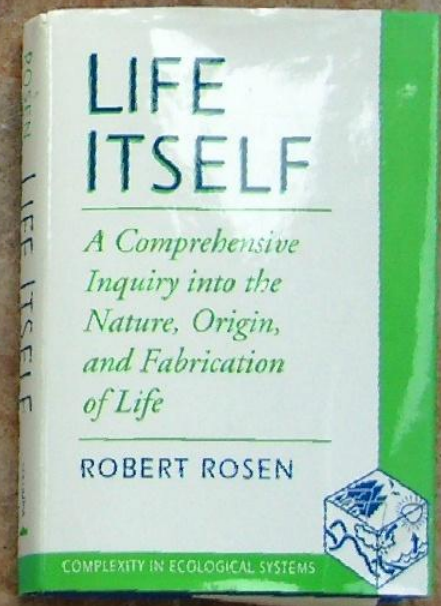
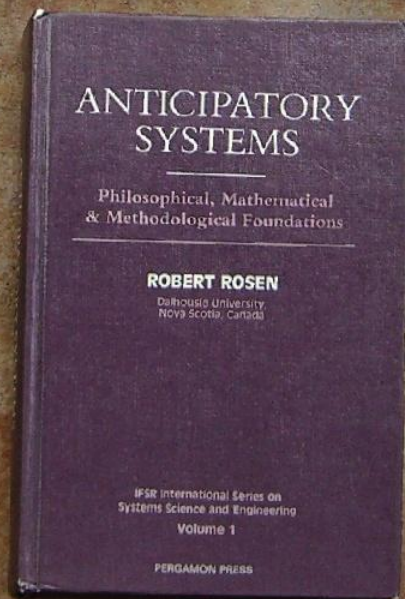
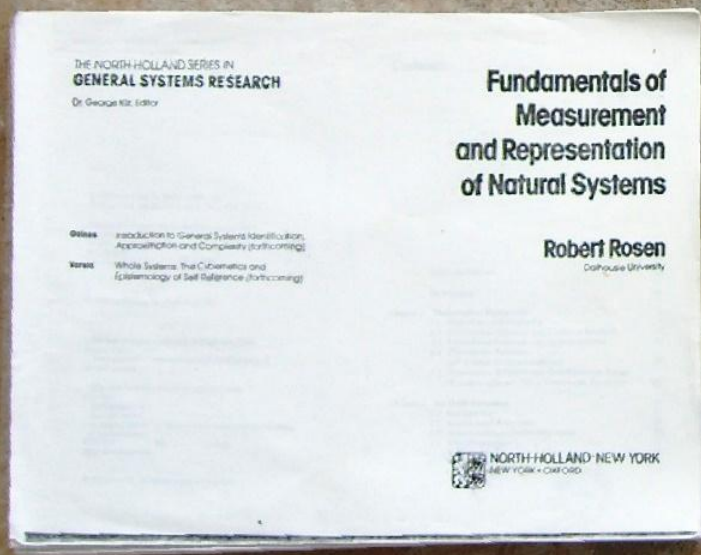
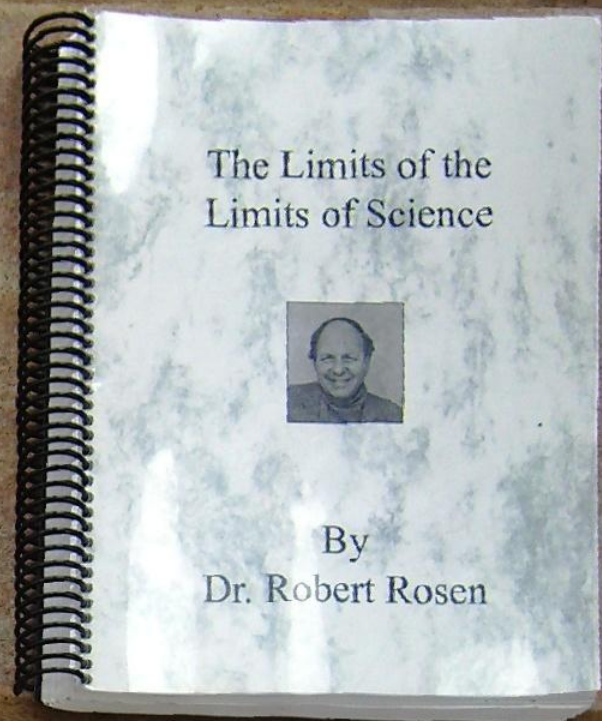
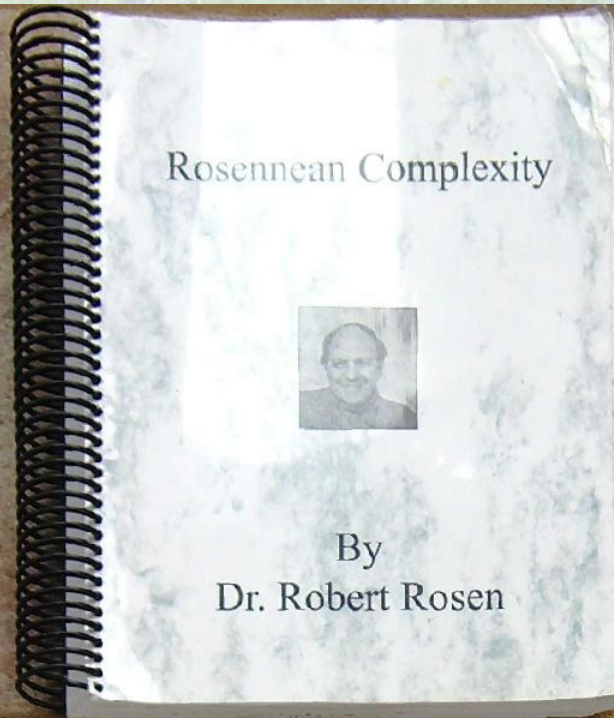
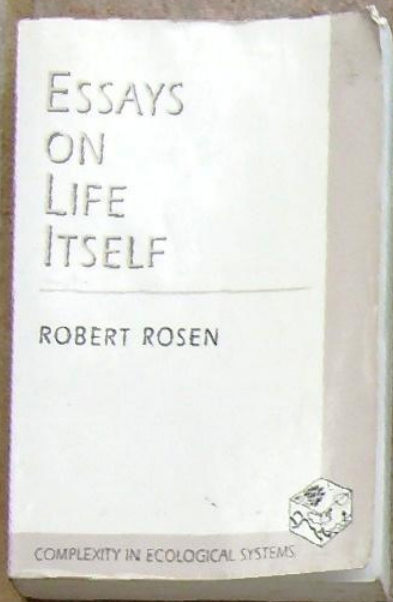


INCOSE Webinar:

Foundations of Relational Complexity Theory

Dr. John J. Kineman

University of Colorado
Ashoka Trust for Research in Ecology and Environment
Sri Sathya Sai University
Center for Ecological Studies
ArcProspect
Nexial Institute



Papers

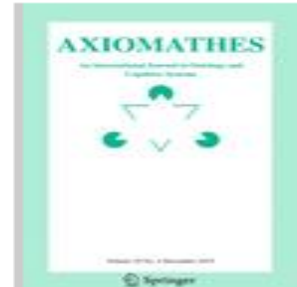
Kineman, J.J. (2011). "Relational Theory: A Synthesis". *Axiomathes* 21 (3):393-437.

Kineman, J.J. (2011). "R-Theory", in: *Anticipatory Systems: Philosophical, Mathematical, and Methodological Foundations*. Second Edition (with contributed chapters by J. Rosen, M. Nadin, and J. Kineman).

Kineman, J.J. (in prep). "*Relational Space-Time: A Naïve Theoretical Solution to Cosmological Gravity and Variation of the Hubble Parameter*". Invited paper: *Axiomathes*.

AXIOMATHES

DOI: 10.1007/s10516-011-9154-z



INVITED PAPER

Relational Science: A Synthesis

John J. Kineman

Download PDF (892.7 KB)

<http://www.springerlink.com/content/4n5705051262323h/fulltext.pdf>

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SPRINGER

Anticipatory Systems:

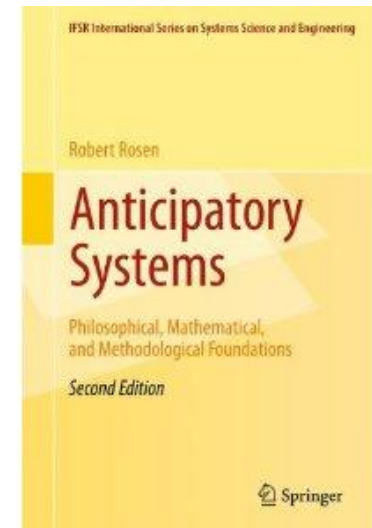
Philosophical, Mathematical, and Methodological Foundations (IFSR International Series on Systems Science and Engineering). Springer. 2011.

