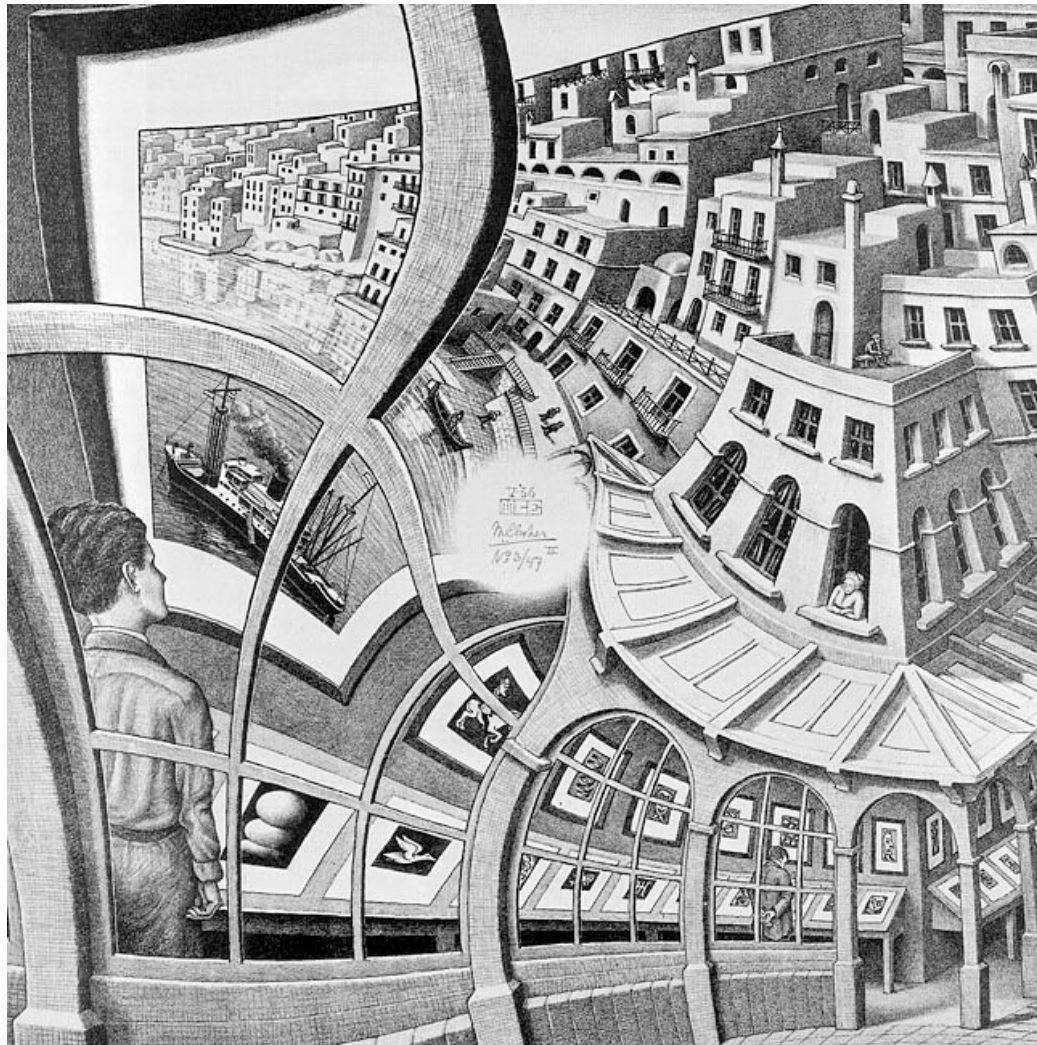
**Biotic Phase**

## REFLEXIVE SPACE

A reflexive space  $S$  is a space  
where the points in  $S$  are in  
1-1 correspondence  
with the  
mappings of  $S$  to itself.

(A domain where entities are processes and new processes  
become new entities.)

A reflexive space  $S$  is a space where the points in  $S$  are in 1-1 correspondence with the mappings of  $S$  to itself.



# Church-Curry Fixed Point Theorem

Theorem. Every  $F$  has a fixed point.  
(in contexts where entities can act upon themselves)

Proof. Let  
 $gx = F(xx)$ .

Then

$gg = F(gg)$ .

QED



A reflexive space  $S$  is a space where the points in  $S$  are in 1-1 correspondence with the mappings of  $S$  to itself.

$D$  = a reflexive space

$[D, D]$  = all mappings from  $D$  to  $D$ .

$r: D \longrightarrow [D, D]$

a 1-1 correspondence of  $D$  and  $[D, D]$ .

Fixed Point Theorem: If  $D$  is a reflexive space and

$T: D \longrightarrow D$

is any mapping from  $D$  to  $D$ , then there is an  $A$  in  $D$  such that  $T(A) = A$ .

Fixed Point Theorem: If  $D$  is a reflexive space and

$$T:D \longrightarrow D$$

is any mapping from  $D$  to  $D$ , then there is an  $A$  in  $D$  such that  $T(A) = A$ .

Proof. Define a new mapping  $S$  by the formula

$$Sx = T(r(x)x).$$

$$S = r(z).$$

$$r(z)x = T(r(x)x).$$

$$r(z)z = T(r(z)z).$$

$$\text{Let } A = r(z)z.$$

$$T(A) = A.$$

QED.

A reflexive space  $S$  is a space where the points in  $S$  are in 1-1 correspondence with the mappings of  $S$  to itself.

This definition could be a mathematician's conception. This depends upon what you might mean by "points" and by "mappings".

Points have particularity, timelessness.  
Mappings have action, possibly recursion.

A concept has particularity of statement.  
The collecting of that which satisfies the concept has action.

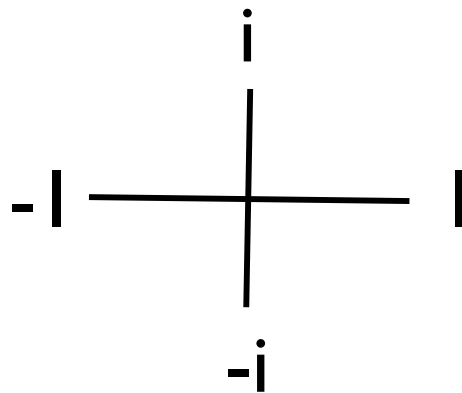
The eigenform (fixed point) always exists, but  
it may be imaginary with  
respect to our present  
Reality.

$$\text{If } i = -1/i,$$

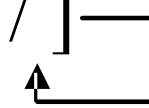
then

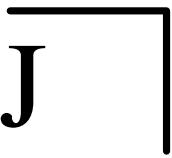
$$i i = -1.$$

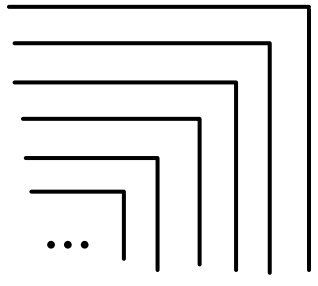
There is no real number whose  
square is minus one.

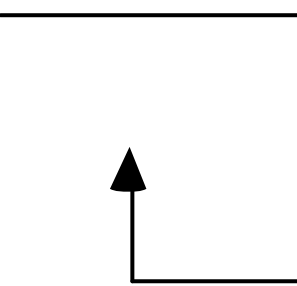


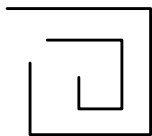
$$i = -1/i$$

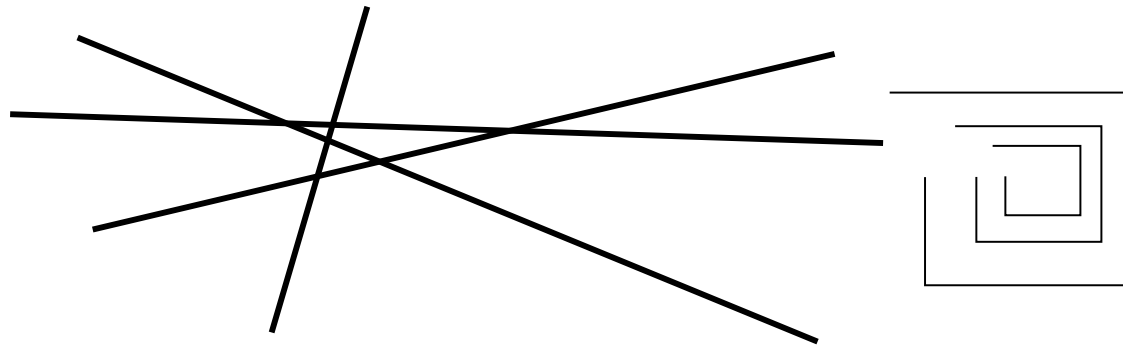
$$i = -1/(-1/(-1/...)) = [-1/]$$


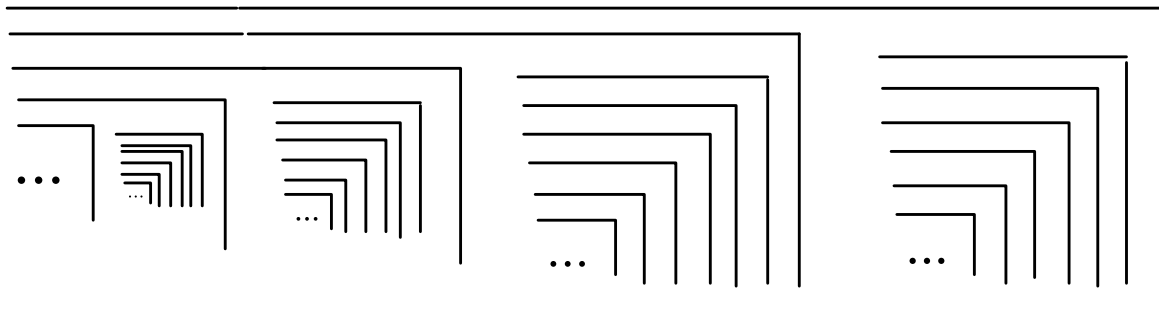
$$J = J$$


$$J = \dots$$


$$=$$


$$J' =$$




$$=$$


# Re-entry and Parenthesis Structure

$$\langle x+y \rangle = \langle x \rangle + \langle y \rangle$$
$$\langle | \rangle = \langle \rangle$$

$$S = | + \langle \rangle + \langle \rangle \langle \rangle + \langle \langle \rangle \rangle +$$
$$\langle \rangle \langle \rangle \langle \rangle + \langle \langle \rangle \rangle \langle \rangle + \langle \rangle \langle \langle \rangle \rangle +$$
$$\langle \langle \rangle \langle \rangle \rangle + \langle \langle \langle \rangle \rangle \rangle + \dots$$

$$S = | + S \langle S \rangle \quad \text{enumeration}$$



$$F = | + xF^2 \quad \text{generating function}$$

$$f(x) = a + b/x$$

$$F = \left[ a + \frac{b}{\phantom{F}} \right]$$

$$f(F) = a + b/F = F$$

$$\left[ 1 + \frac{1}{\phantom{F}} \right]$$

$$= \frac{1 + \sqrt{5}}{2}$$

**Irrational**

$$\left[ \frac{-1}{\phantom{F}} \right]$$

$$= i$$

**Imaginary**



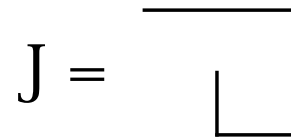
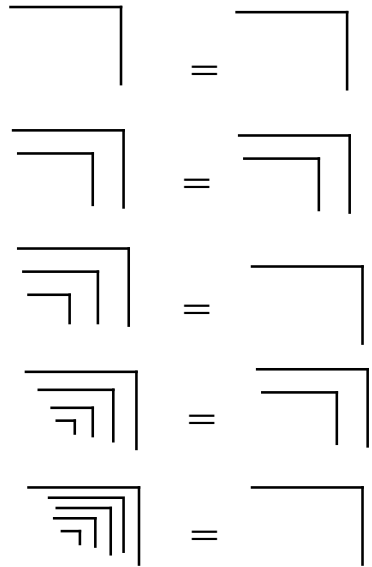
**Iterant**

... + | - | + | - | + | - | ...

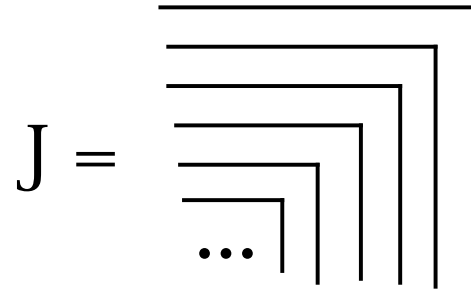
$$J = \overline{J}$$

$$J = \neg \rightarrow J = \neg \neg =$$

$$J = \rightarrow J = \neg$$



**Implicate**



**Spatial Explicate**

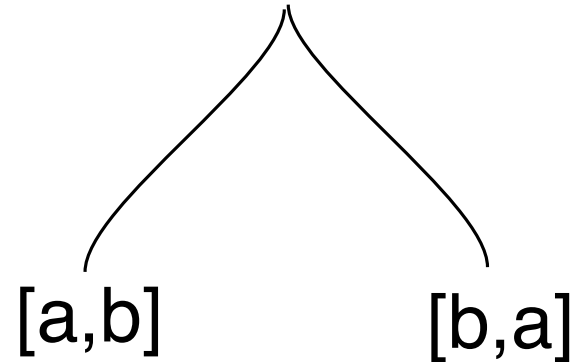


**Temporal Explicate**



# Matrix Algebra as Iterant Multiplication

....abababababababab...



$$[a,b] + [c,d] = [a+c, b+d]$$

$$[a,b][c,d] = [ac, bd]$$

$$[a,b]P = P[b,a]$$

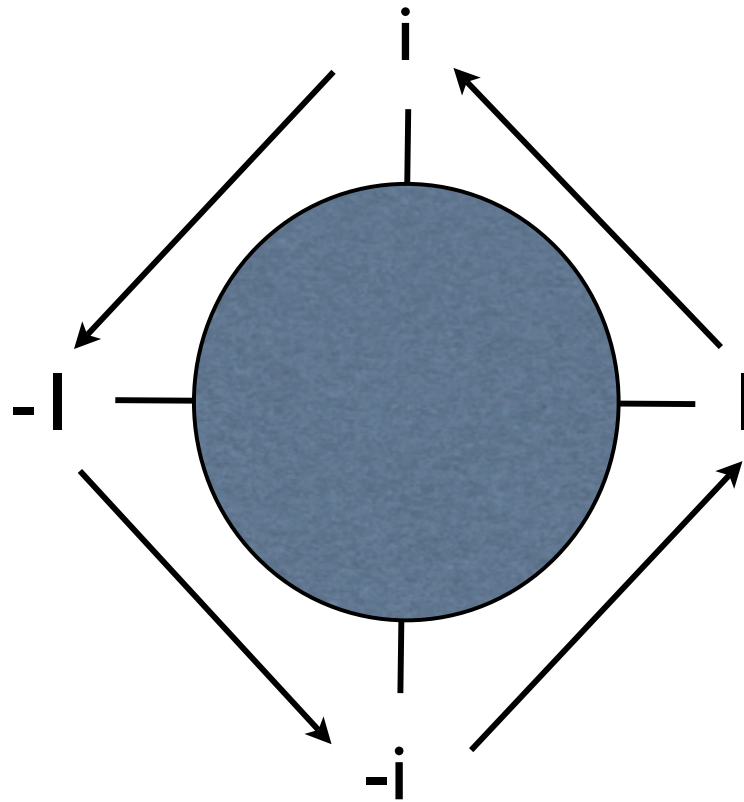
$$i = [1, -1]P$$

$$ii = [1, -1]P[1, -1]P = [1, -1][-1, 1]PP = [-1, -1] = -1$$

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} a & 0 \\ 0 & d \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} + \begin{bmatrix} b & 0 \\ 0 & c \end{bmatrix} \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$$

$$= [a,d]1 + [b,c]P$$

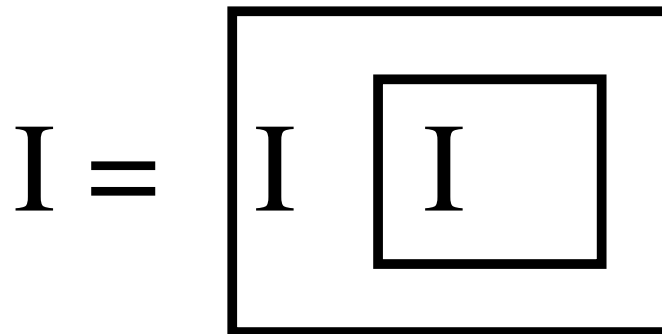
# Possibility and Necessity



“I am the observed link  
between myself  
and  
observing myself.” (HVF)

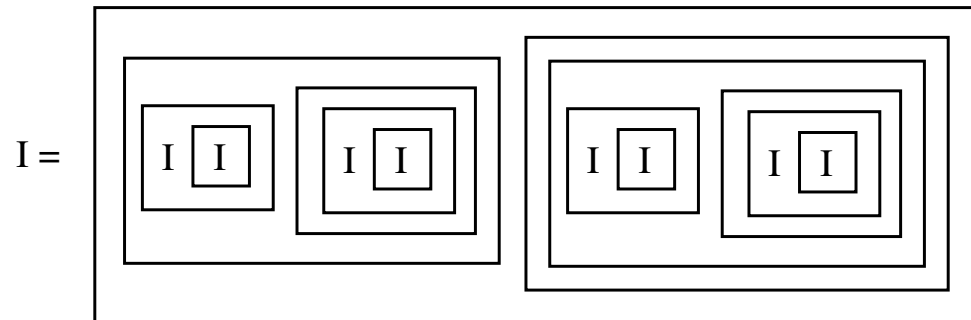
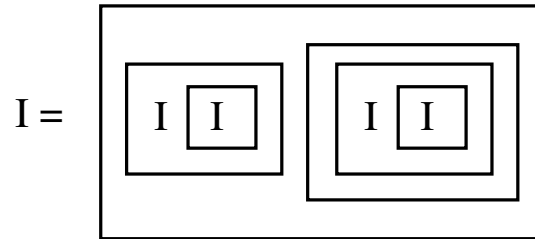
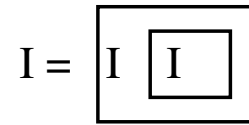
$\boxed{X}$  = "observing X"

$XY$  = "the link between X and Y".

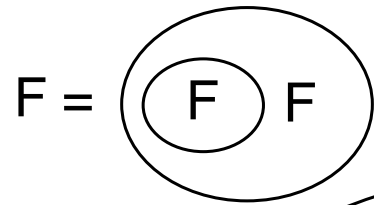


“I am a Fibonacci Form!”