[Robert Rosen \(Author\).](#)

[Judith Rosen \(Contributor\).](#)

[John J. Kineman \(Contributor\).](#)

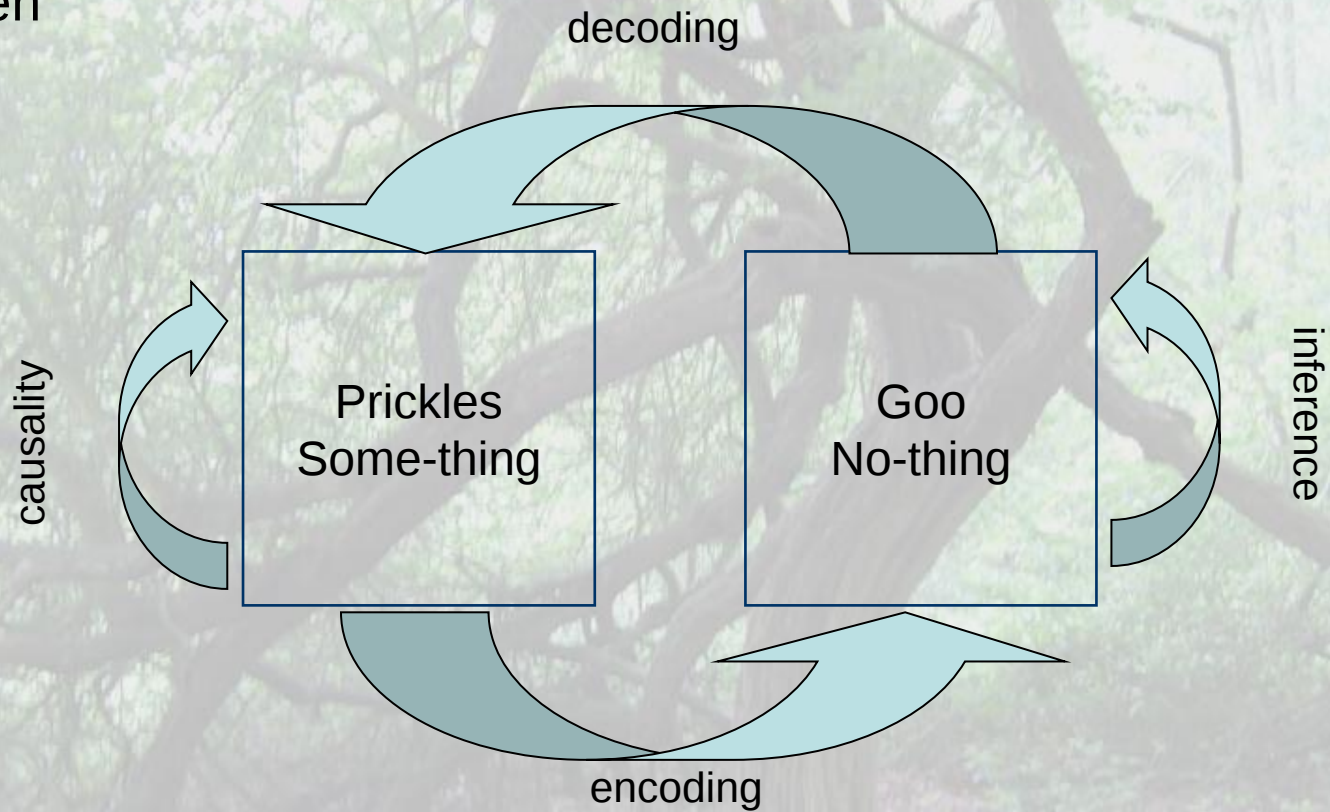
[Mihai Nadin \(Contributor\)](#)