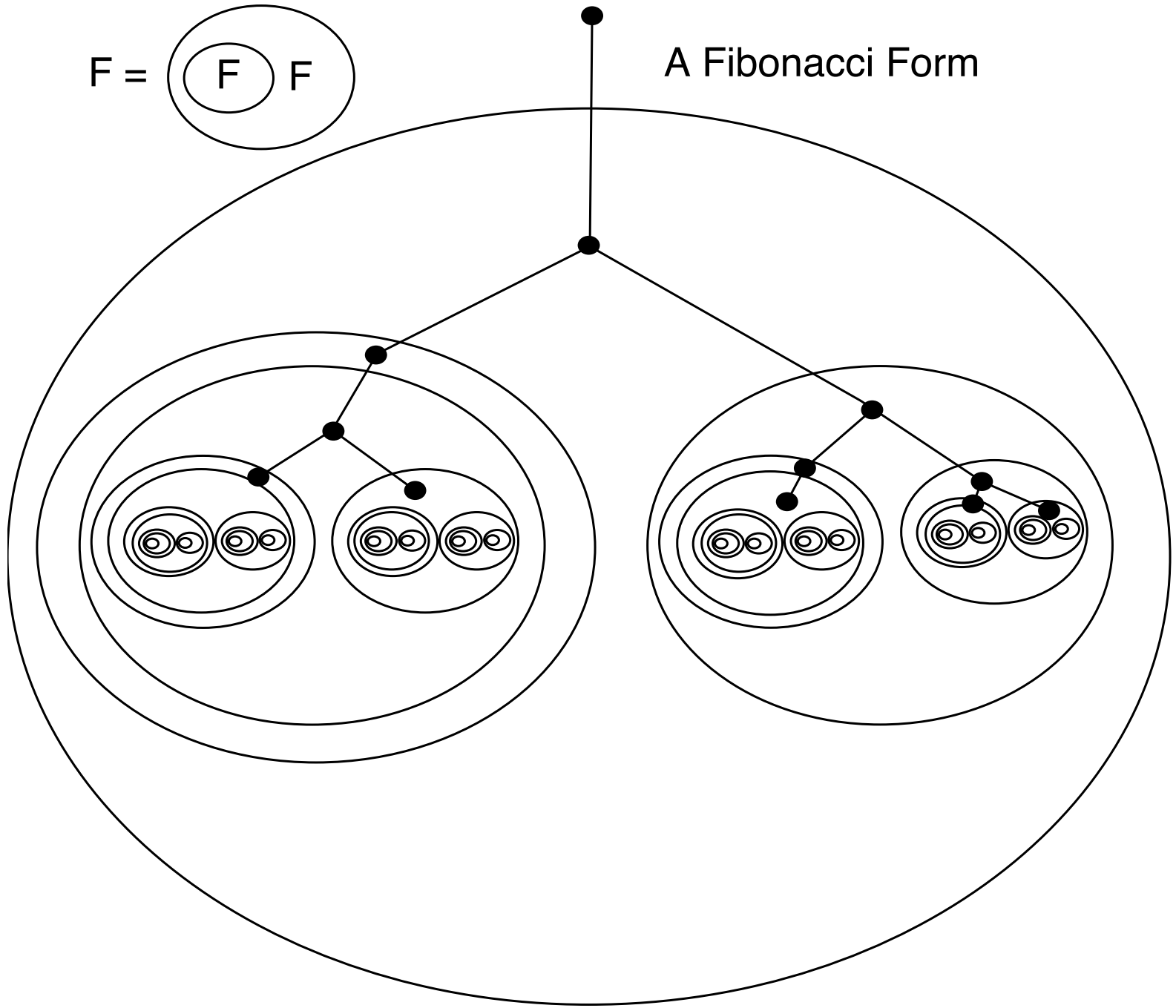
1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, ...

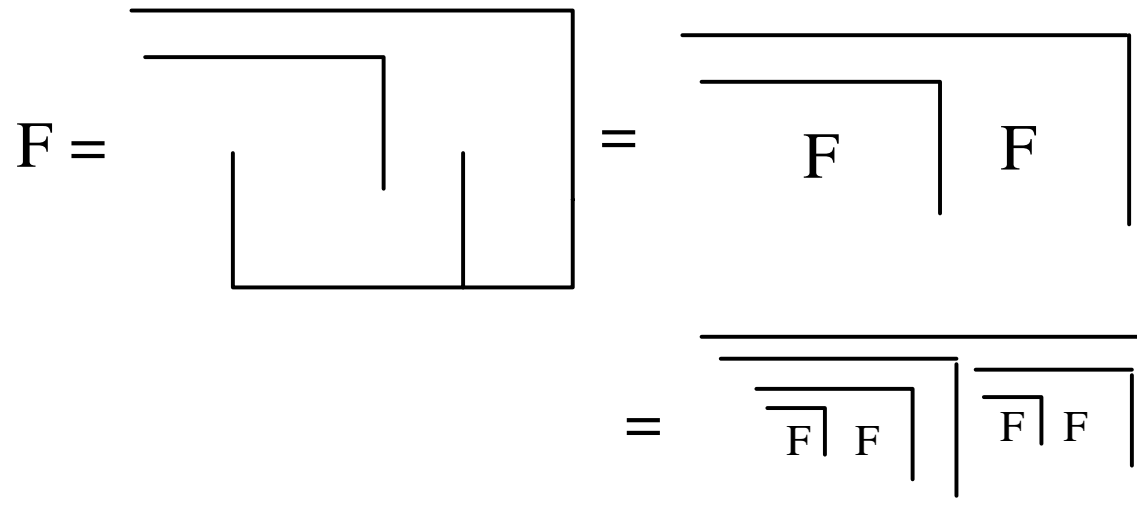


The number of divisions of  
the Fibonacci Form at  
depth N is the  
N-th Fibonacci number.

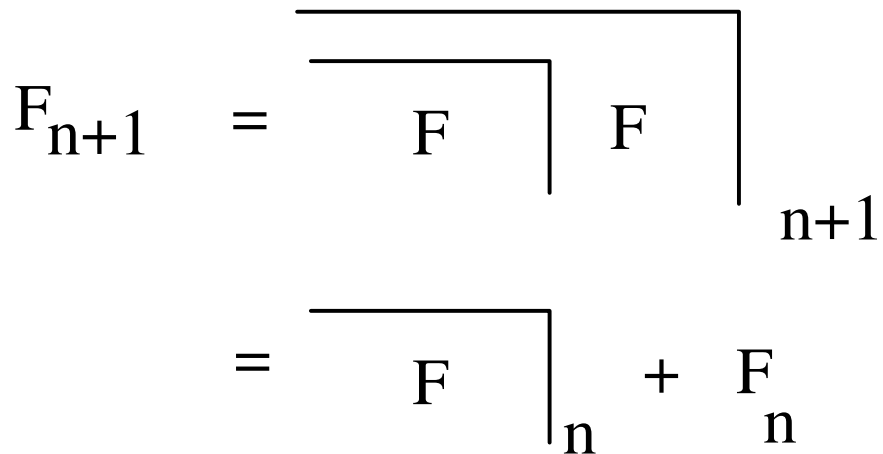


A Fibonacci Form



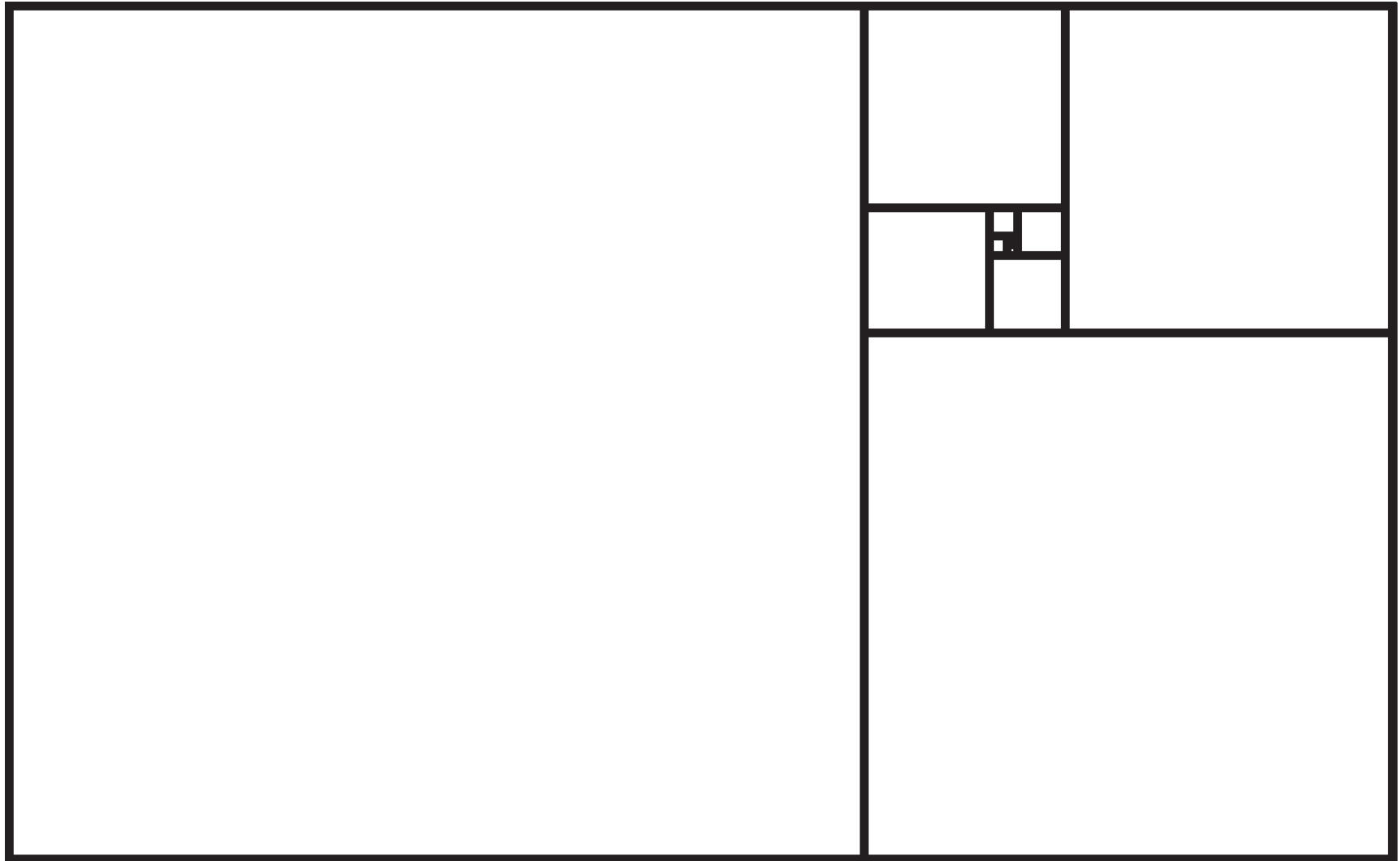


Depth  
Count

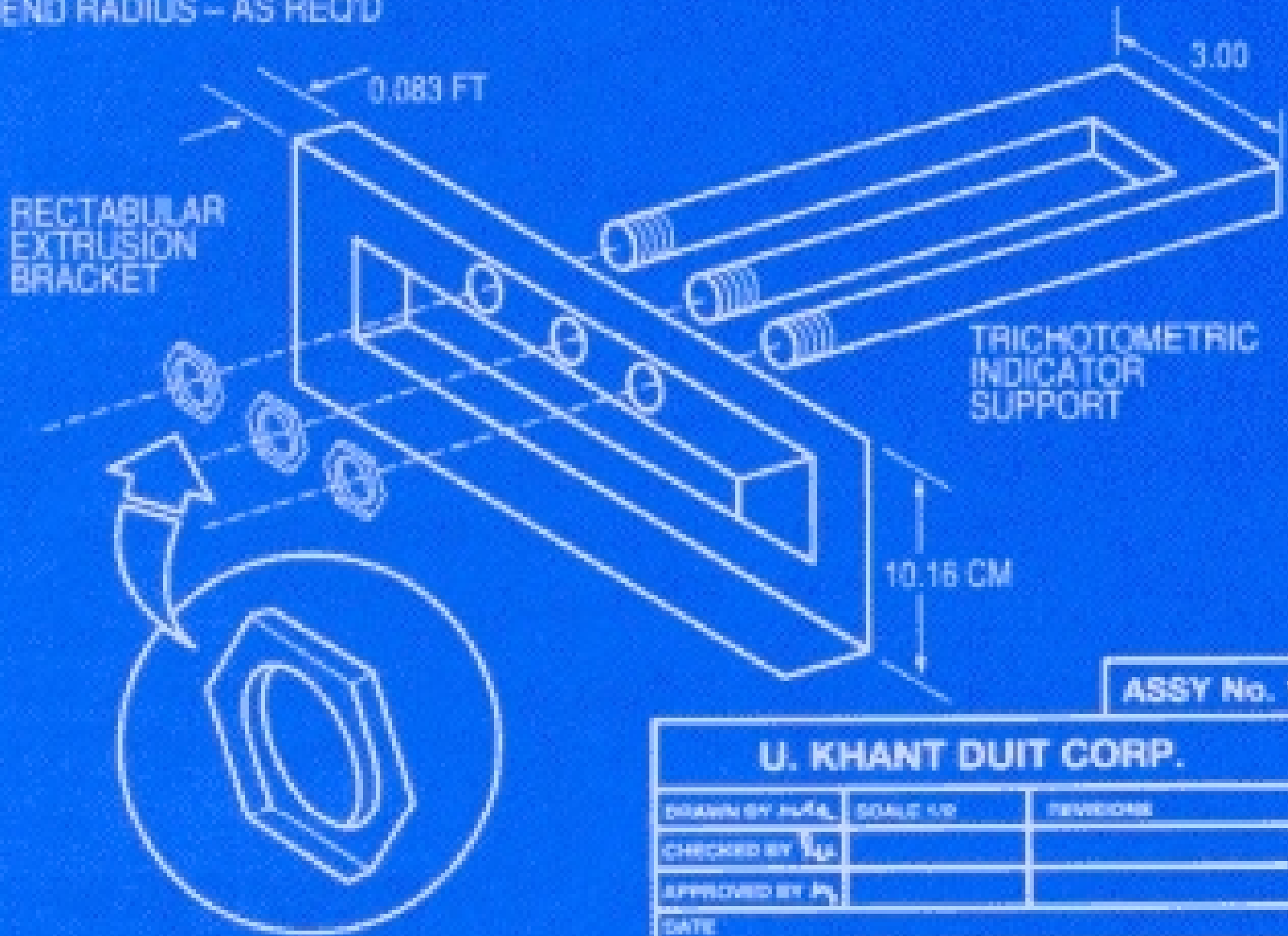


$$F_{n+1} = F_n + F_{n-1} \text{ with } F_0 = F_1 = 1$$

# The Golden Rectangle



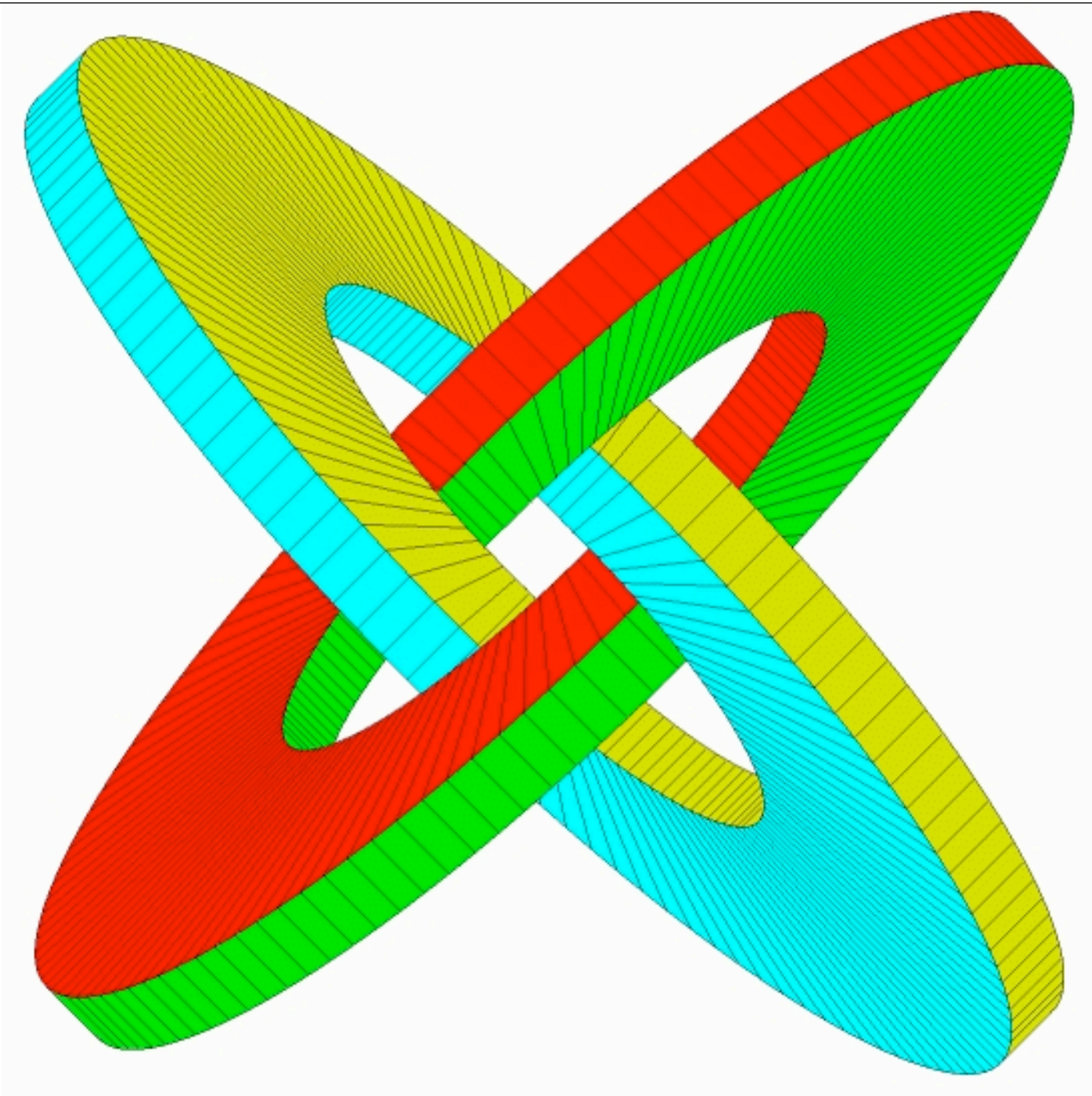
TOLERANCES xx +/- .015  
 xxx +/- .0015  
 BEND RADIUS - AS REQ'D



ASSY No. 13

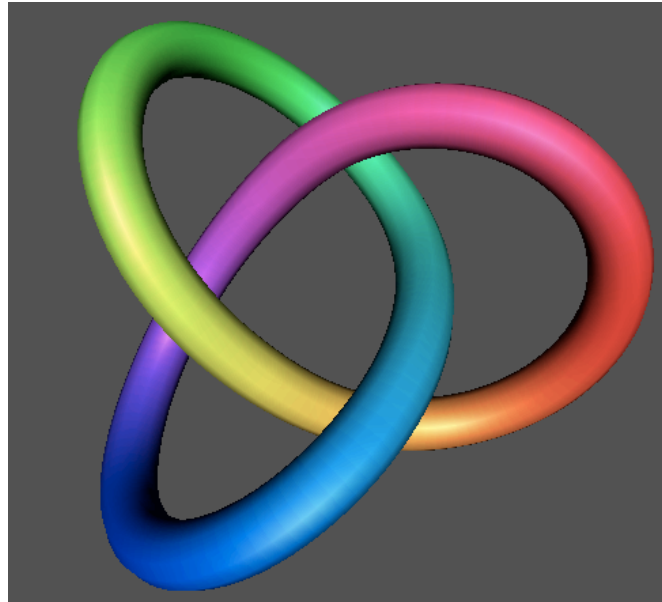
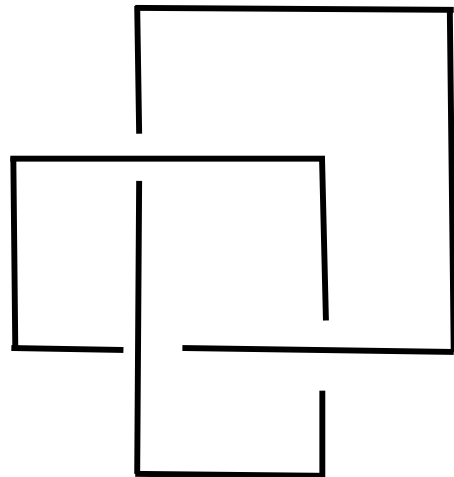
U. KHANT DUIT CORP.		
DRAWN BY <i>JKR</i>	SCALE 1/1	REVISIONS
CHECKED BY <i>JKR</i>		
APPROVED BY <i>JKR</i>		
DATE		
TITLE		NO
BRACE HORIZONTAL		GMJ UK 94



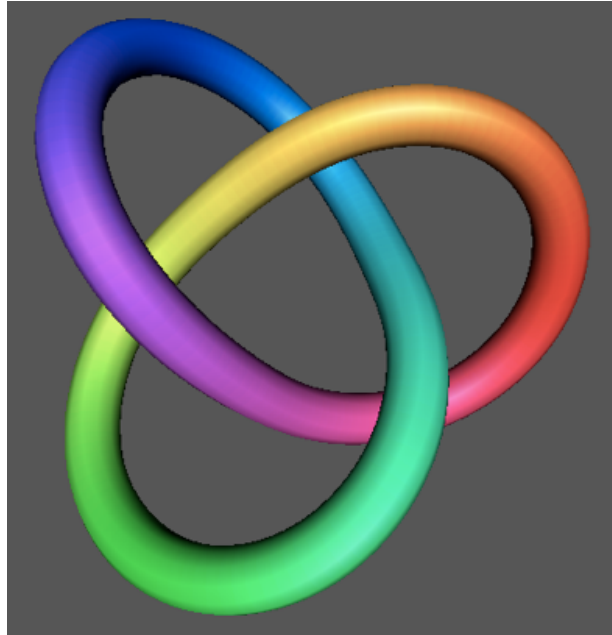


**Impossibly linked ambiguous rings. © 2004 by Donald Simanek.**

# The Imaginary and The Real



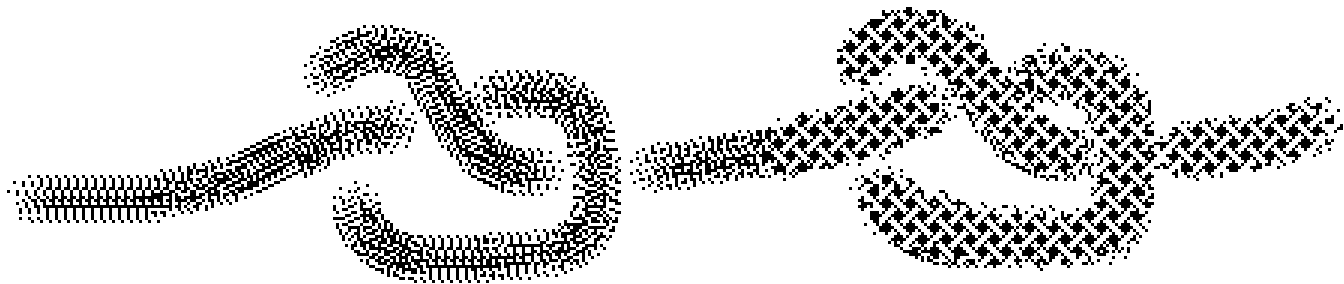
# Self-Mutuality and Fundamental Triplexity



Trefoil as self-mutuality.  
Loops about itself.  
Creates three loopings  
In the course of  
Closure.

## Patterned Integrity

The knot is information independent  
of the substrate that carries it.



# Arithmetic of Knots

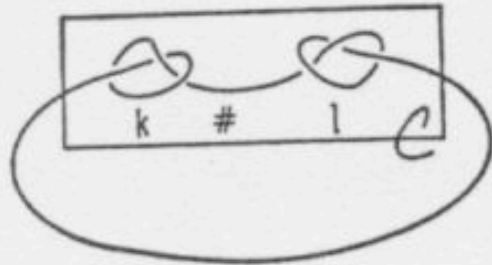
It is trivial that composition is associative and that the trivial knot type is a unit. Commutativity may be seen from the following picture.



Thus the set of all (tame, oriented) knot types form a commutative semigroup under the operation  $\#$ .

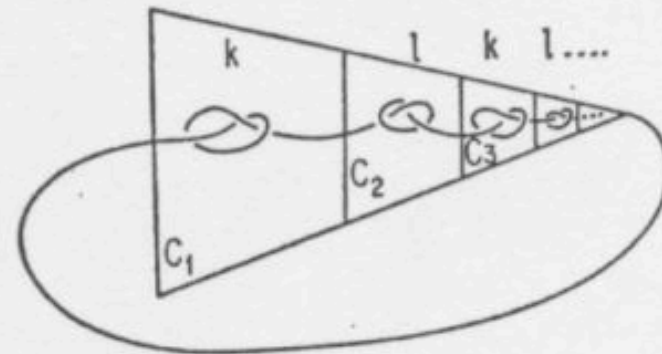
Schubert has proved that, in this semigroup, factorization is unique. Just as in the proof of unique factorization of integers under multiplication, the proof may be made to depend on two fundamental lemmas: (a) finiteness of factorization, and (b) the lemma about prime divisors of a product.

# A Wild Proof that You Cannot Cancel Knots



Suppose that there were an autohomeomorphism  $f$  of space mapping  $k \# l$  into  $0$ . It may be arranged that  $f$  is the identity outside a cube  $C$  whose boundary meets  $k \# l$  in two points.

Construct the following wild knot  $m$ :

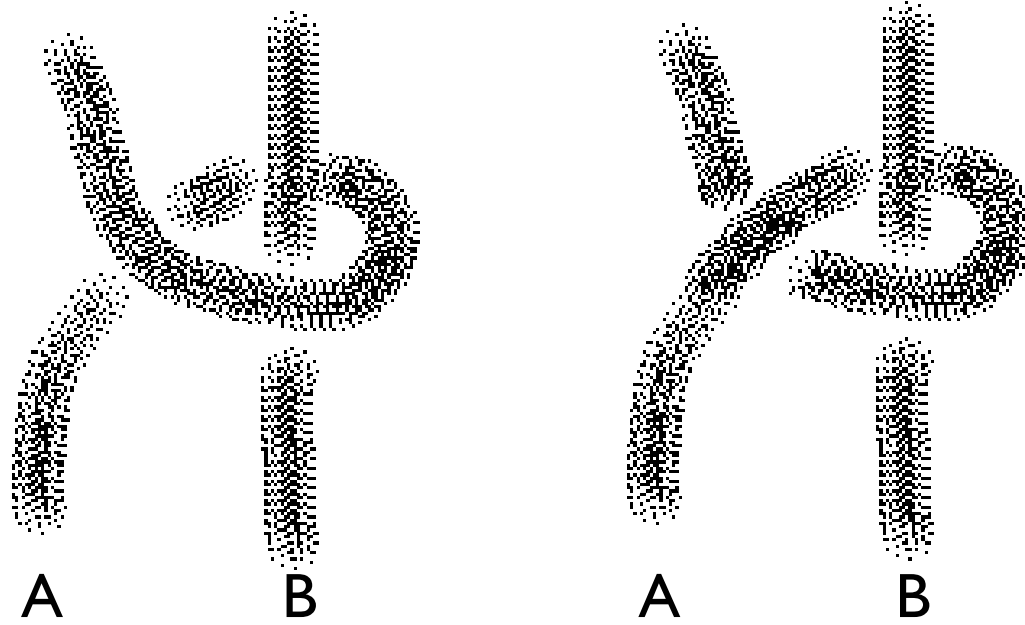


Then there is an autohomeomorphism  $f_n$  of space that is the identity outside  $C_{2n-1} + C_{2n}$ , that replaces  $k \# l$  by  $0$  inside  $C_{2n-1} + C_{2n}$ . Defining  $f$  to be  $f_n$  inside  $C_{2n-1} + C_{2n}$  for all  $n$  and the identity outside

$$\sum_{i=1}^{\infty} C_i,$$

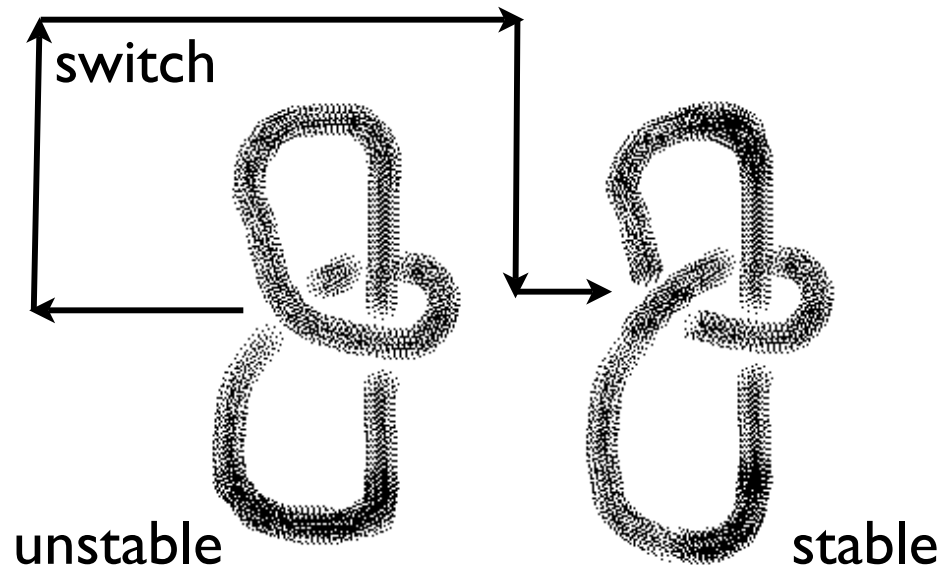
we see that  $m = 0$ . Repeating the same construction, using  $C_{2n} + C_{2n+1}$ ,  $n = 1, 2, 3, \dots$ , instead of  $C_{2n-1} + C_{2n}$ , and observing that  $k \# l = l \# k$ , we see that  $m = k$ . Consequently  $k = 0$ , and hence  $l = 0$ .

## Observation as Linking

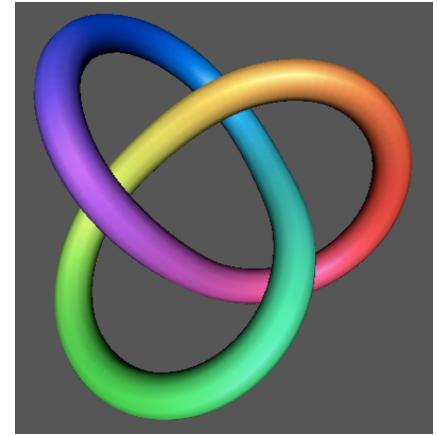


A observes B

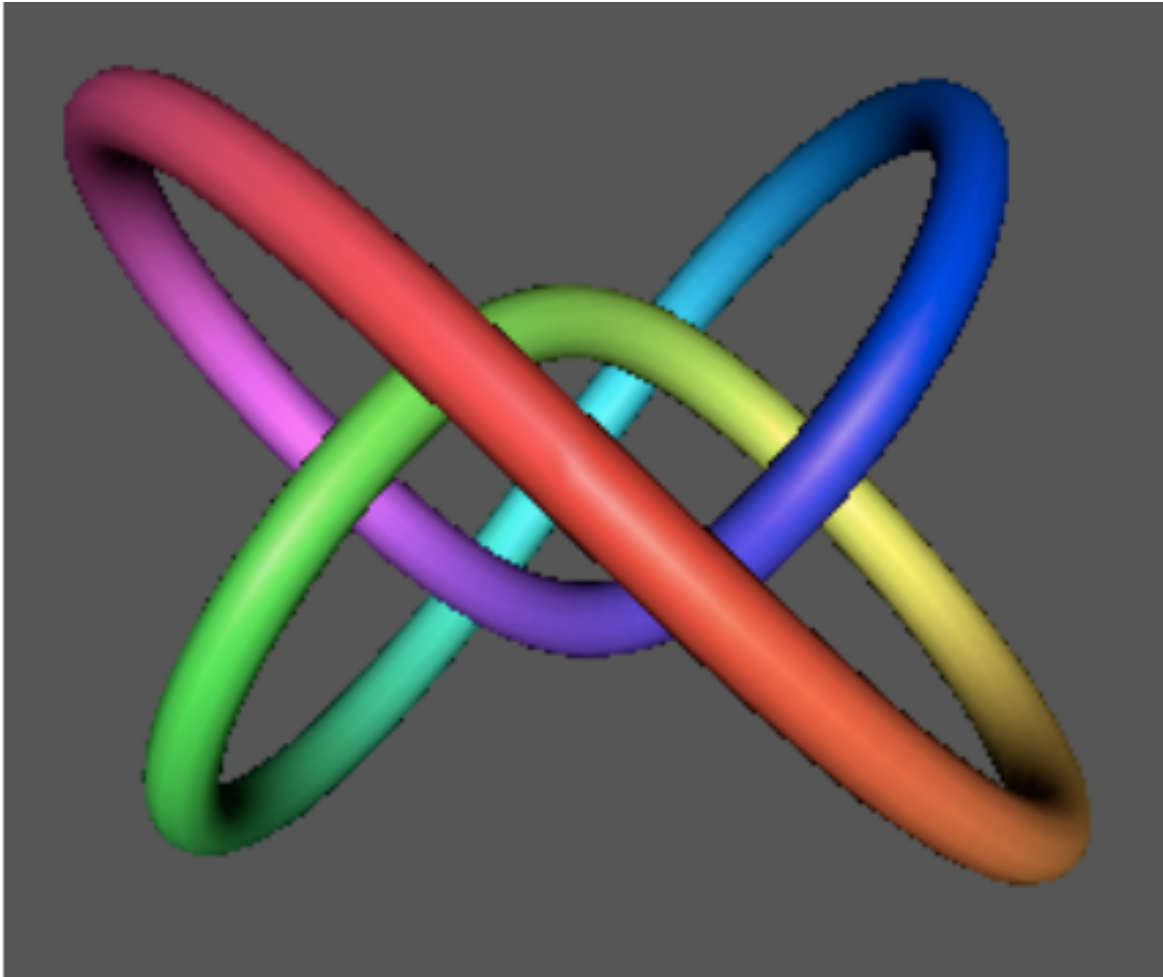
# Self-Observation and Observing Observing