Modeling Relation

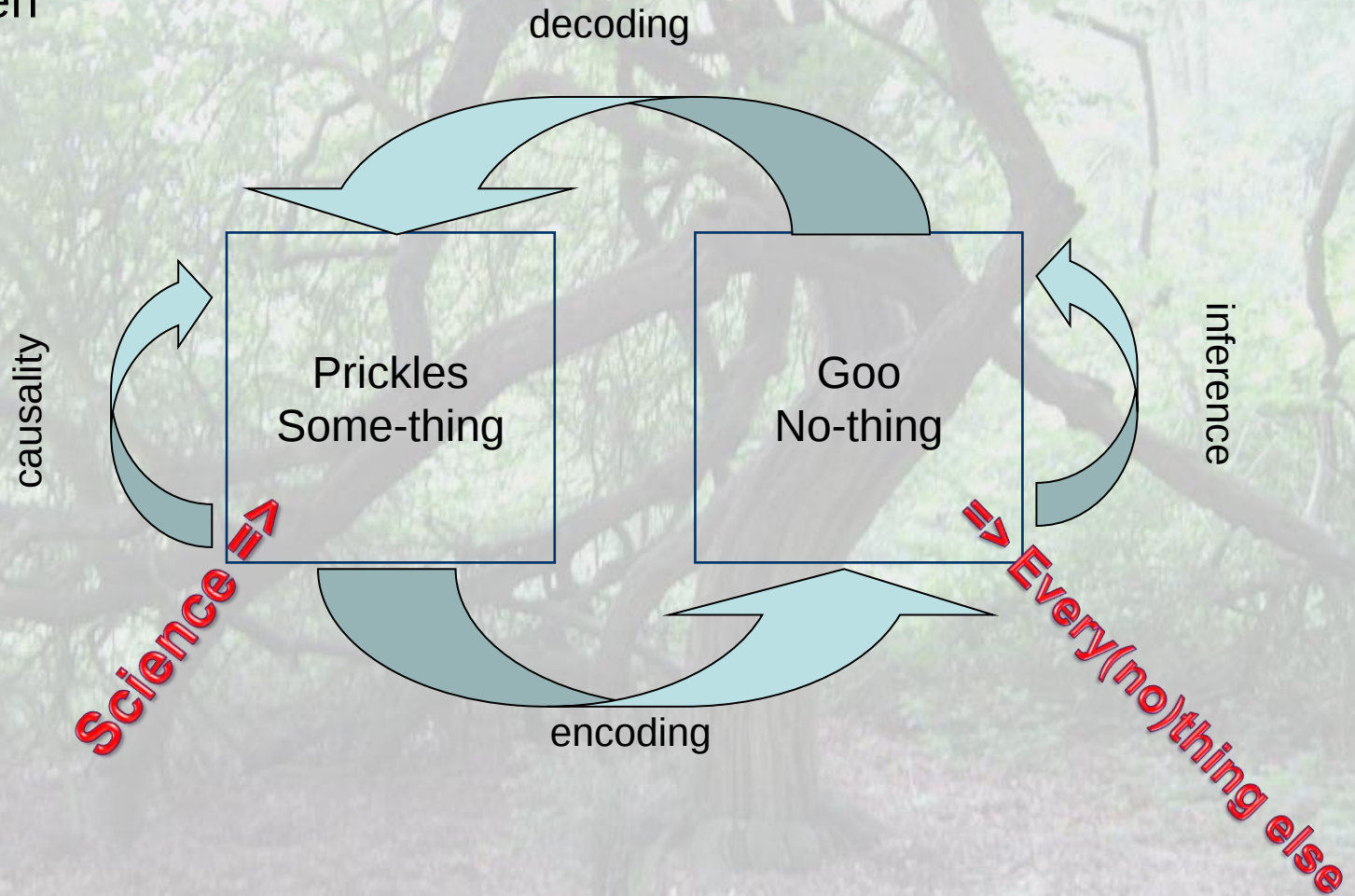
Robert Rosen





Classical Western View

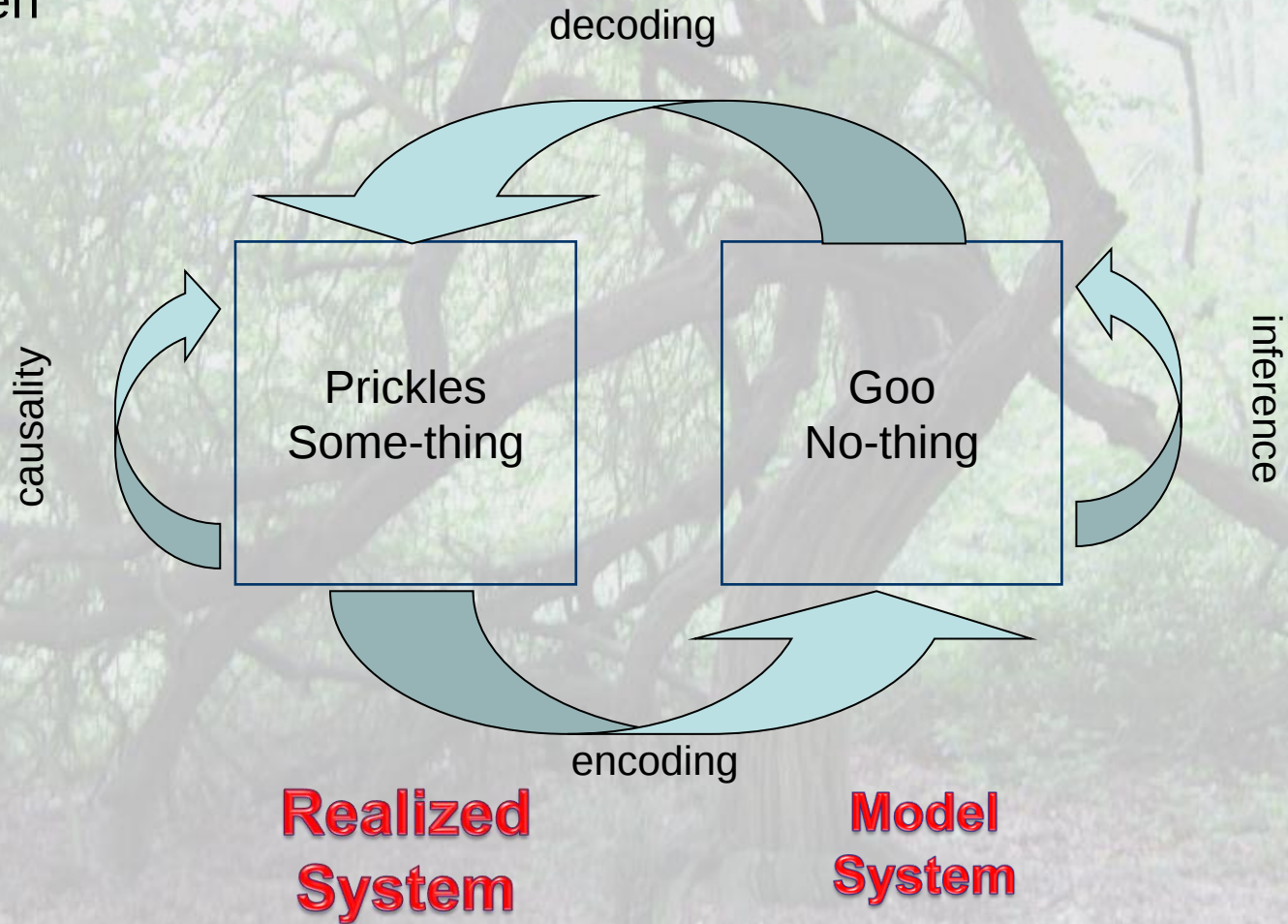
Robert Rosen



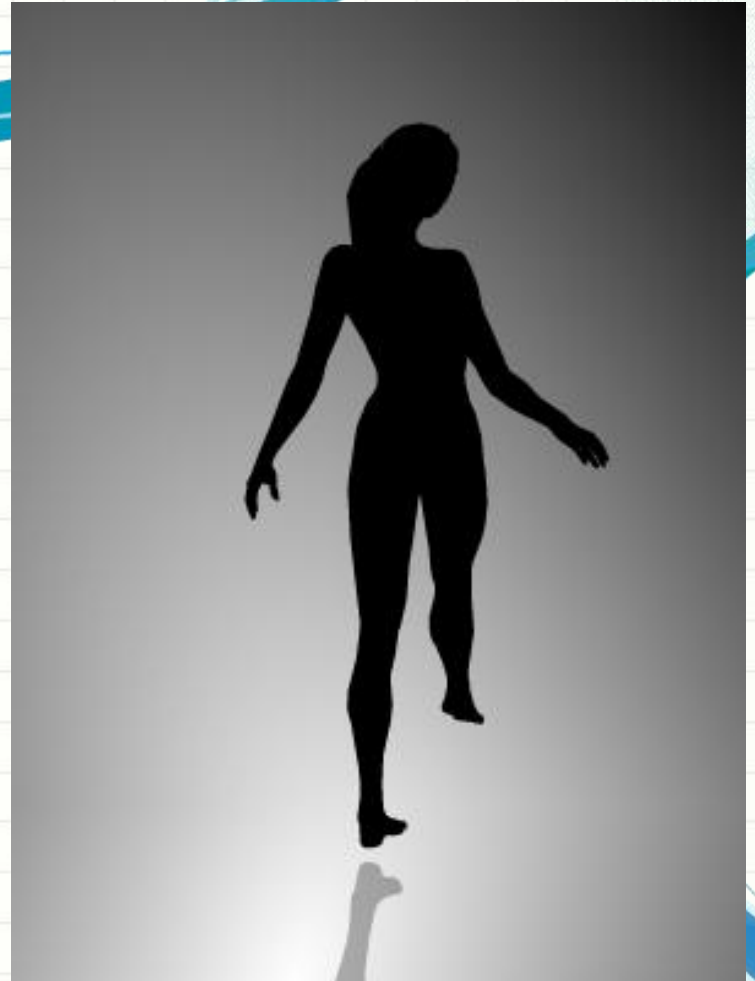
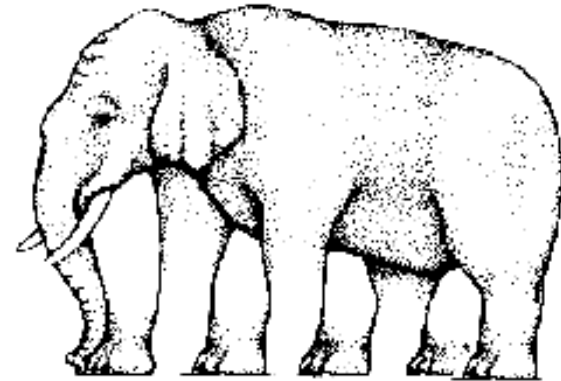


Relational View

Robert Rosen



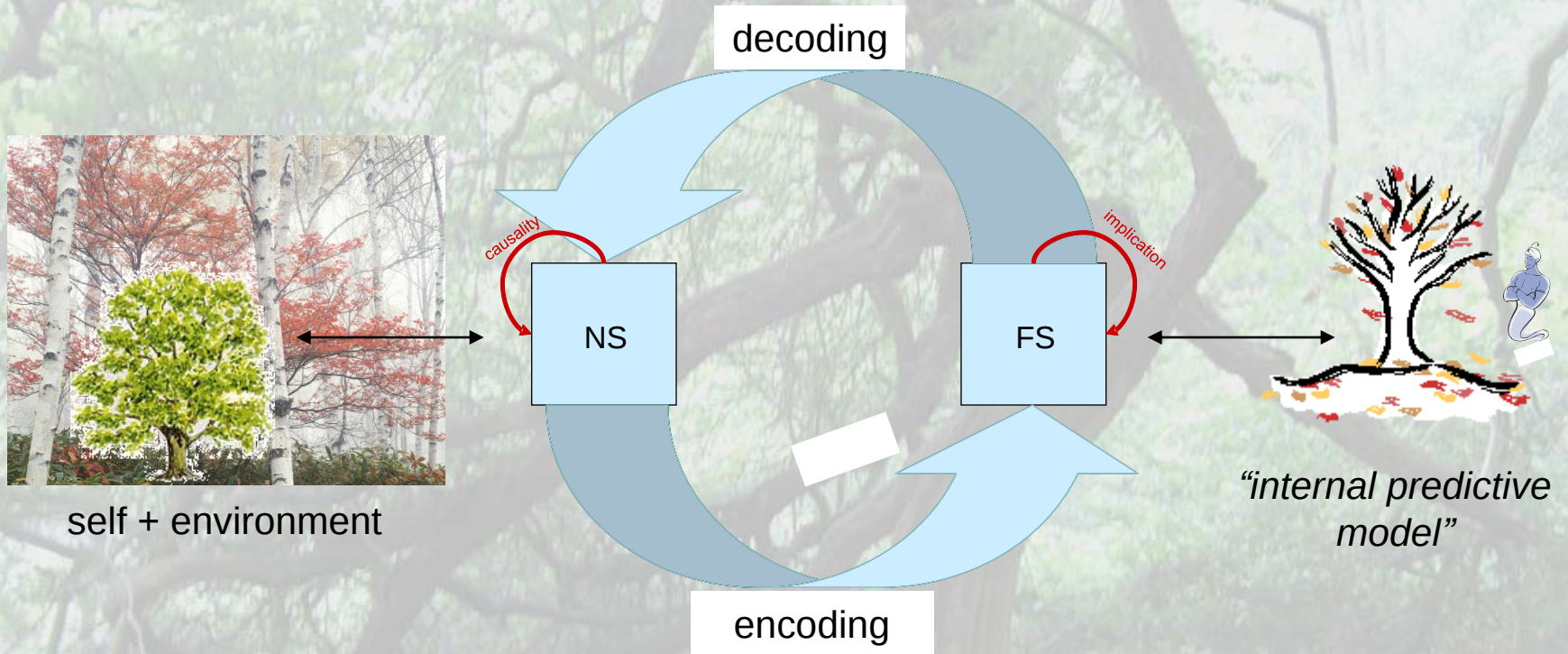
Model-dependent Reality?



<http://www.echalk.co.uk/amusements/OpticalIllusions/illusions.aspx>

http://www.michaelbach.de/ot/fcs_thompson-thatcher/index.html

Information IN Nature



Complex 'modeling relations' produce *'anticipatory systems'*

(Simple modeling relations produce reactionary, or mechanical systems)

The Hawking Paradox

BOOK EXCERPT

Stephen Hawking Asks, What Is Reality?

By STEPHEN HAWKING AND LEONARD MLODINOW Friday, Sept. 10, 2010

[M-Theory I](#) (0, 1:10)

[M-Theory V](#) (2:40-5:14)



[ENLARGE PHOTO+](#)

Stephen Hawking, co-author of *The Grand Design*
David Parry / PA / Landov

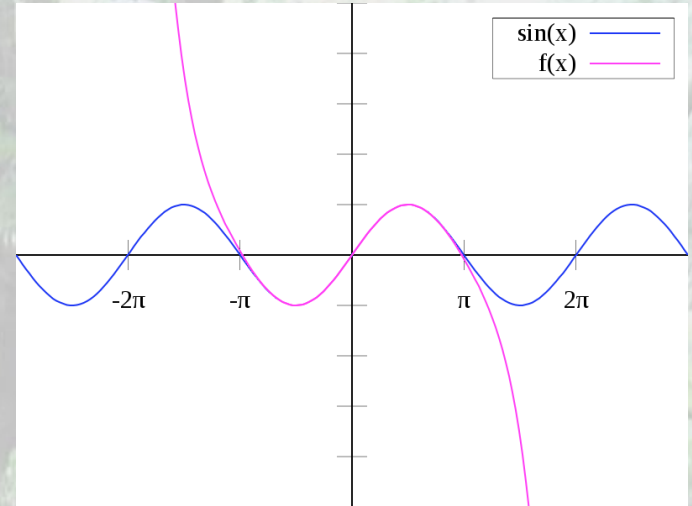
Rosen: *It takes an infinite regress of mechanisms to describe one complex relation.*

Two Ways of Describing the Same Thing

- Taylor Series:

e.g., Sine function for N=4:

$$\sin(x) \approx x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!}.$$



- Fourier Series:

$$\begin{aligned} f(x) &= \frac{a_0}{2} + \sum_{n=1}^{\infty} [a_n \cos(nx) + b_n \sin(nx)] \\ &= 2 \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n} \sin(nx), \quad \text{for } x - \pi \notin 2\pi\mathbb{Z}. \end{aligned}$$

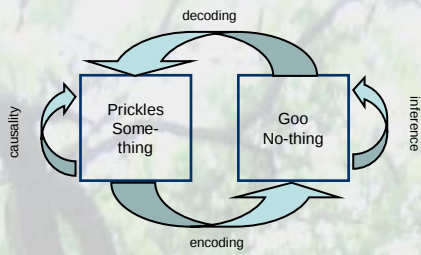


R-theory

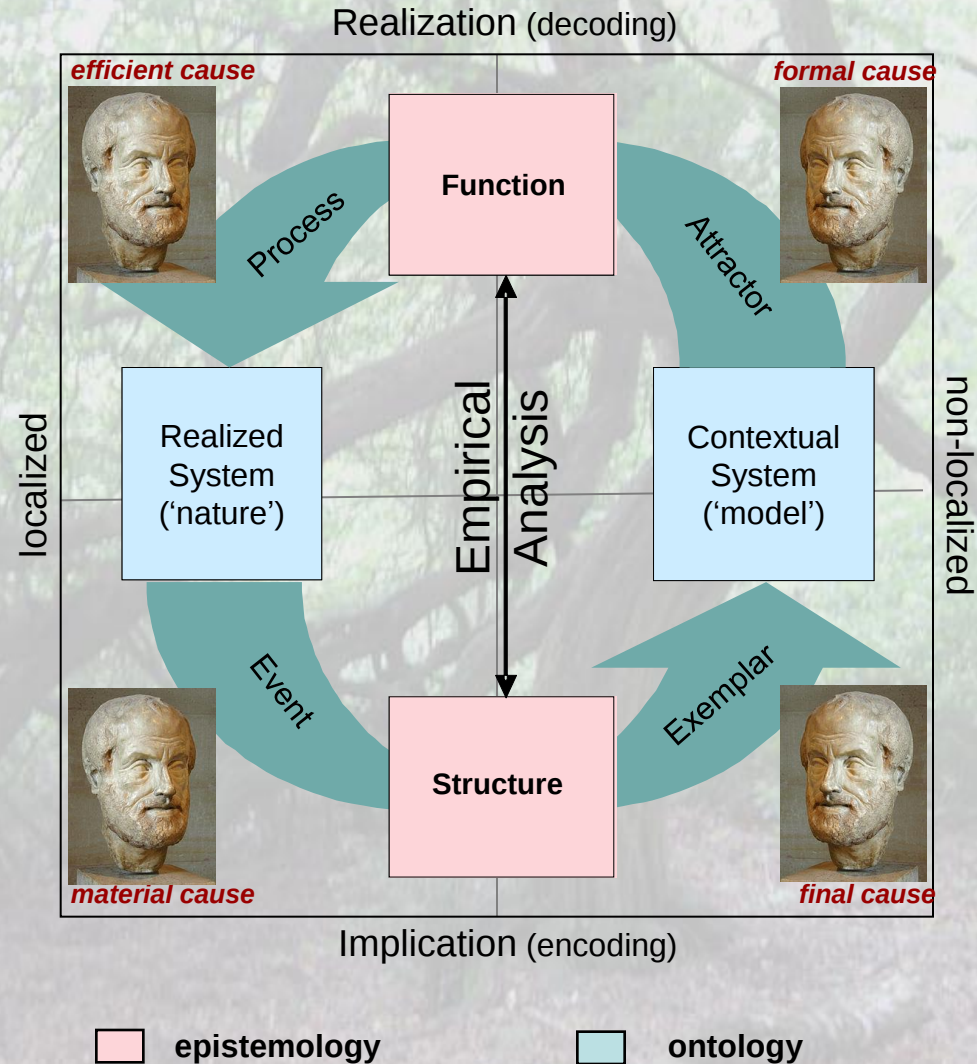
Nature is
Self-referential,
Self-Organizing