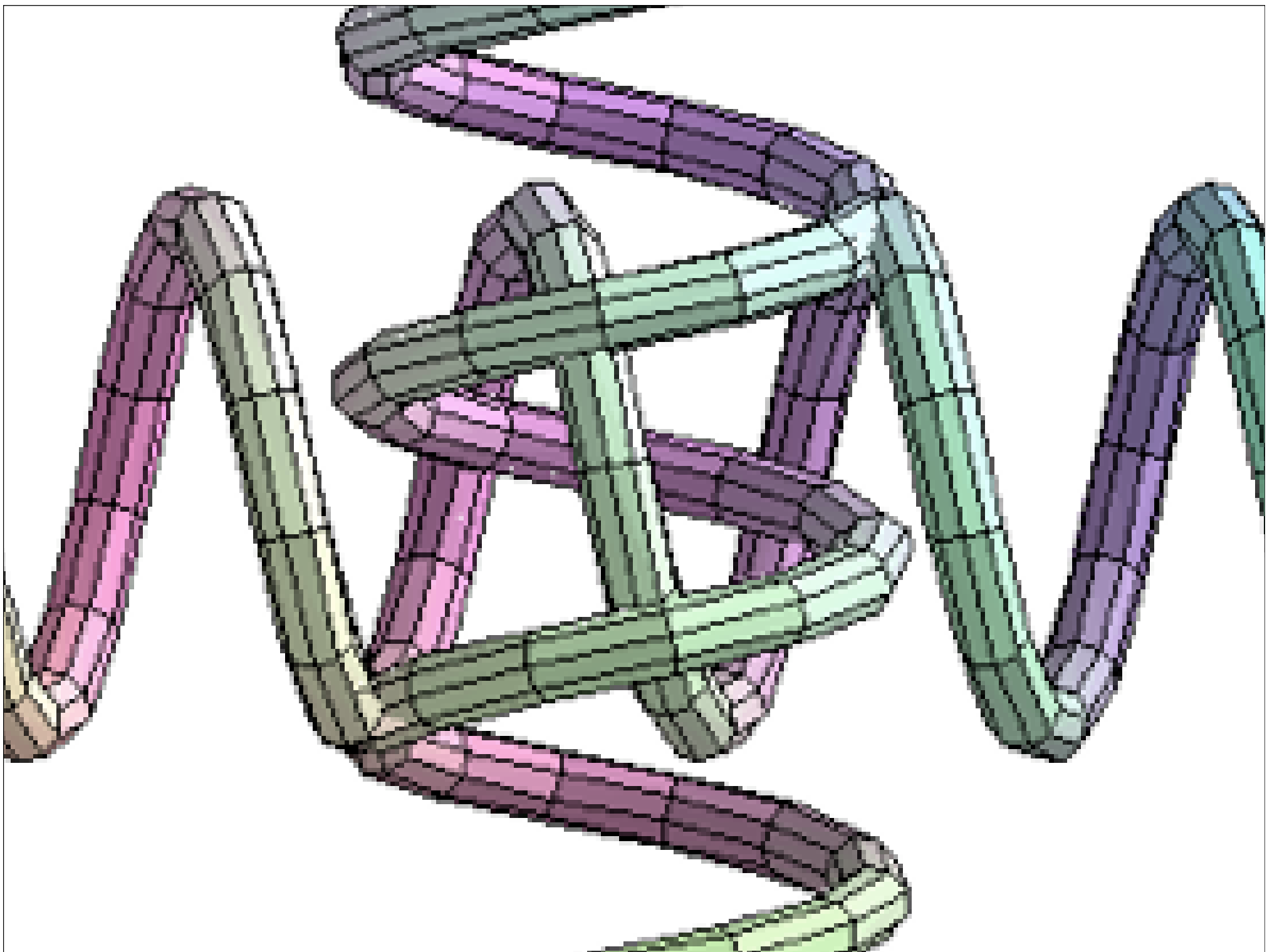


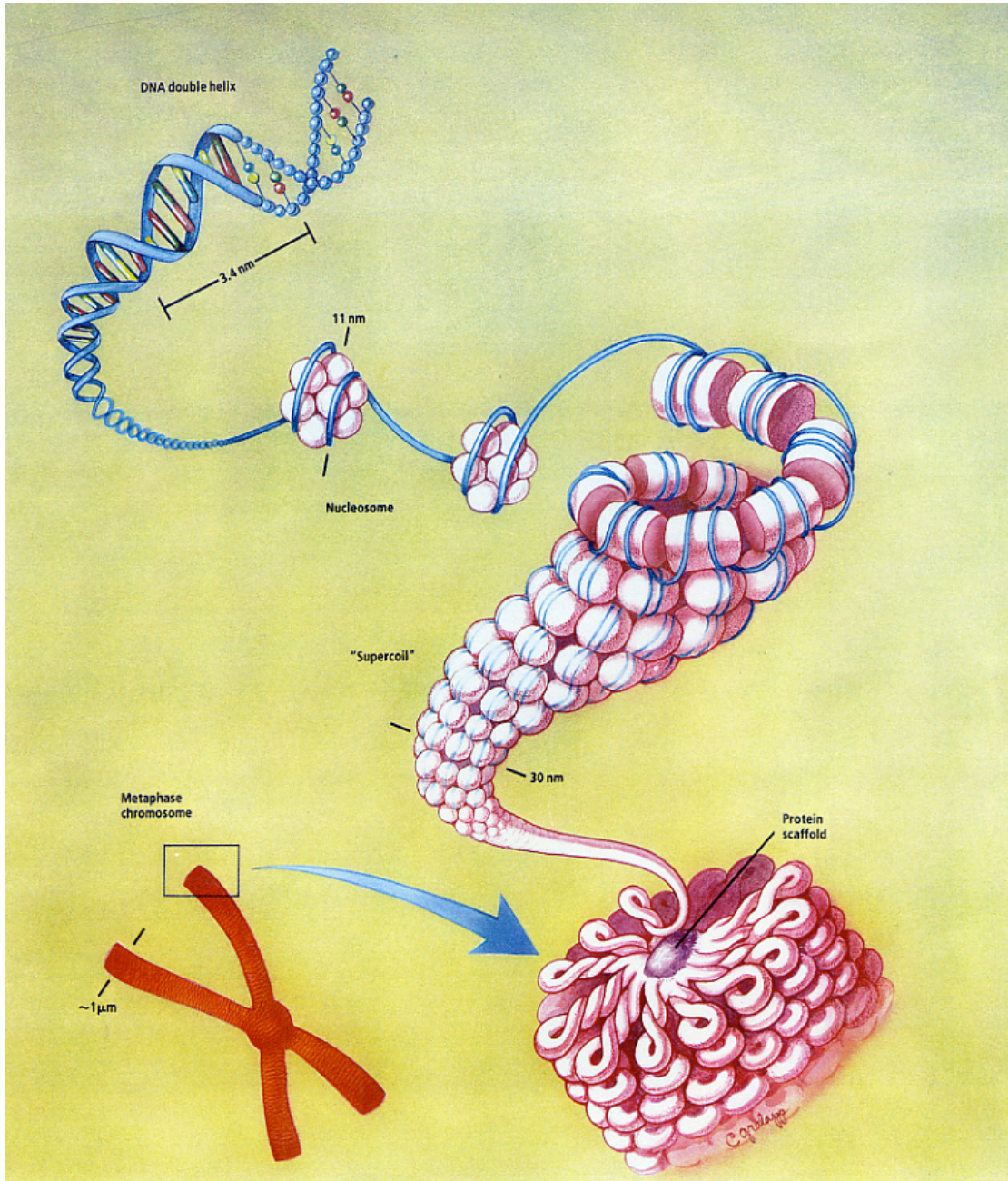
A observing A

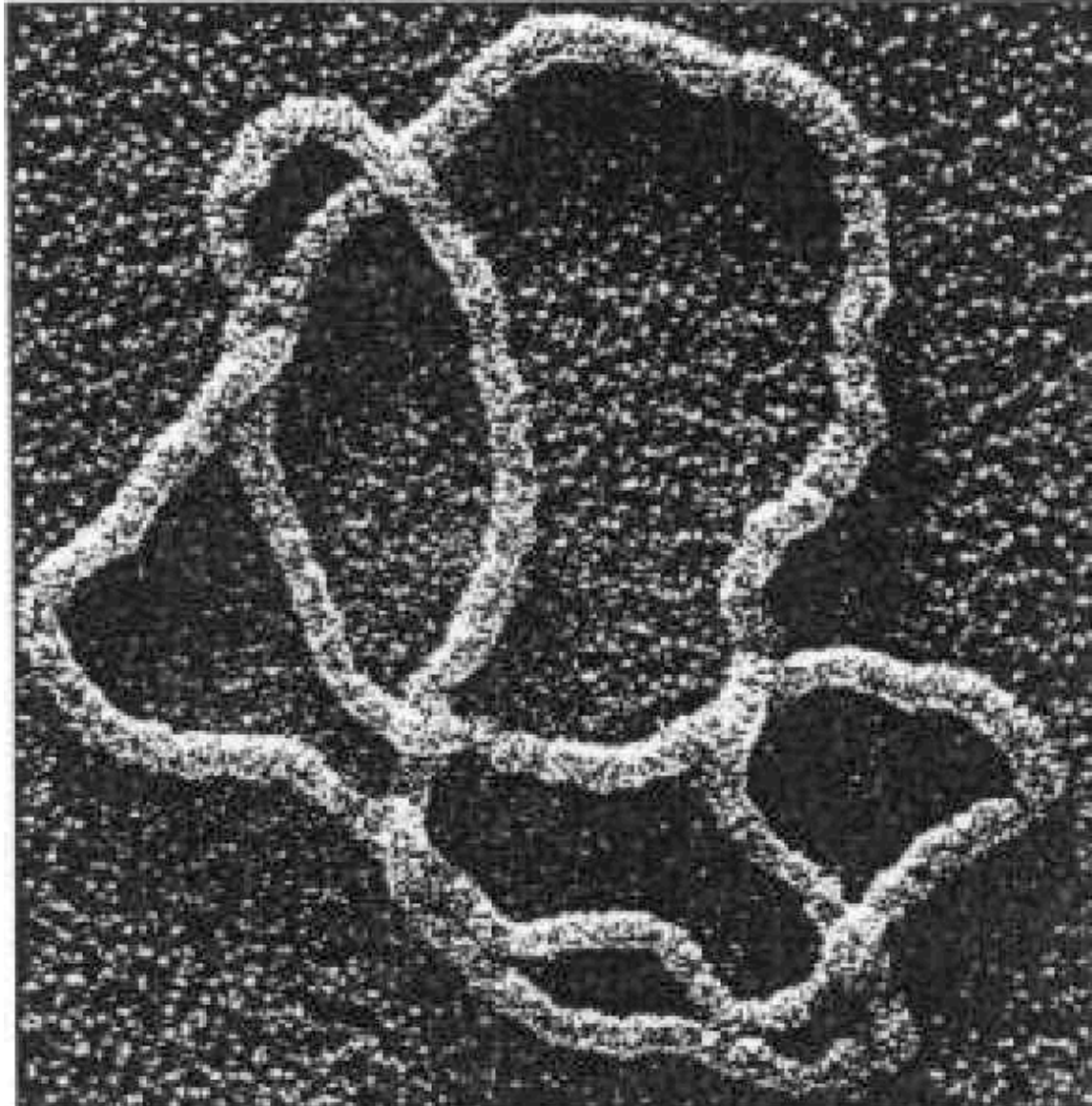




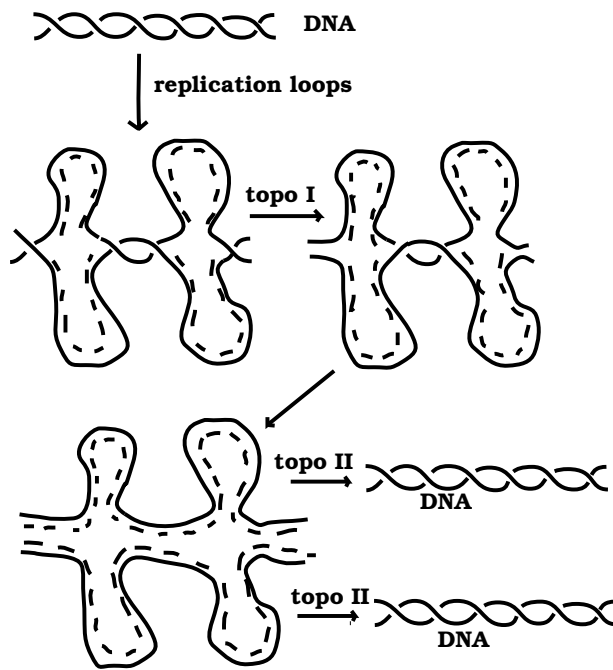








# DNA is a Self-Replicating EigenForm



$$DNA = \langle W|C \rangle$$

$$\langle W| = \langle \dots TTAGAATAGGTACGCG \dots |$$

$$|C \rangle = | \dots AATCTTATCCATGCGC \dots \rangle .$$

$$\langle W| + E \longrightarrow \langle W|C \rangle = DNA$$

$$E + |C \rangle \longrightarrow \langle W|C \rangle = DNA$$

$$\langle W|C \rangle \longrightarrow \langle W| + E + |C \rangle = \langle W|C \rangle \langle W|C \rangle$$

**Self Replication Schematic**

$$DNA = \langle \text{Watson} | \text{Crick} \rangle$$

**E = Environment**

DNA = <>

DNA = <> → < E > → <><> = DNA DNA.

E is the “environment”.

E is replaced by ><.

<> is a Container,

>< is an Extainer.

Each produces the Other.

<><> = < >< >

>< >< = ><><

<> is a Container,  
>< is an Extainer.  
Each produces the Other.

<><> = < >< >

>< >< = ><><

$\langle \rangle$  Container

$\rangle \langle$  Extainer

$$P = \rangle \langle, \quad Q = ] [$$

$$PP = \rangle \langle \rangle \langle = \langle \rangle \rangle \langle = \langle \rangle P$$

$$QQ = ] [ ] [ = ] [ ] [ = ] [ Q$$

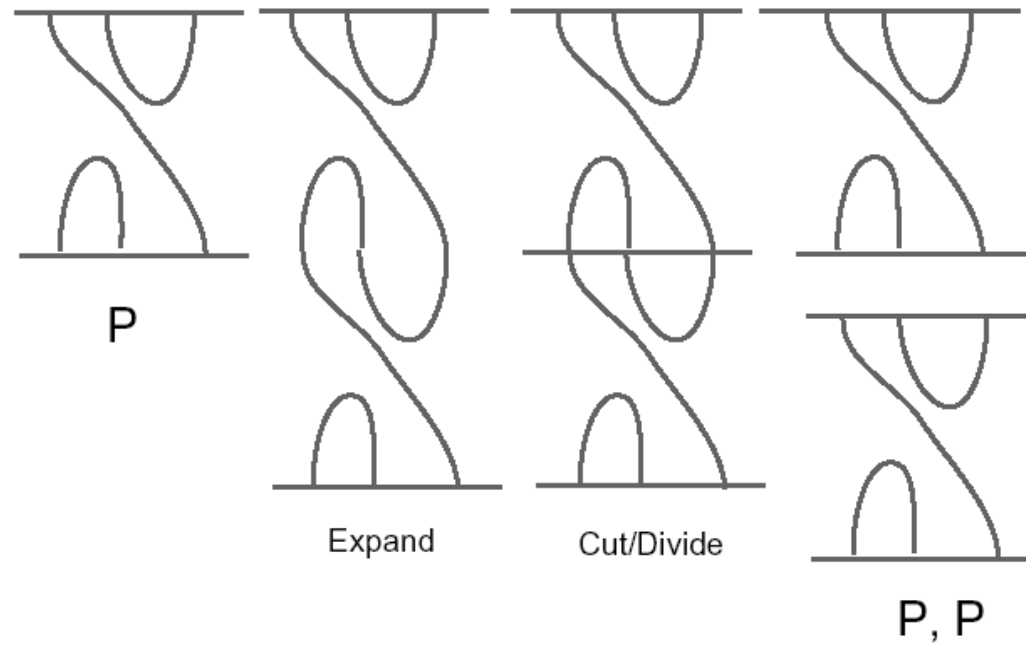
$$PQP = \rangle \langle ] [ \rangle \langle = \langle \rangle ] [ \rangle \langle = \langle \rangle ] [ \rangle \langle P$$

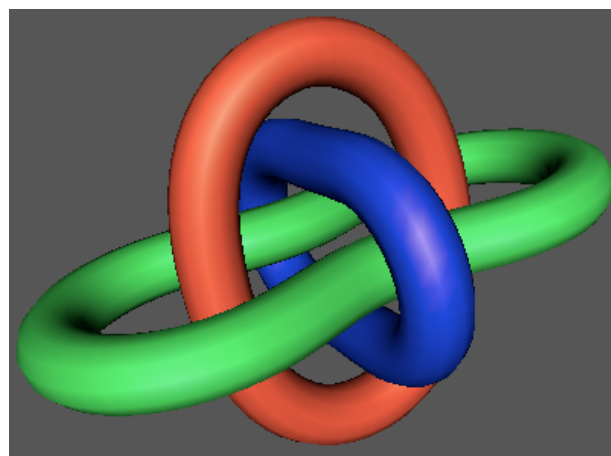
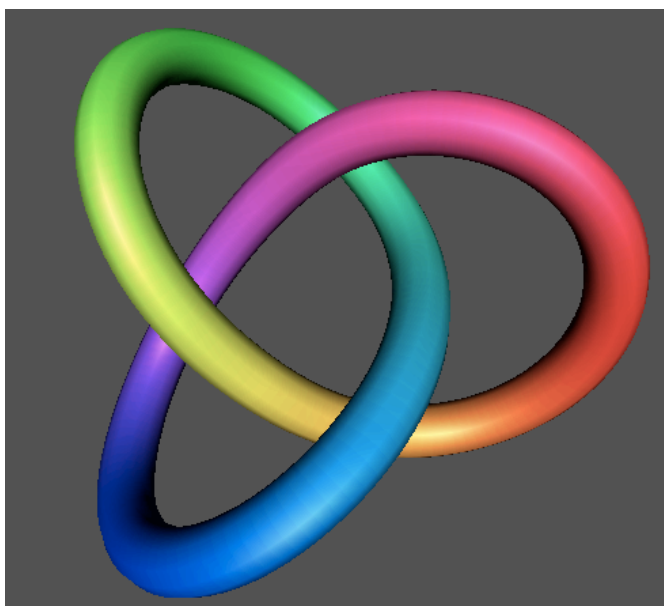
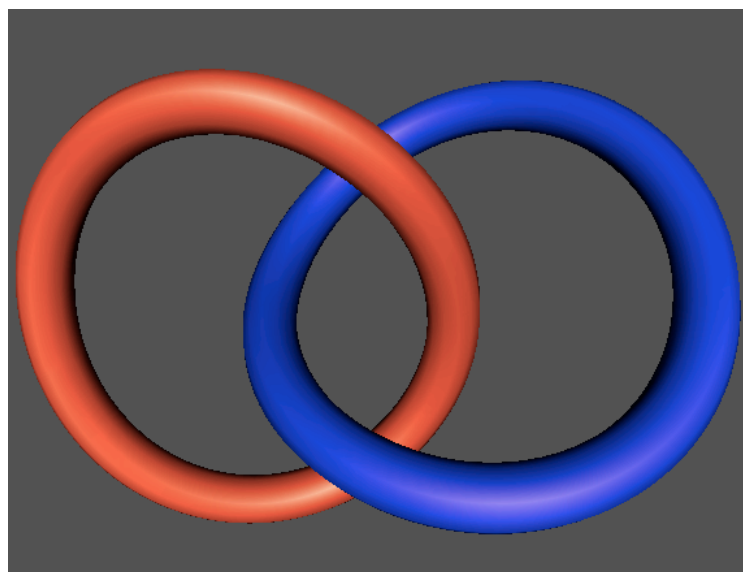
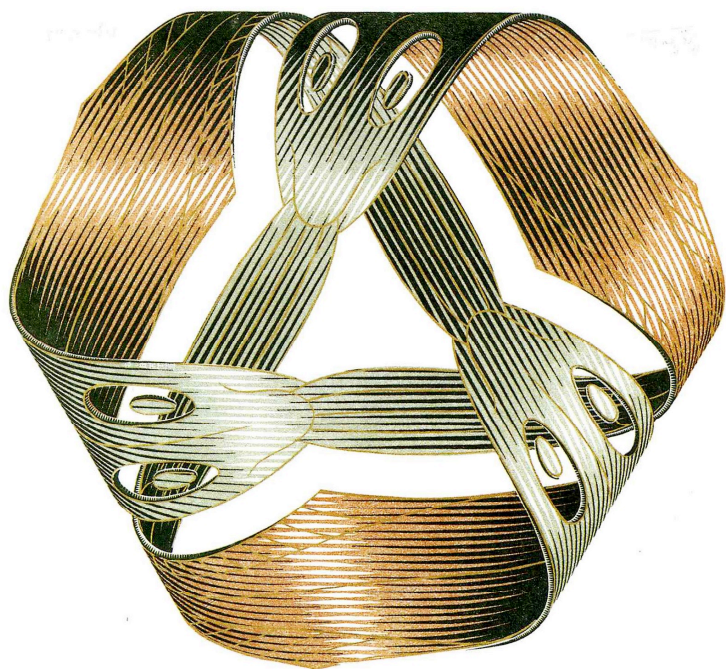
$$QPQ = ] [ \rangle \langle ] [ = ] [ \rangle \langle ] [ = ] [ \rangle \langle Q$$

Temperley-Lieb Relations Arise  
Naturally in an Algebra of Projectors



# Topological Replication





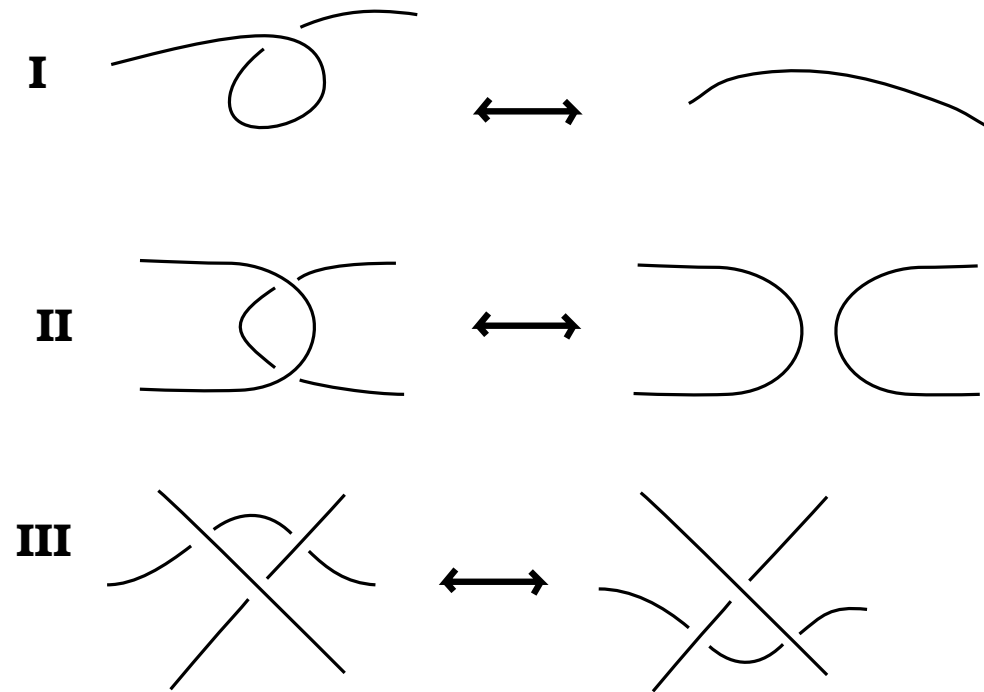
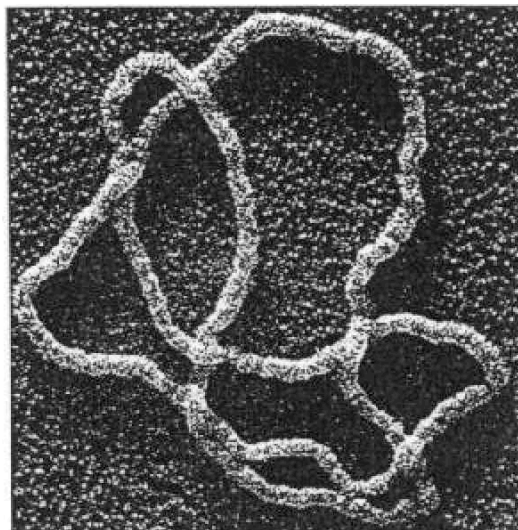
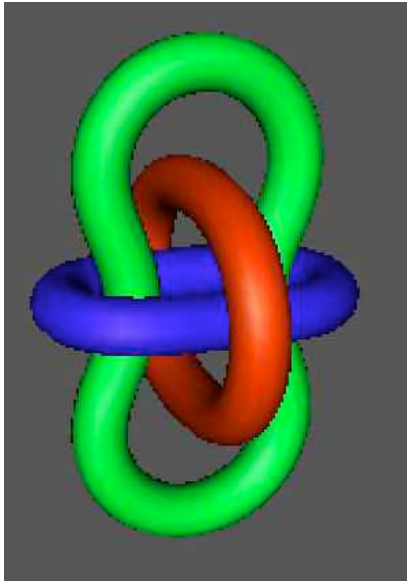
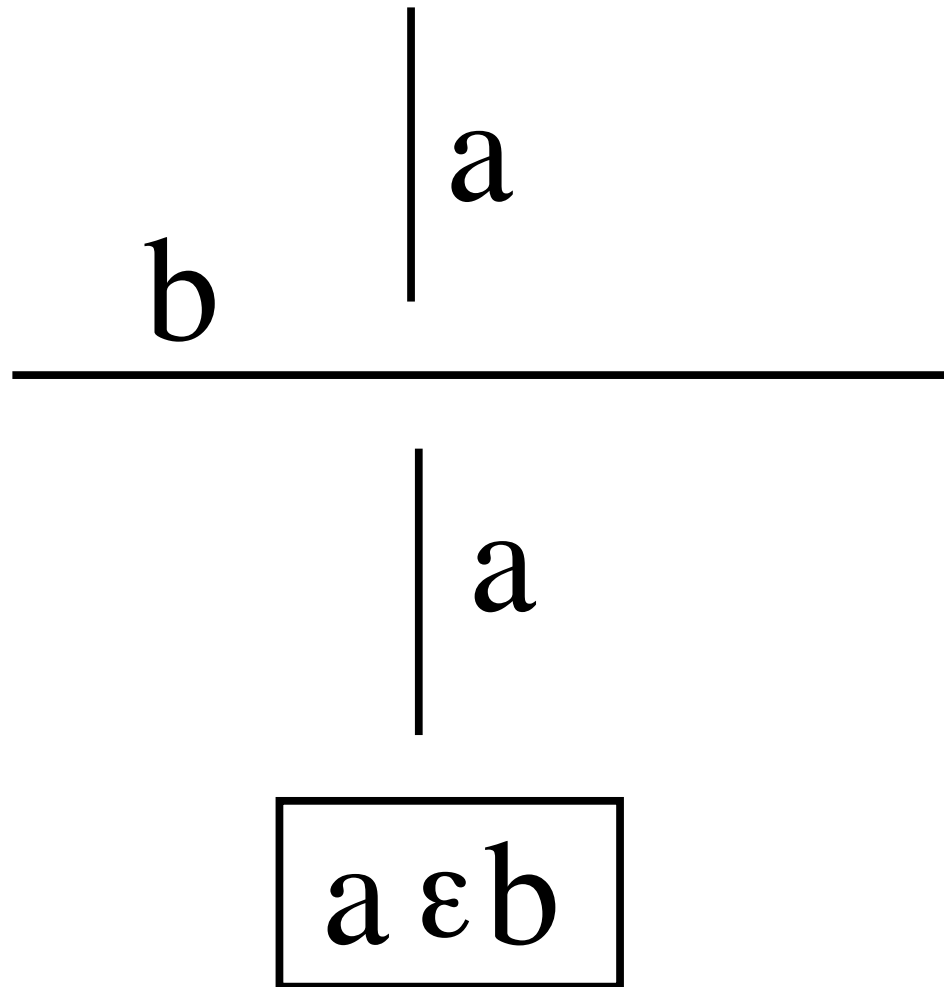


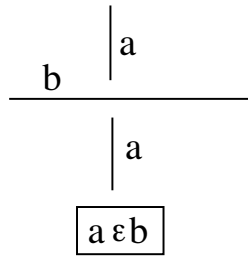
Figure 2 - The Reidemeister Moves.

Reidemeister Moves  
reformulate knot theory in  
terms of graph  
combinatorics.

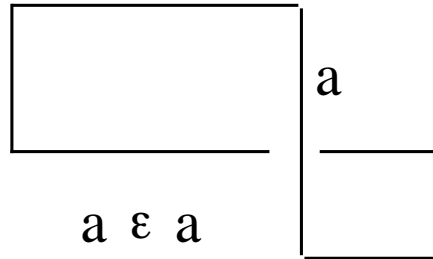
# Knot Sets



# Knot Sets

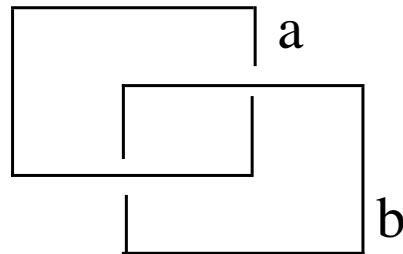


Crossing  
as Relationship



Self-  
Membership

$$a = \{a\}$$

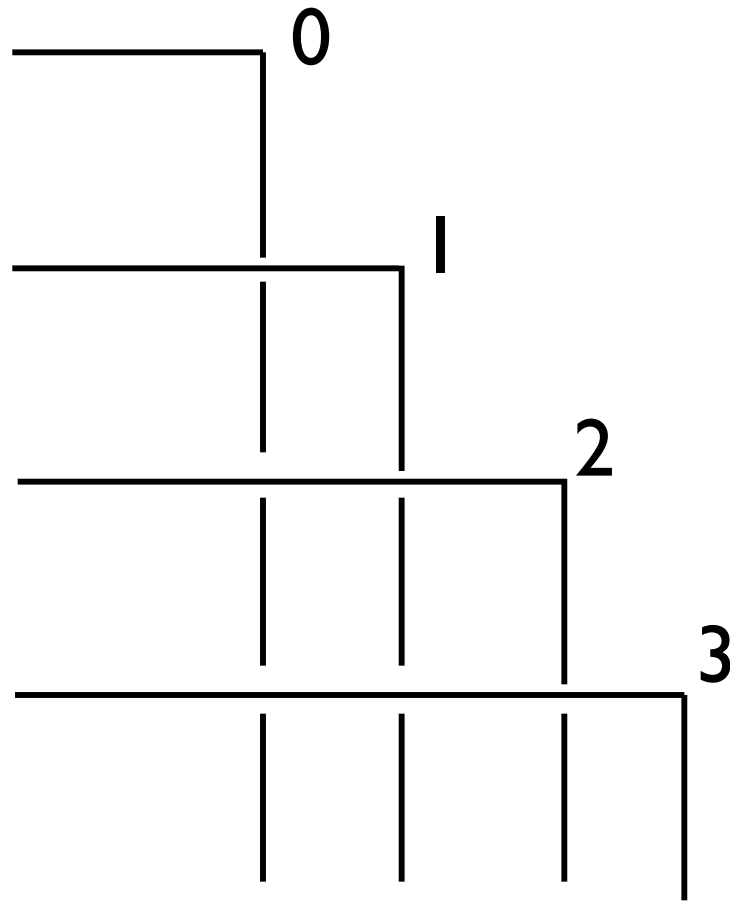


Mutuality

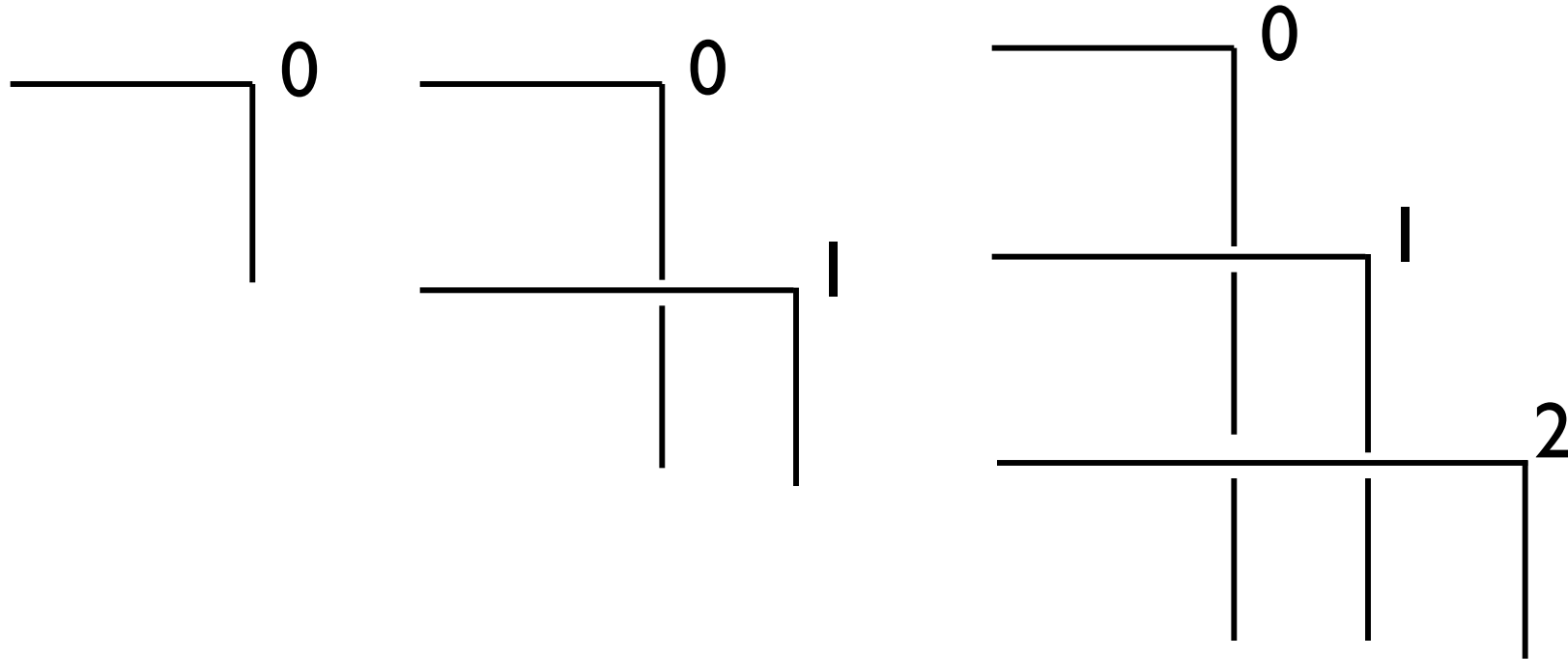
$$b = \{a\}$$

$$b = \{a\}$$

# Architecture of Counting



# Architecture of Counting



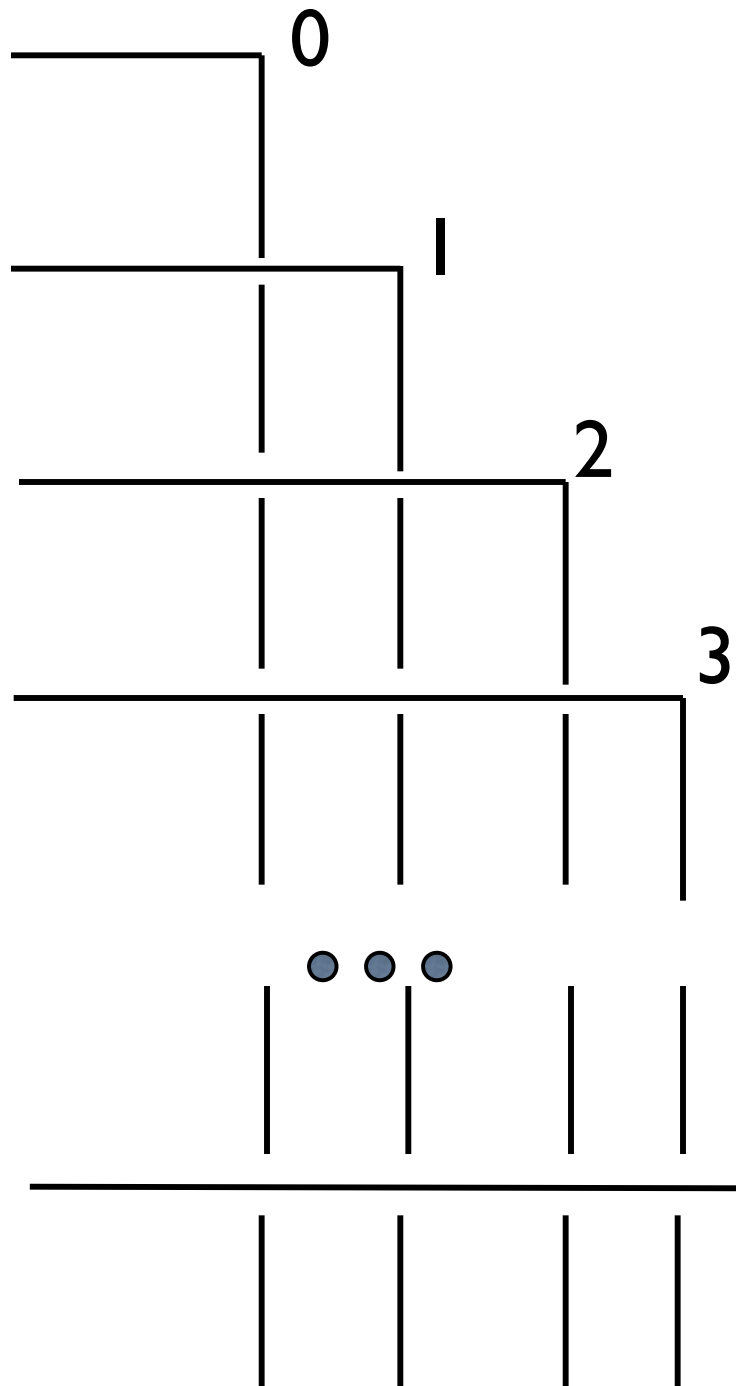
Each new level collects all that has gone before.

Already this is a solution to the Russell Paradox.

Each new set comes in the demand to write down sets that have not themselves as members.

The demand is never met and the creation process continues.