...And there are Mechanisms

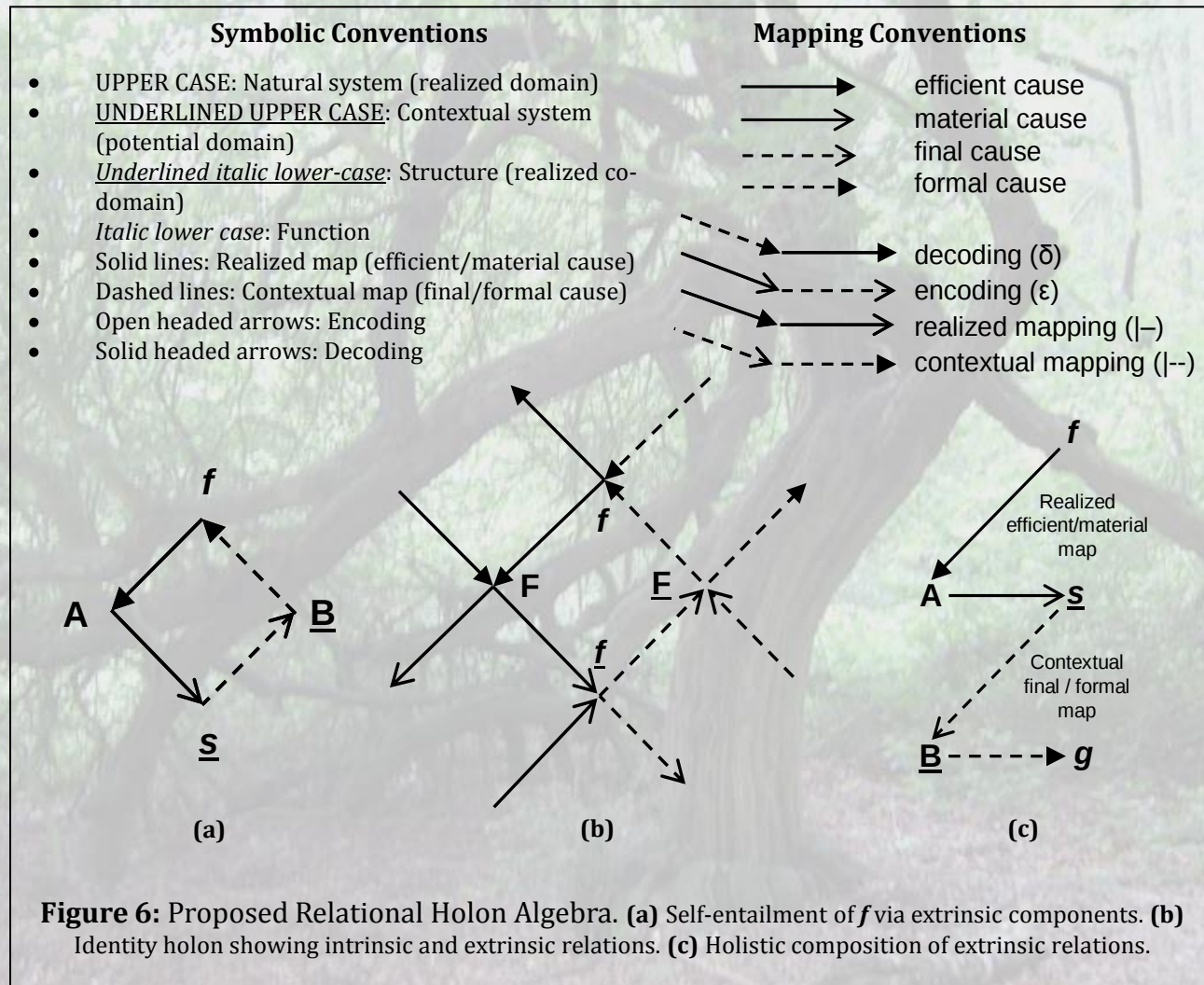
Audre 05



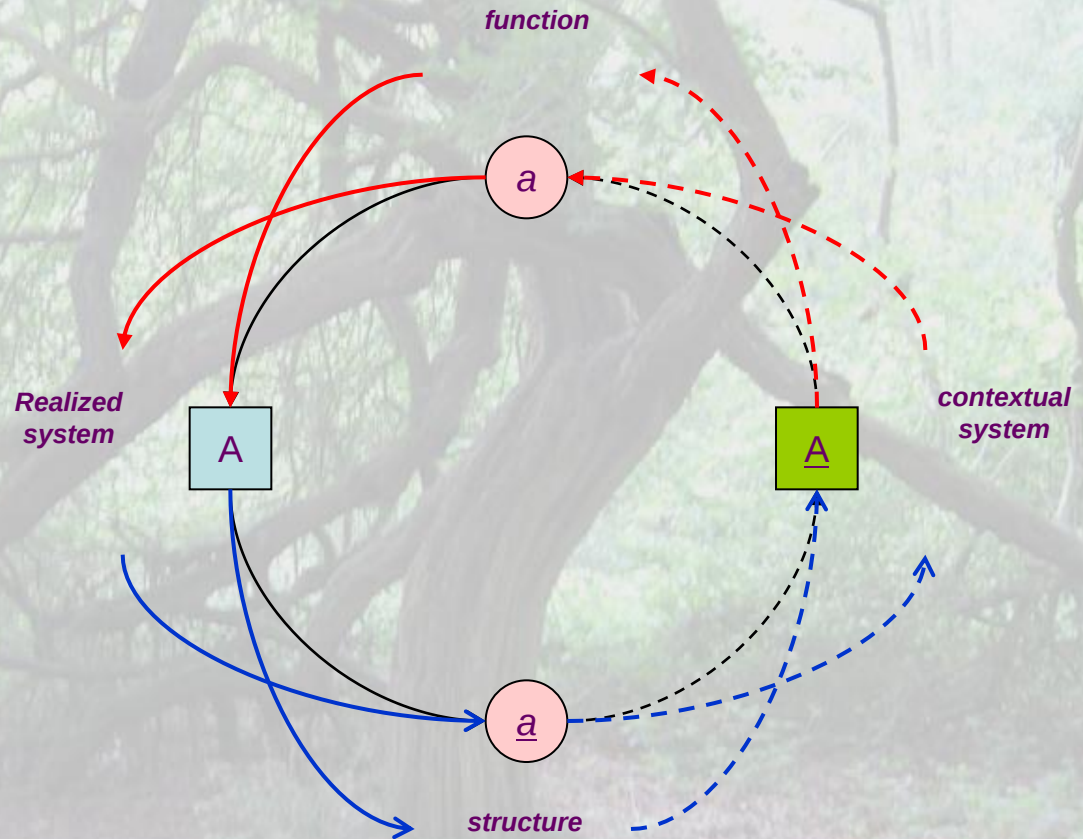
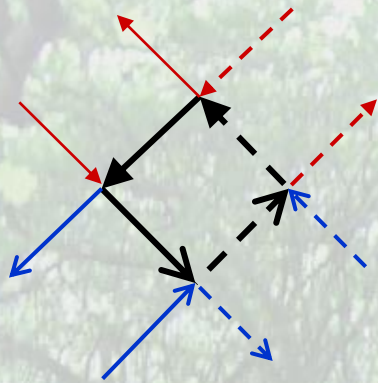
The Causal Holon



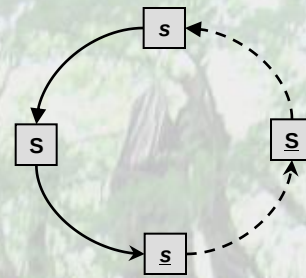
Relational Mapping (category theory)



How Holons Relate to Other Holons

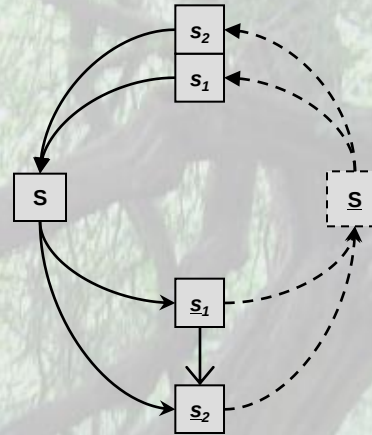


Types of closure

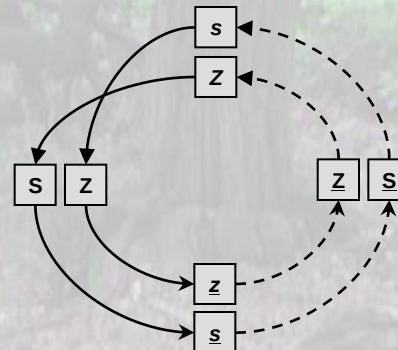


1st-order closure

Identity Holon for System 'S'