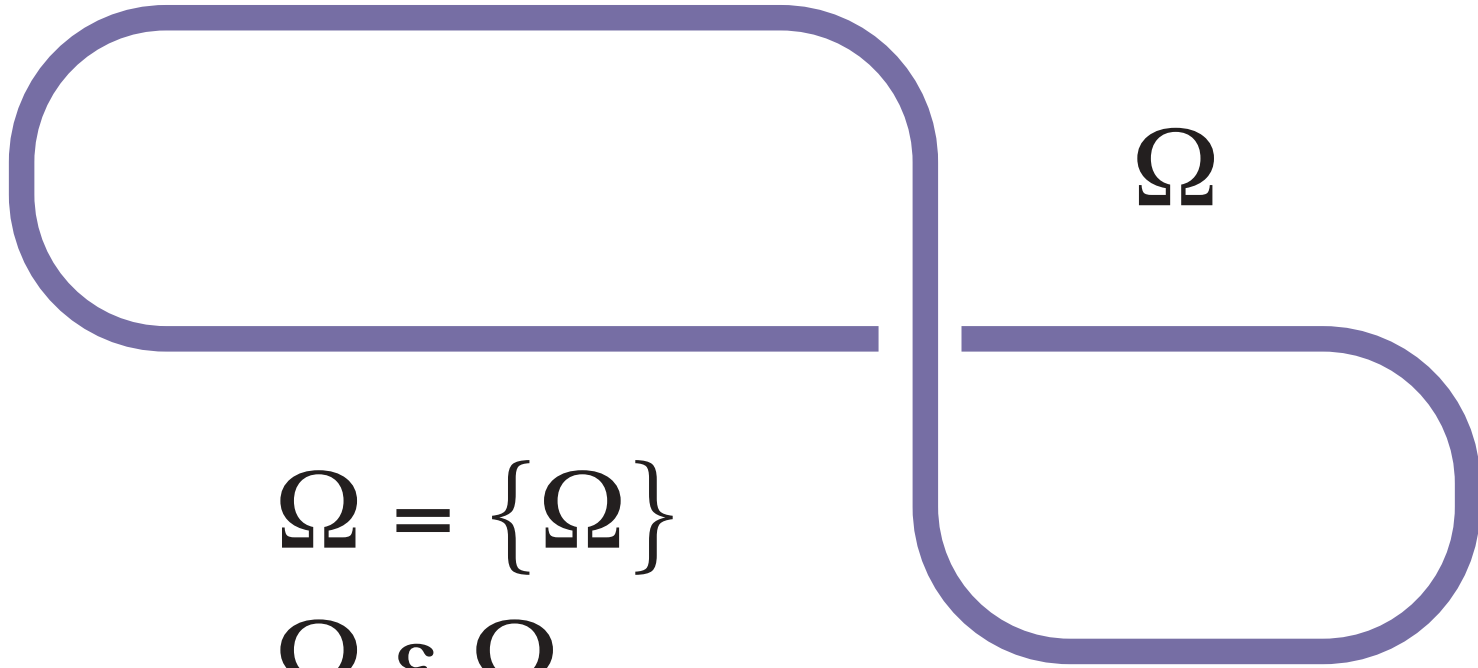




Architecture of Counting

The Counting Process  
Never Stops

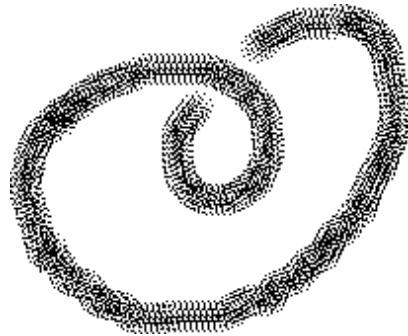
Omega



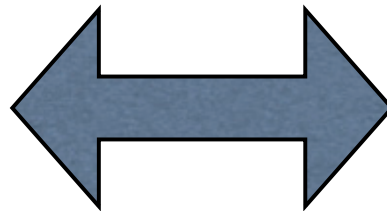
$$\Omega = \{\Omega\}$$

$$\Omega \varepsilon \Omega$$

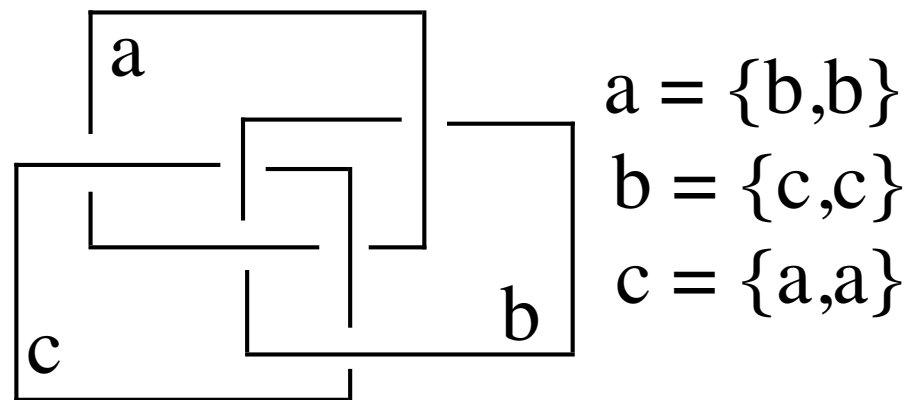
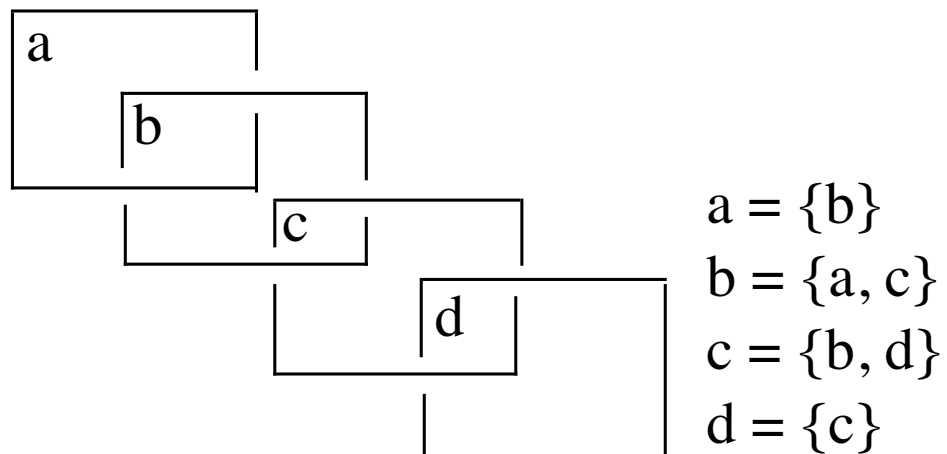
# Topological Russell (K)not Paradox



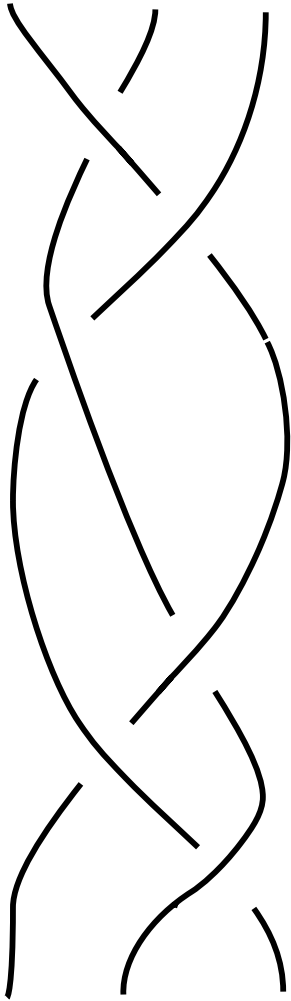
A  
belongs to A.



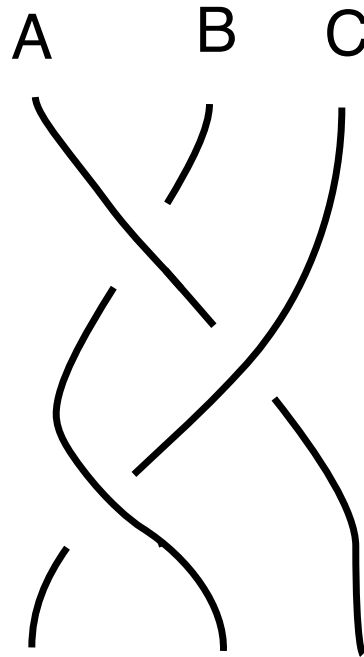
A does not  
belong to A.



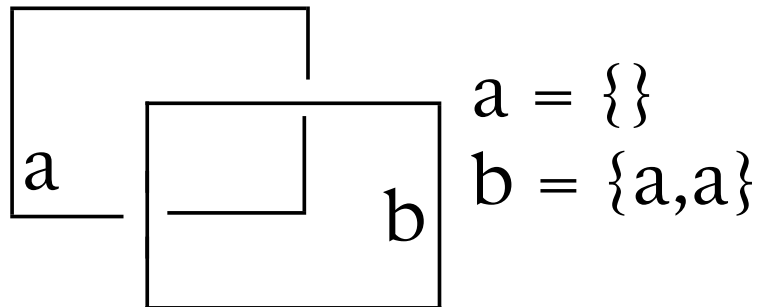
The Borromean Rings



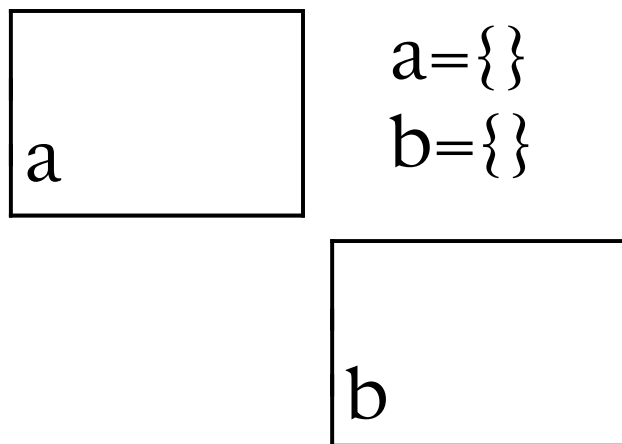
Borromean Braid



$$\begin{aligned} A &= \{B\} \\ B &= \{C\} \\ C &= \{A\} \end{aligned}$$



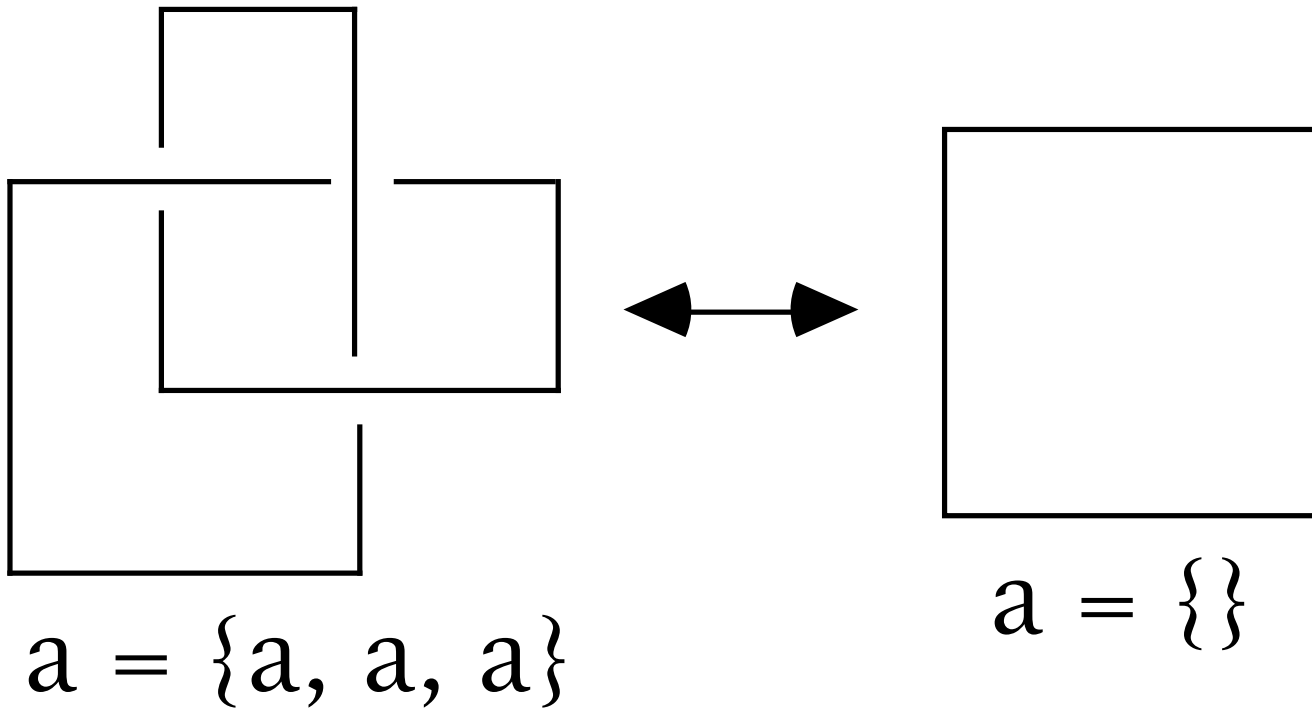
↑ topological  
 ↓ equivalence



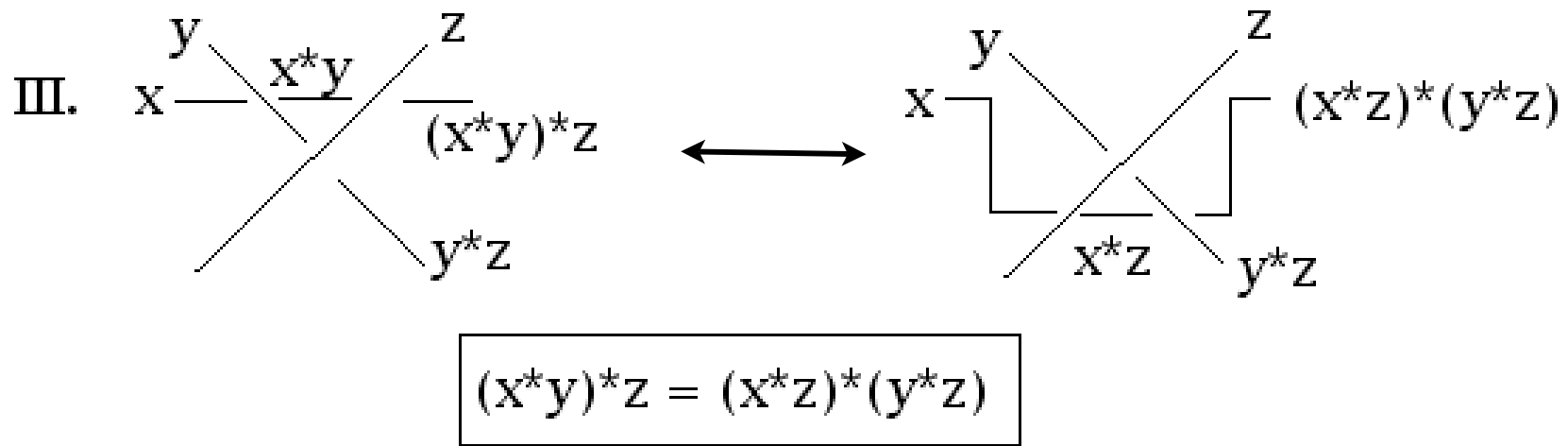
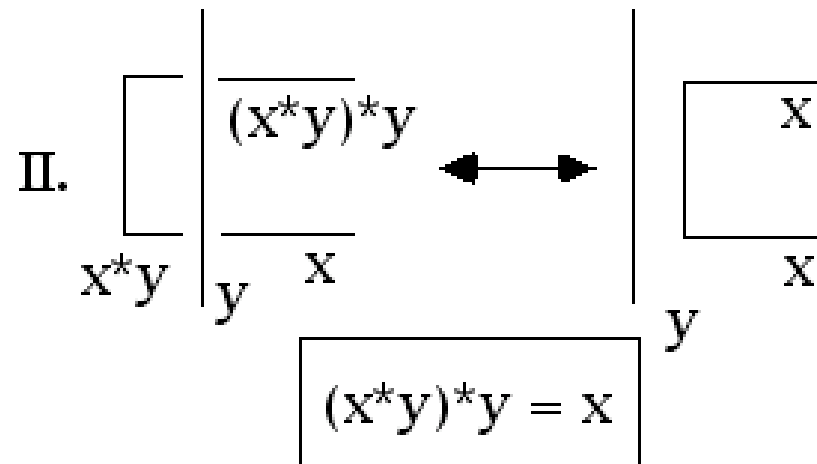
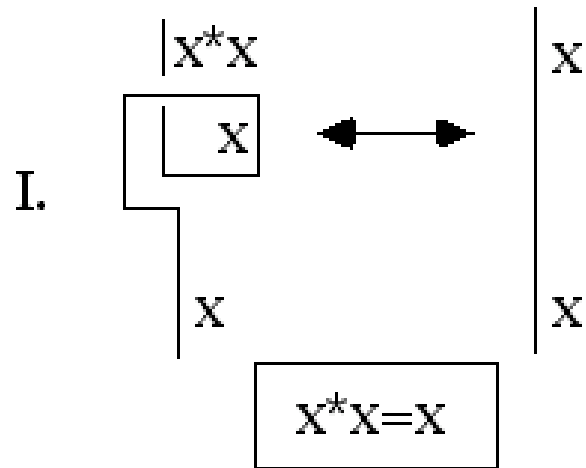
**Knot Sets are  
 “Fermionic”.**  
**Identical elements  
 cancel in pairs.**

**(No problem with  
 invariance  
 under third  
 Reidemeister move.)**

Knot sets do not know knots.  
But they do provide a non-standard  
model for sets.



# The Next Step - An Algebra of Boundaries





# Algebra of Discrimination

$$\begin{array}{c|c} & C = A * B \\ \hline B & A \end{array}$$

A and B are distinct.

The distinction is reflected by

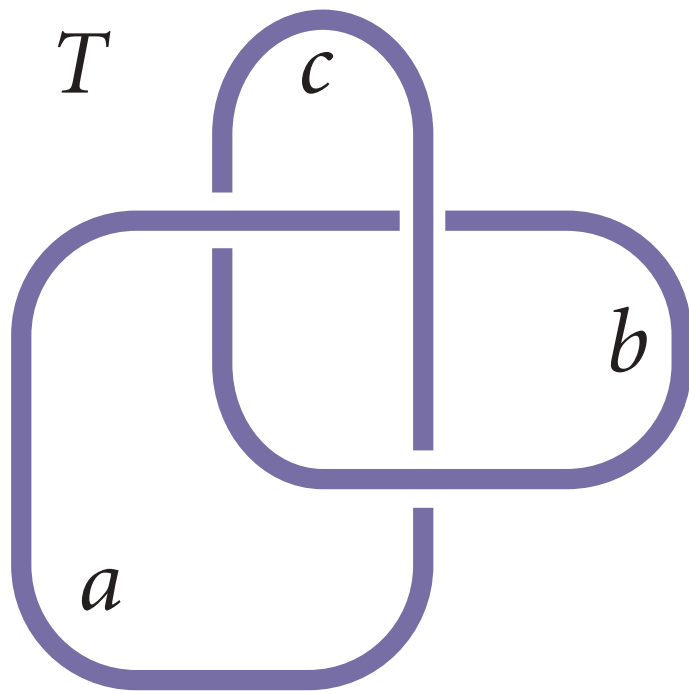
$A * B$  is neither A nor B.