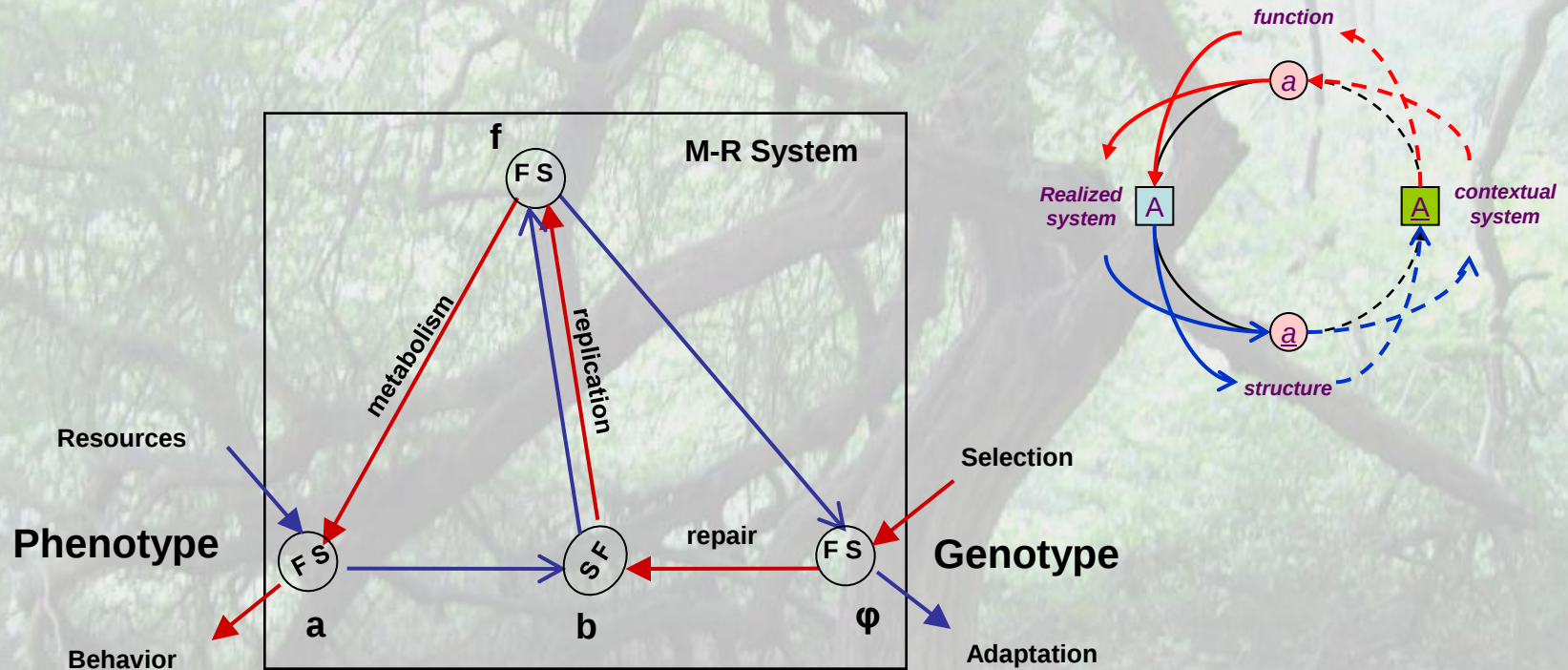
Sequential Composition



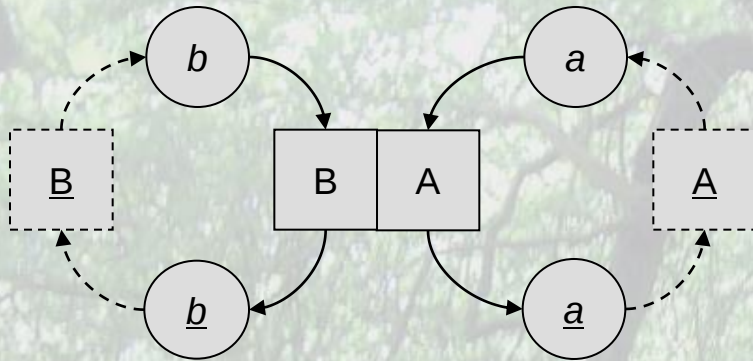
2nd-order closure

Recursive Hierarchical Composition
(two systems, S and Z)

Holon (Structure-Function) Analysis of Rosen's M-R System

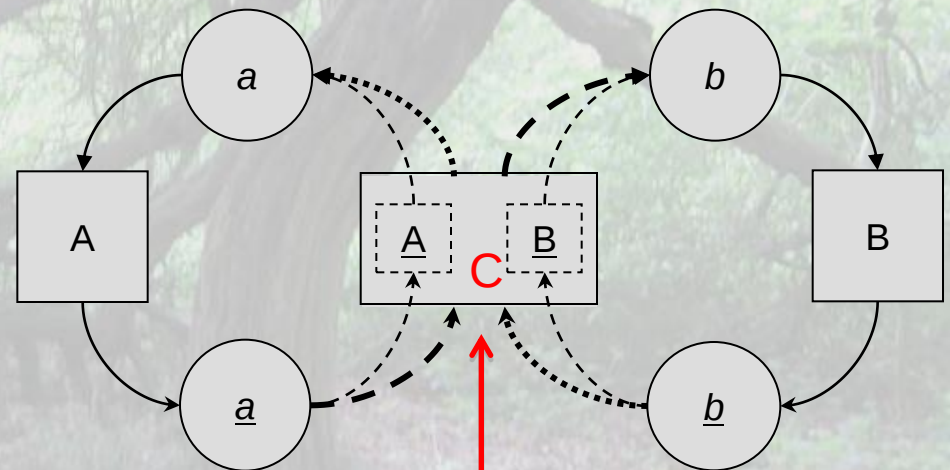


How Holons Combine

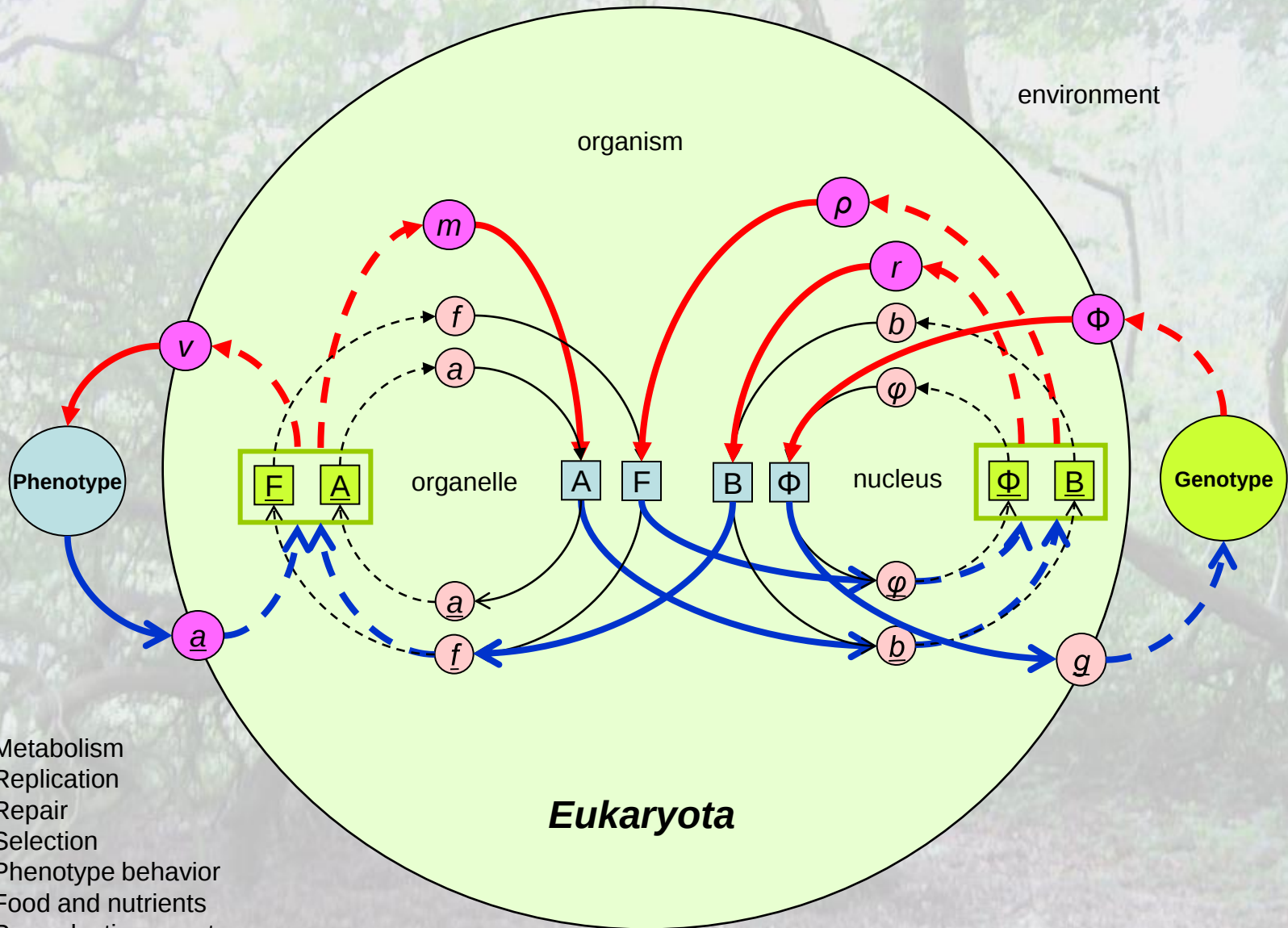


Combine Realizations

Combine Contexts

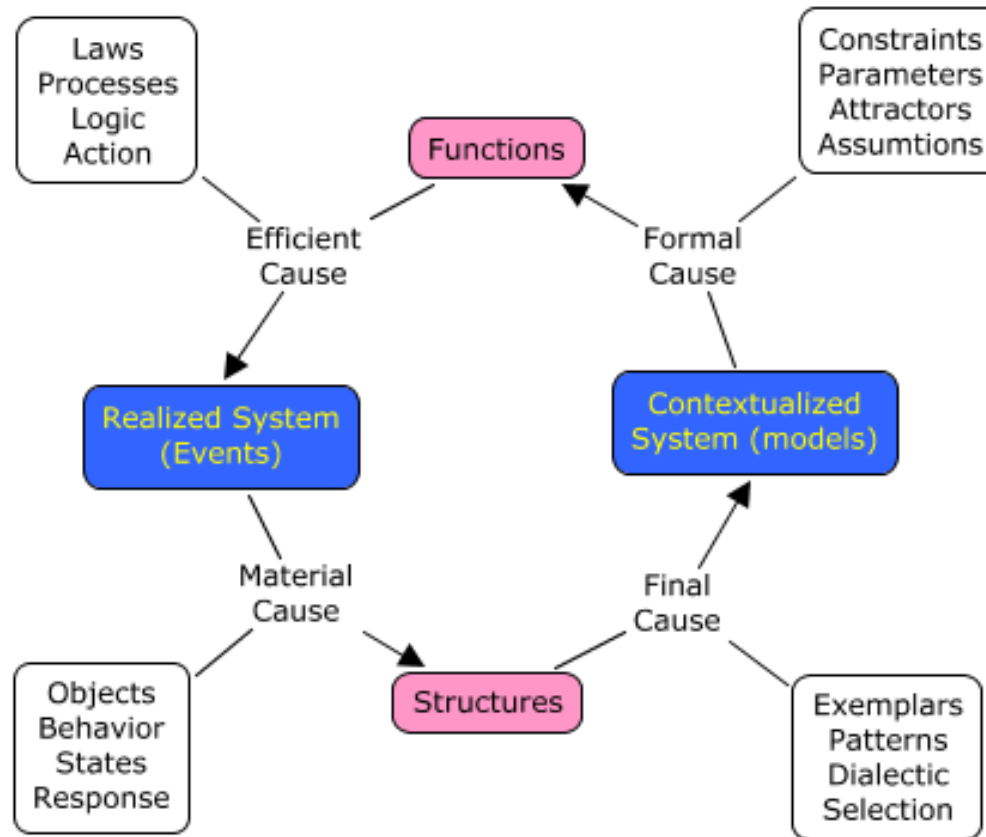


Emergence
Entropy reversal



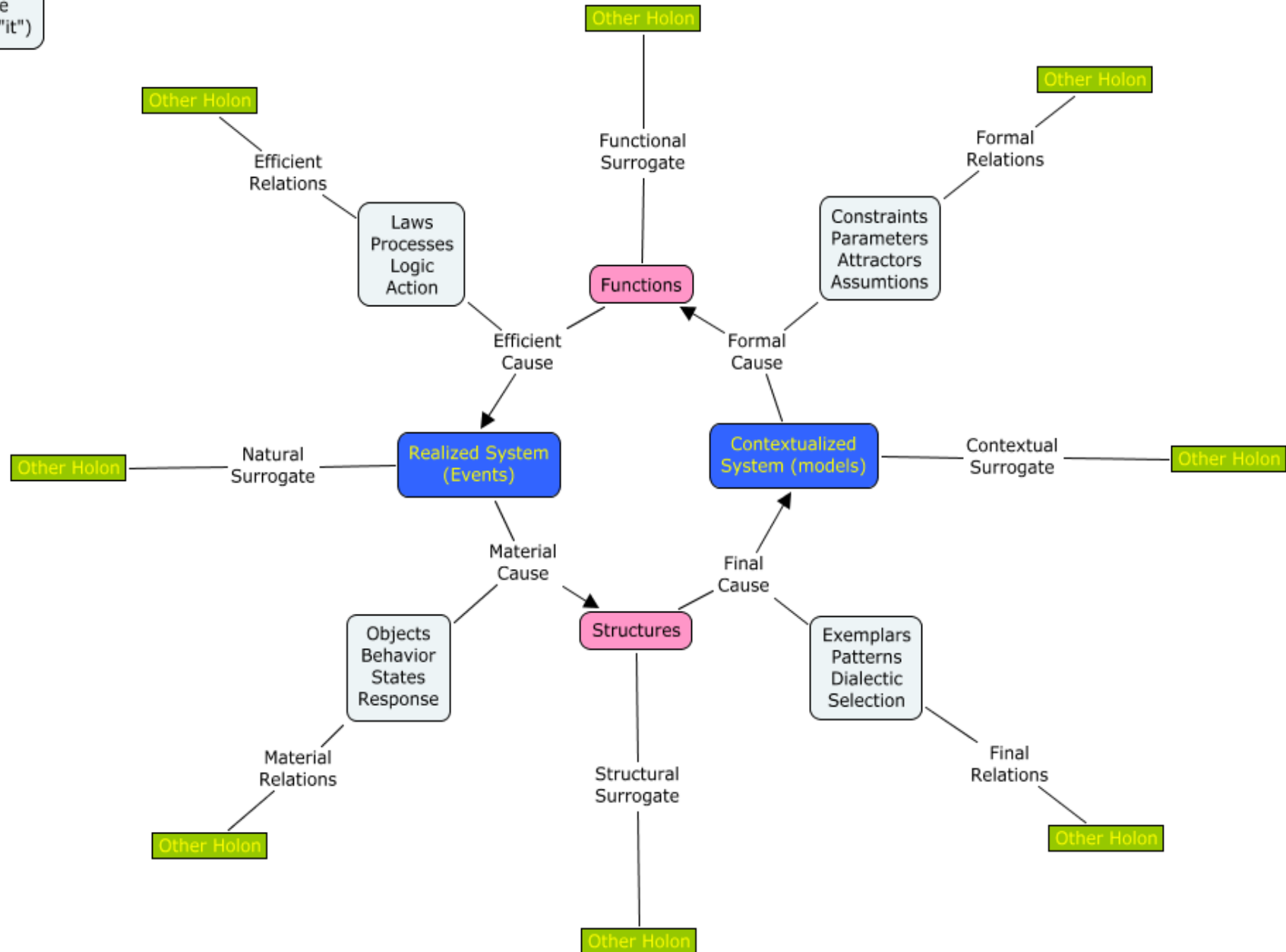
- m Metabolism
- ρ Replication
- r Repair
- g Selection
- v Phenotype behavior
- i Food and nutrients
- g Reproductive genotype
- ϕ Genetic code
- a Resources
- b, f Internal components

R-Theory Model
The Holon
Ways of Knowing
Whole System
Unit of Nature
(the proverbial "it")

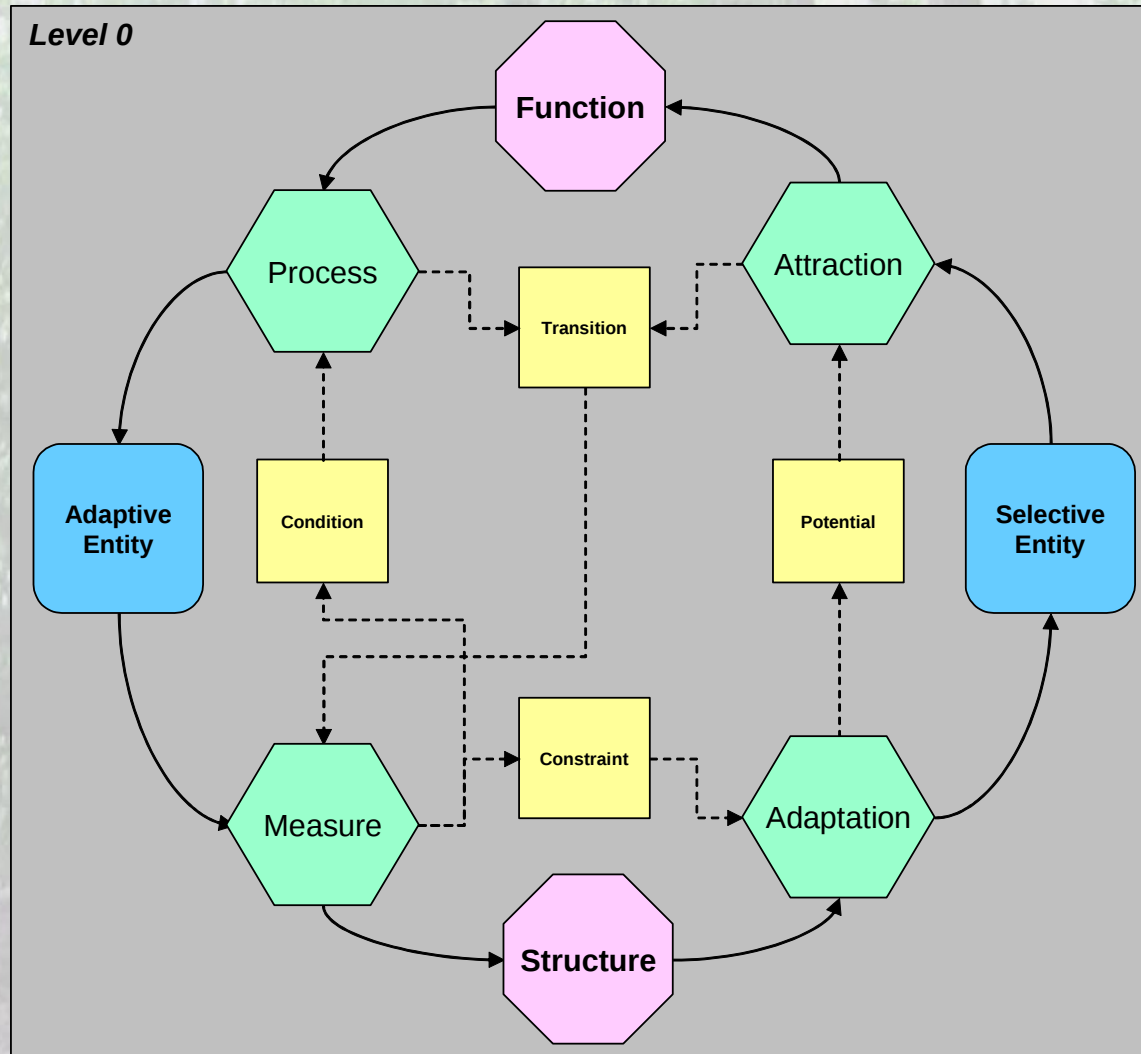


Informatics?