$$A * B = B * A = C$$

$$A * C = C * A = B$$

$$B * C = C * B = A$$

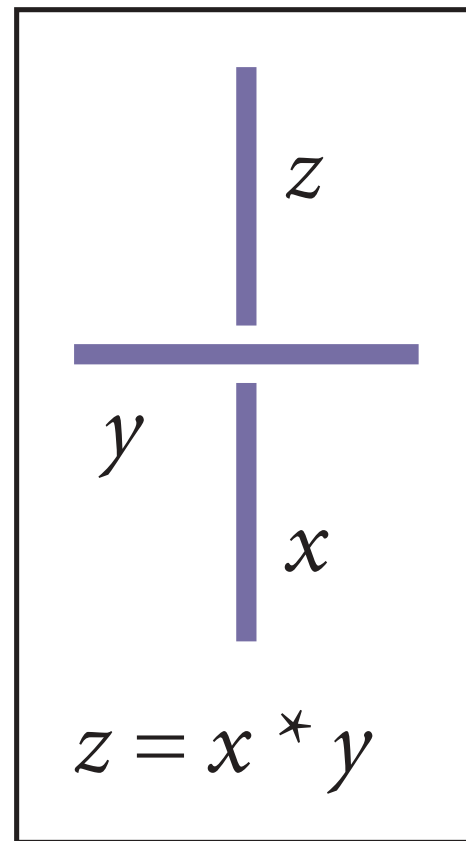
$$X * X = X$$



$$b = a * c$$

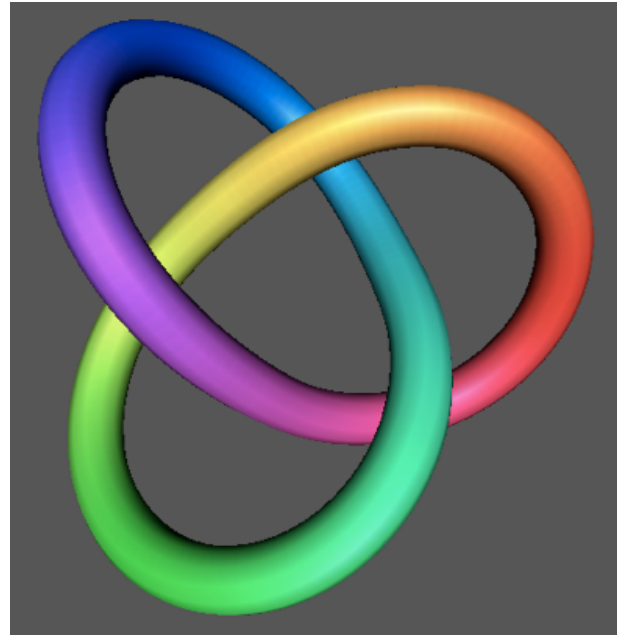
$$c = b * a$$

$$a = c * b$$



$$z = x * y$$

# Self-Mutuality and Fundamental Triplicity



# Describing Describing

\*

1\*

111\*

311\*

13211\*

111312211\*

311311222111\*

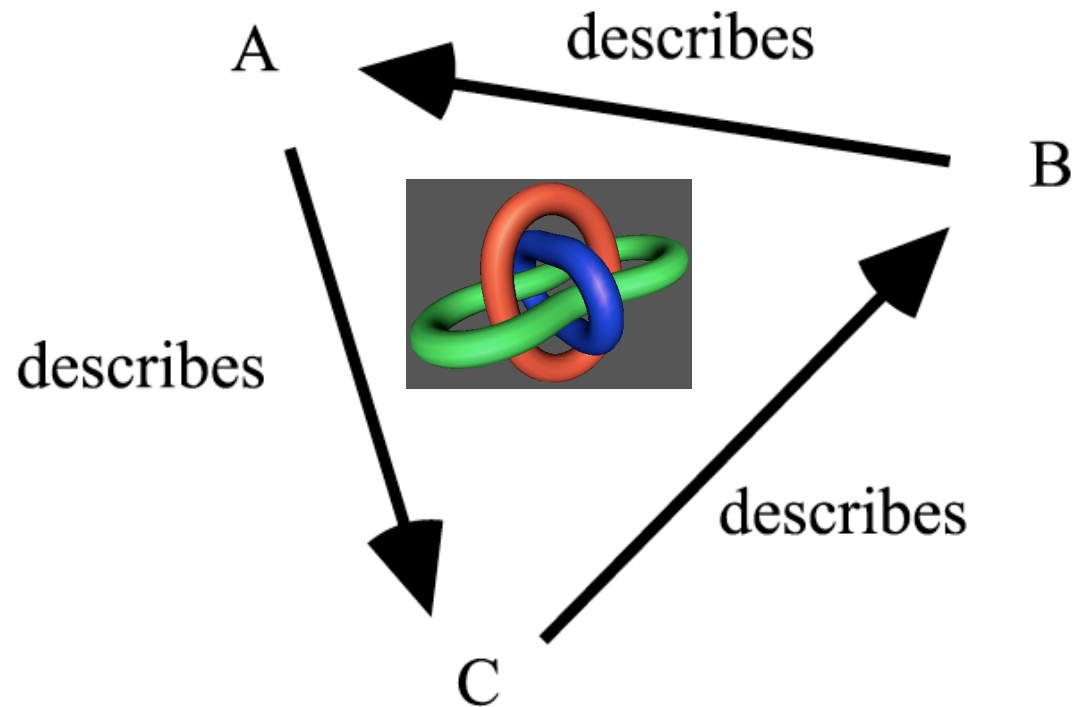
1321132132311\*

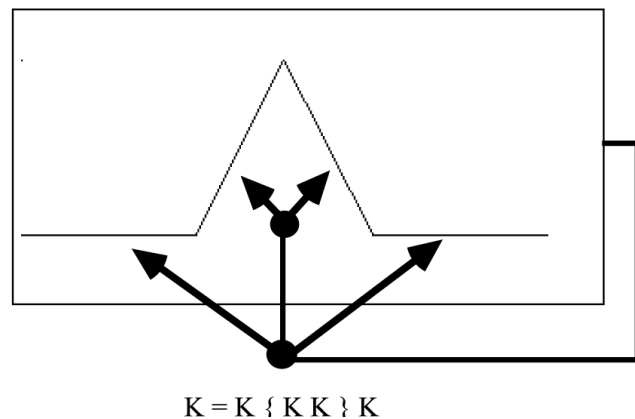
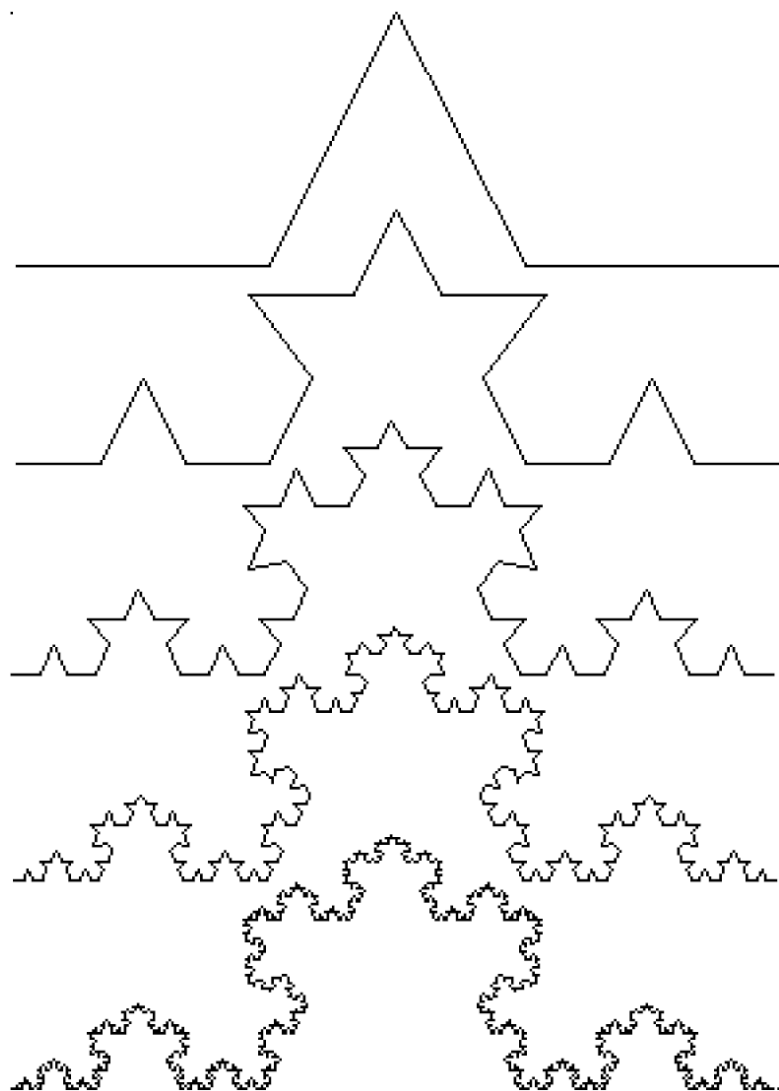
11131221131211131213211\*

$A = 11131221131211132221\dots$

$B = 3113112221131112311332\dots$

$C = 132113213221133112132123\dots$

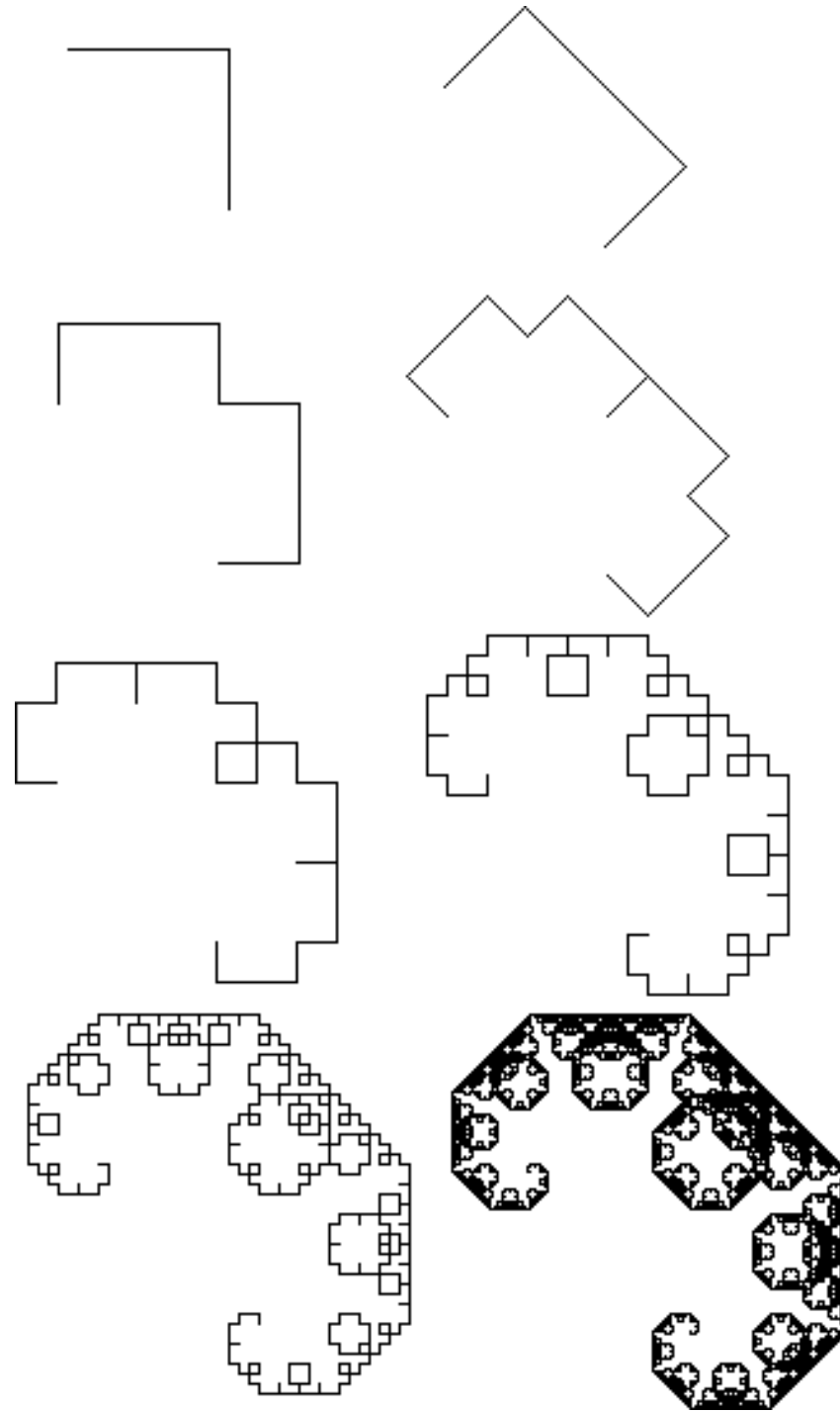


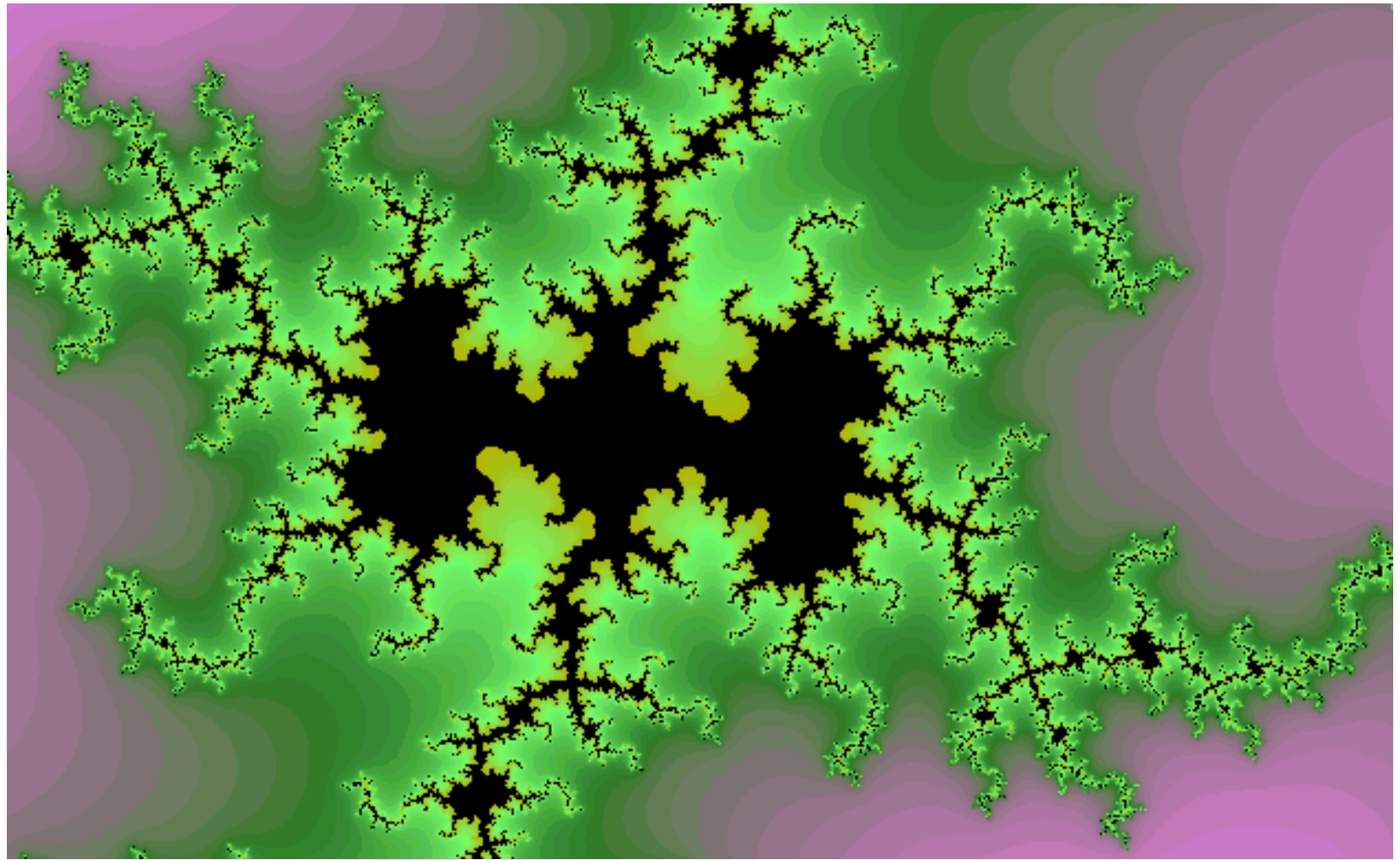


$$K = K \{ K K \} K$$

The Framing of  
Imaginary Space.

# Fractal Re-entering Mark





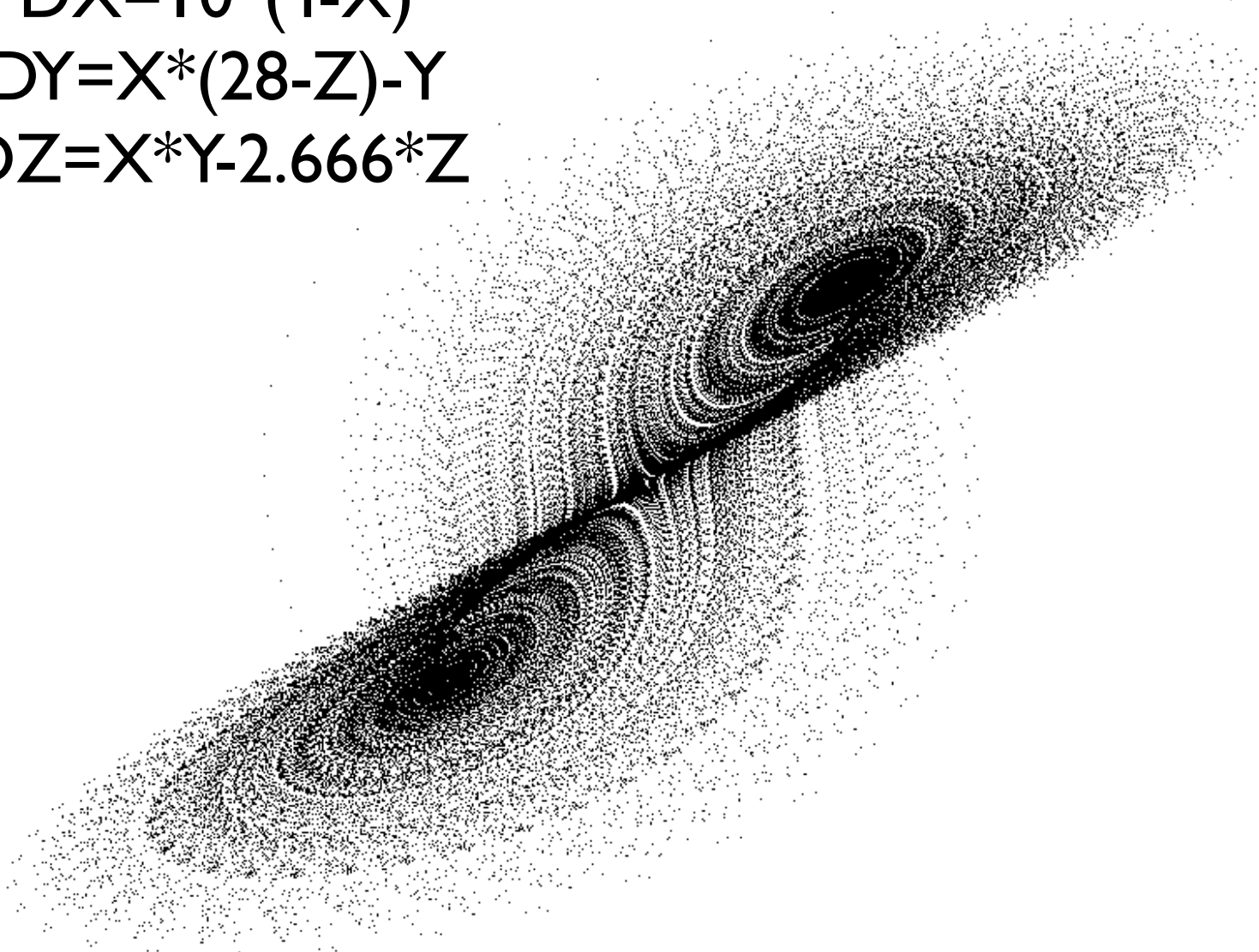


# Lorenz EigenForm

$$DX=10*(Y-X)$$

$$DY=X*(28-Z)-Y$$

$$DZ=X*Y-2.666*Z$$



# THE INDICATIVE SHIFT

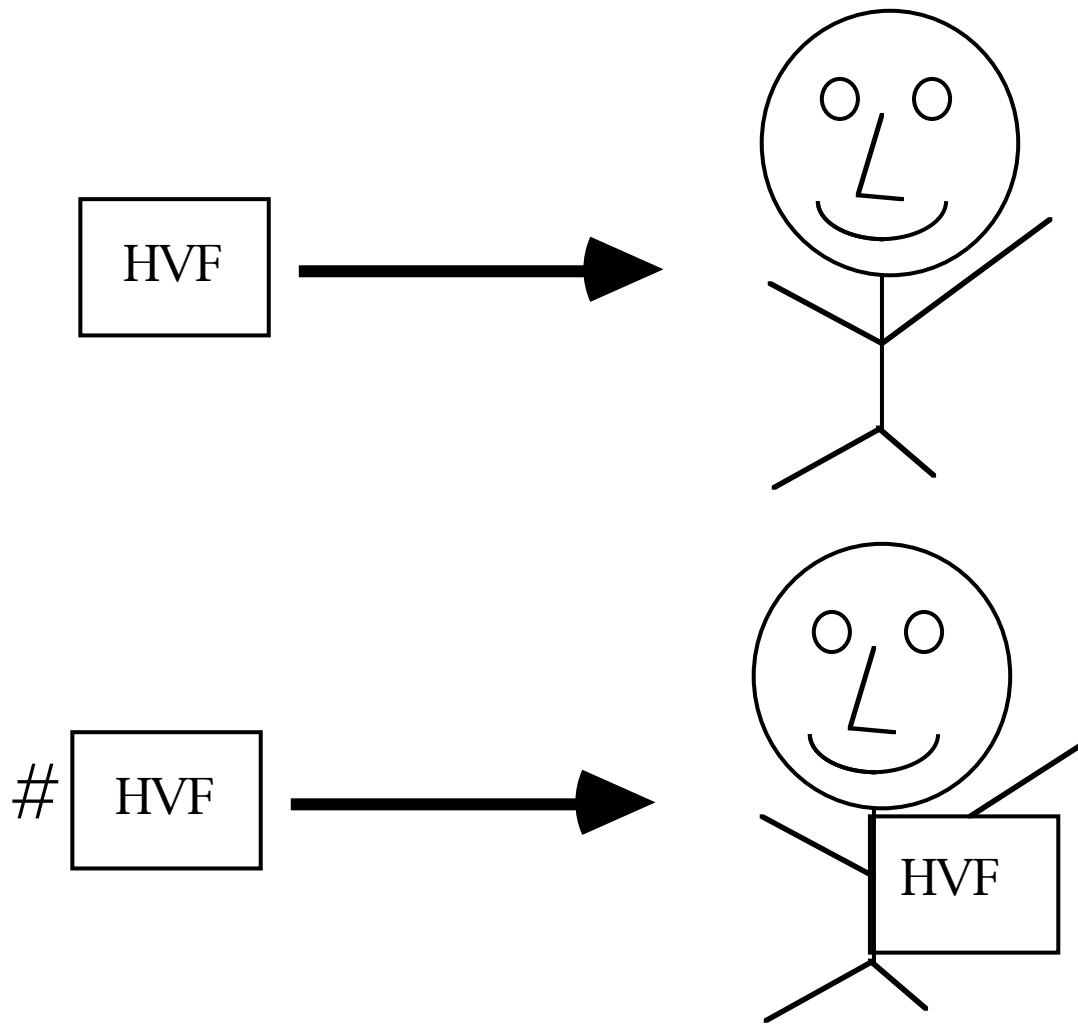
A → B  
#A → BA

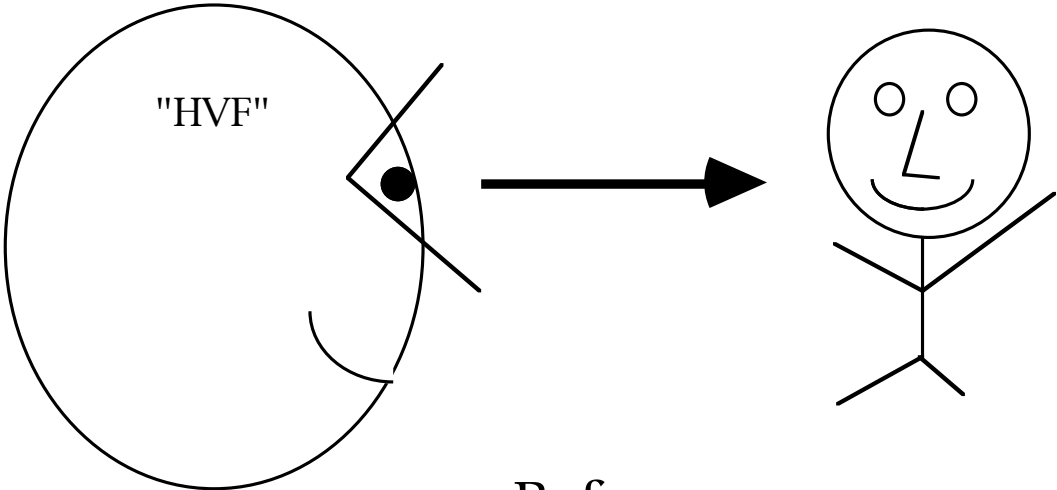
name → object  
#name → object name

→  
# →  
## → #  
### → ###

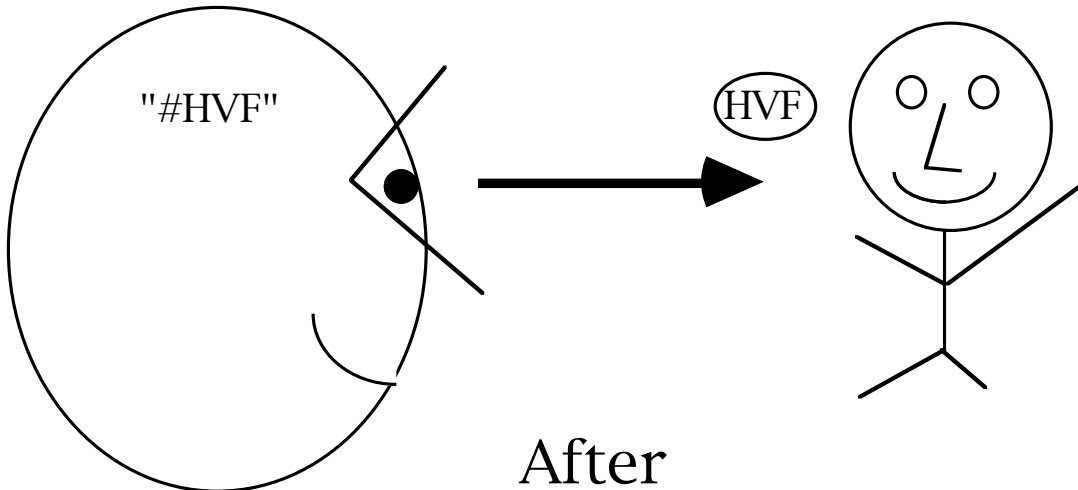
Eigenvalue Occurs  
At the Third Departure from Void.

# The Indicative Shift





Before



After

$M \longrightarrow \#$

$\# M \longrightarrow \# M$

$\#$  is the operation of observing.

$\#M \longrightarrow \#M$

is the act of observing observing.

“ I am the  
Observed link  
Between myself  
And  
Observing myself.”

## Goedelian Shift

$g \longrightarrow F\#$

$\#g \longrightarrow F\#g$

$F\#g$  talks about its own name.

The pattern behind Goedel's Theorem

where a

Sentence states its own

Uprovability within a given

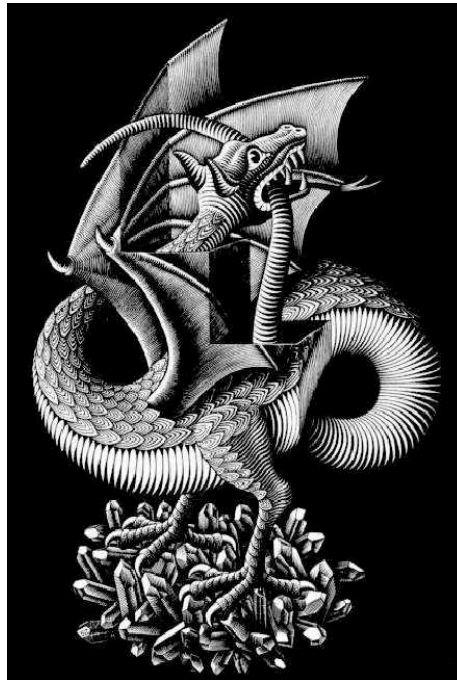
consistent

Formal System. The Sentence is True

Yet Unprovable within that System.

# Goedelian Shift

$$\begin{array}{l} g \longrightarrow \sim B\# \\ \#g \longrightarrow \sim B\#g \end{array}$$



$\sim B\#g$  states  
its own  
unprovability.

## Rules of the Small Machine

- 1 The SM is a box with a button on it. When you press the button, SM prints a “word” consisting in two consecutive letters on card, and emits the card from a slot on its side. Nothing, other than these two letters, is printed on the card.
- 2 SM uses an alphabet consisting in two letters { N, R }. Thus the words that SM might print are { NR, RN, NN, RR }.
- 3 Letting X denote a second letter (X is either R or N) then the words NX and RX each have a specific meaning:

*NX means that the Machine can not print XX.*

*RX means that the Machine can print XX.*

- 4 The Machine always tells the truth. Thus if SM should print NX then it will never print XX. If SM should print RX then it can print XX (and may do so or may have already done so).



# Hidden Repetition

$$\begin{array}{ccc} g & \longrightarrow & A \\ \#g & \longrightarrow & Ag \end{array}$$

Replace the arrow by an equals sign:

$$\begin{array}{ccc} g = A & & \#g = gg \\ \#g = Ag & & \end{array}$$

$$\begin{array}{ccc} g & \longrightarrow & F\# & & g = F\# \\ \#g & \longrightarrow & F\#g & & \#g = F\#g \end{array}$$

$\#g$  is an Eigenform for  $F$ .

# Paradox and Time

$$J = \sim J$$

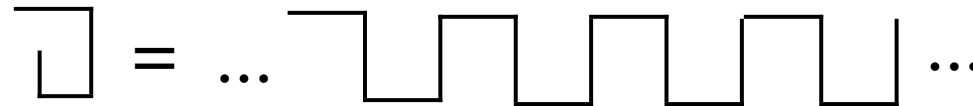
J: ...TFTFTFTFTFTF...

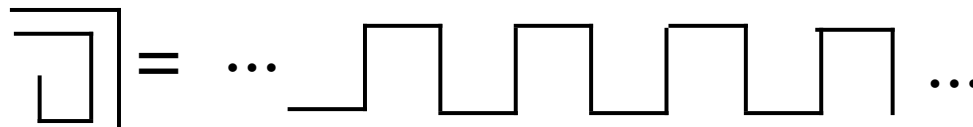
$\sim J$ : ...FTFTFTFTFTFT...

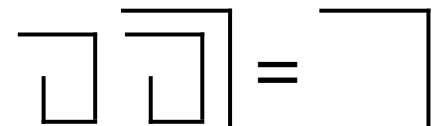
F OR T = T

Therefore

J OR  $\sim J$  = T.







Are the two conditions

$$\overline{\overline{A}} = A$$

and

$$\overline{A \overline{A}} = \overline{\overline{A}}$$

Logically Contradictory?

Flagg Resolution:

There is only one  $\overline{A}$  .

All appearances of  $\overline{A}$  in a  
given Text

Must be altered together  
or not at all.

## Non-Locality in the Text

The Flagg resolution  
allows the entry of eigenforms into our  
discourse without having to change the  
essential forms of reasoning.

This, at the cost of  
“textual non-locality”.



The Universe is undoubtedly  
Indistinguishable from Itself.

$$\square = \dots \square \square \square \square \dots$$

$$\overline{\square} = \square \quad (\text{all by itself})$$

And yet, a Distinction  
arises in Mutuality.

$$\square = \dots \square \square \square \square \dots$$

$$\overline{\square} = \dots \square \square \square \square \dots$$

$$\square \overline{\square} = \square$$

Eigenforms such as

$$J = \sim J$$

could well

be called

Imaginary values.

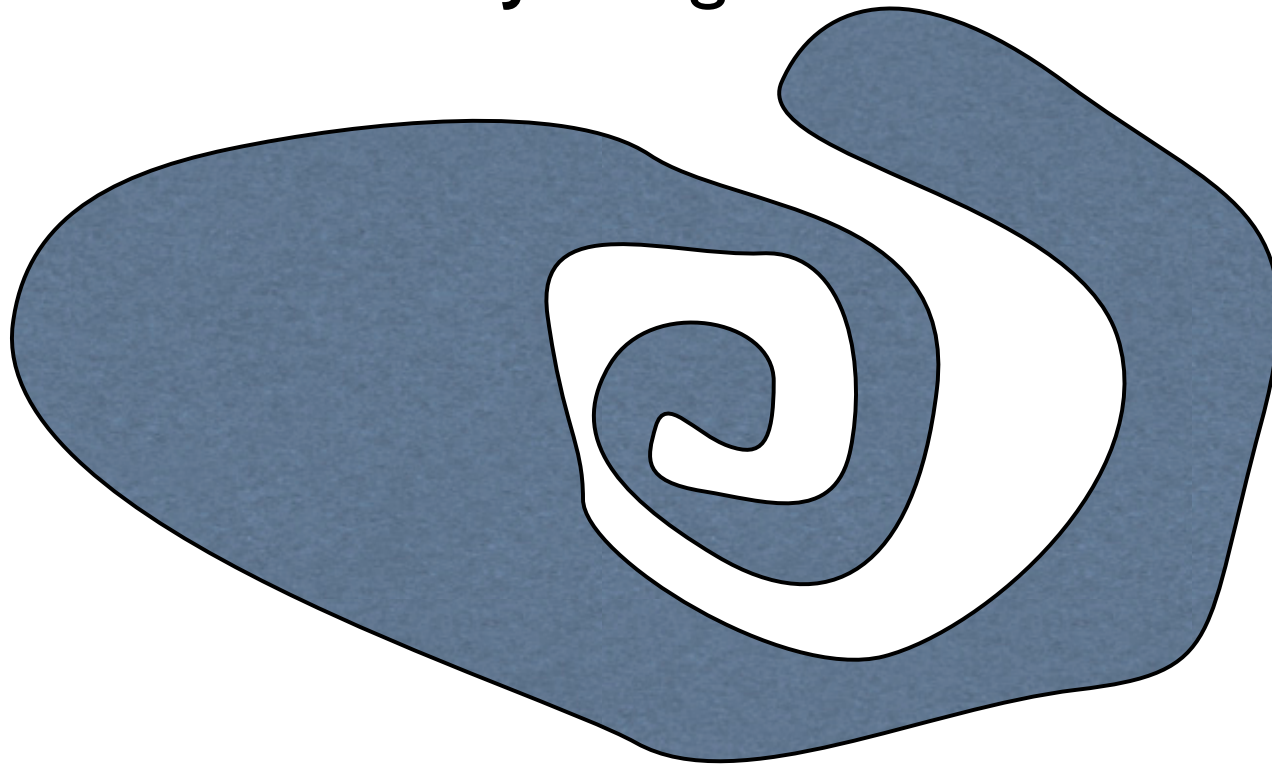
Let us not forget the  
primordial imaginary value,  
the act of (making) a  
distinction.



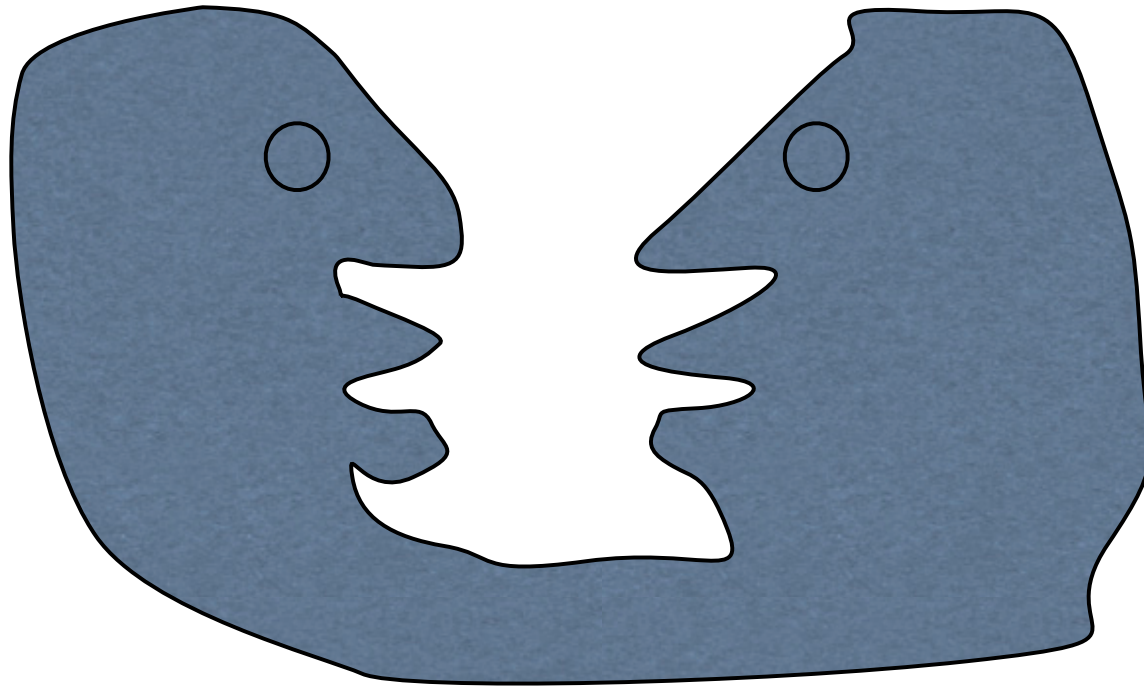
Only the Imaginary is Real.

The universe that we know  
Comes into being  
Through Imagination  
and Observation  
Bringing forth  
A world of distinctions that  
we take to be  
Real.

The art of distinction is  
Inseparable from  
The art of  
Joining.







In order for a universe to come into being the world must act to divide itself into one part that is seen and another part that sees.

Quality, Love  
Reality, Imagination, and  
Discrimination  
are Inseparable.

What IS  
is identical  
In Form  
with  
What is not.

The Form  
we take to exist  
arises from  
framing  
Nothing.