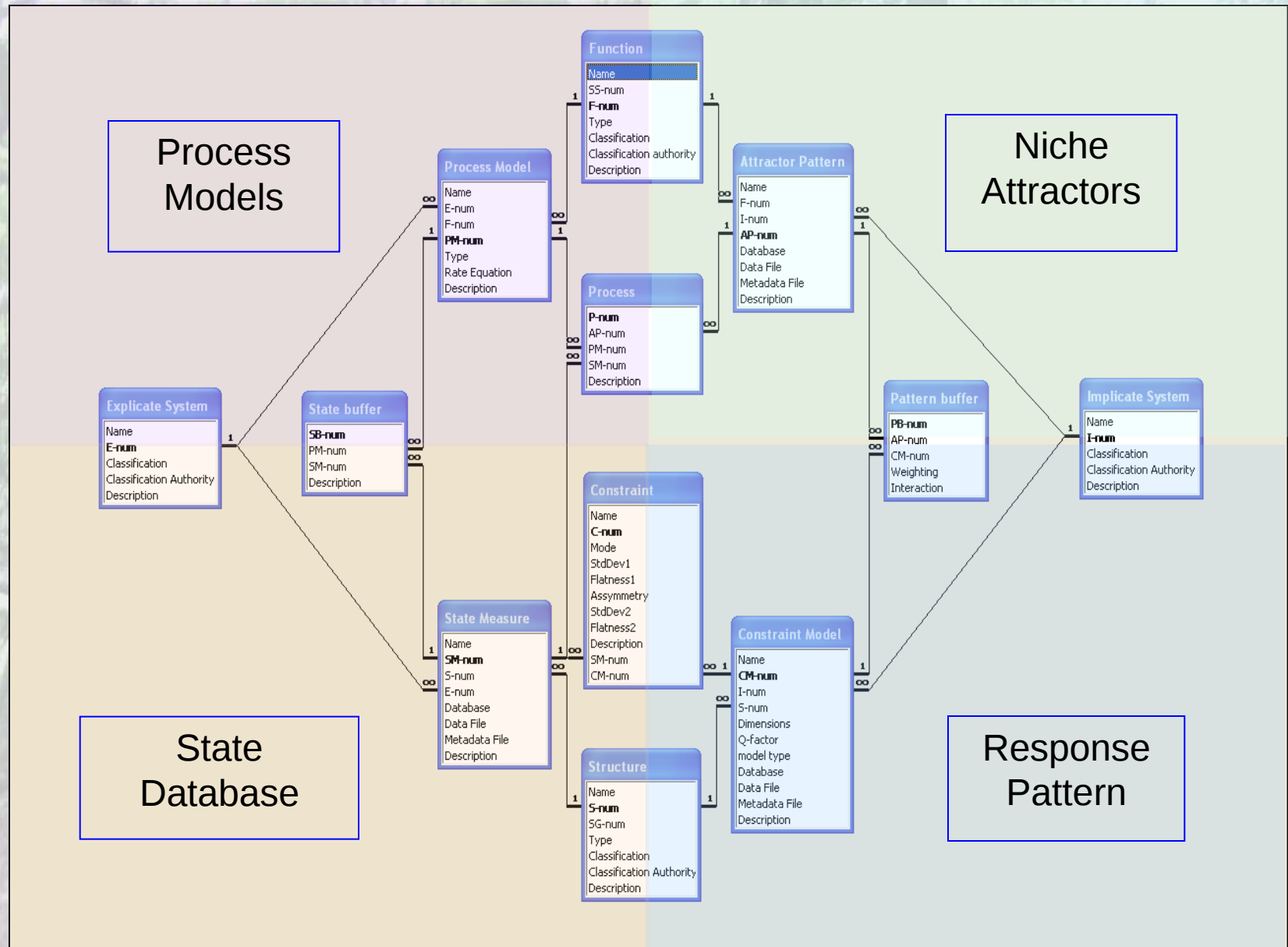
R-Theory Model
The Holon
Ways of Knowing
Whole System
Unit of Nature
(the proverbial "it")



Relational Informatics

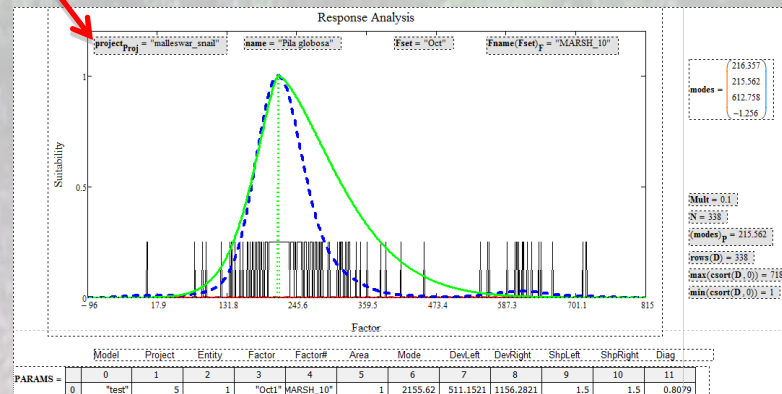
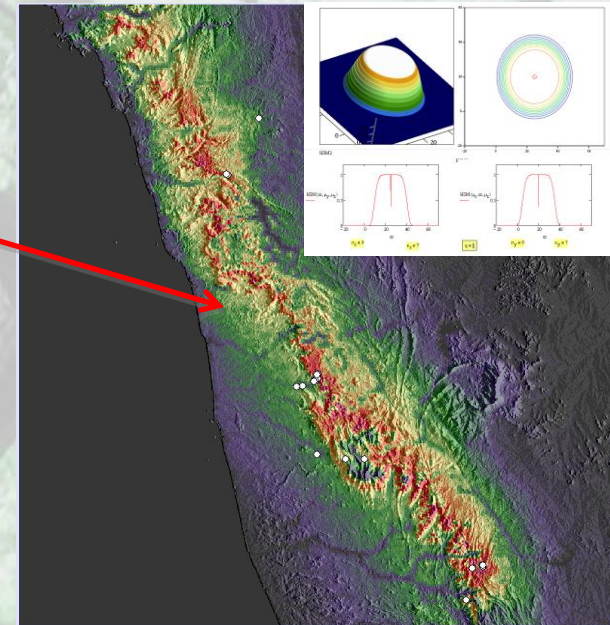
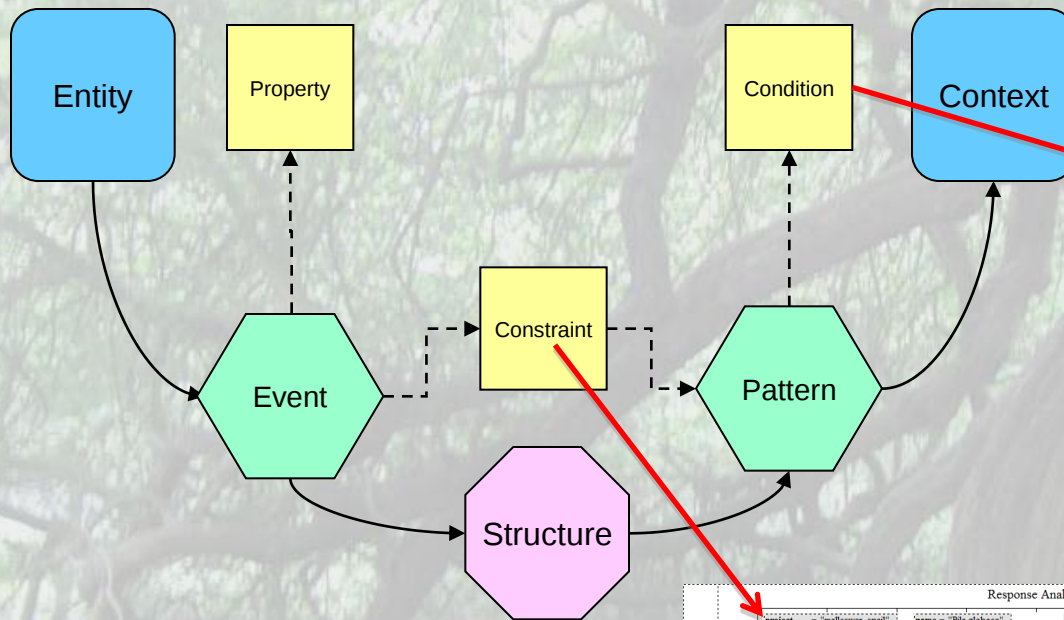


Meta-System Levels 1-4



Ecological Niche Model

- Frogs in the Western mountains of India



Relational Information Management and Support System

[Projects](#) [Edit](#) [View](#) [Definitions](#) [Entailments](#) [Models](#) [Query](#) [Tools](#) [Window](#) [Help](#)

Project: *e.g. niche model of Rhacophorus malabaricus in the Western Ghats*

Project Elements Defined:

RELATIONAL ARCHITECTURE

☒ Natural System

☒ Entity

☒ Context

☒ Empirical System

☐ Structure

☐ Function

☒ Relations

☐ Event

☐ Pattern

☐ Potential

☐ Process

☒ Operations

☐ Property

☐ Constraint

☐ Condition

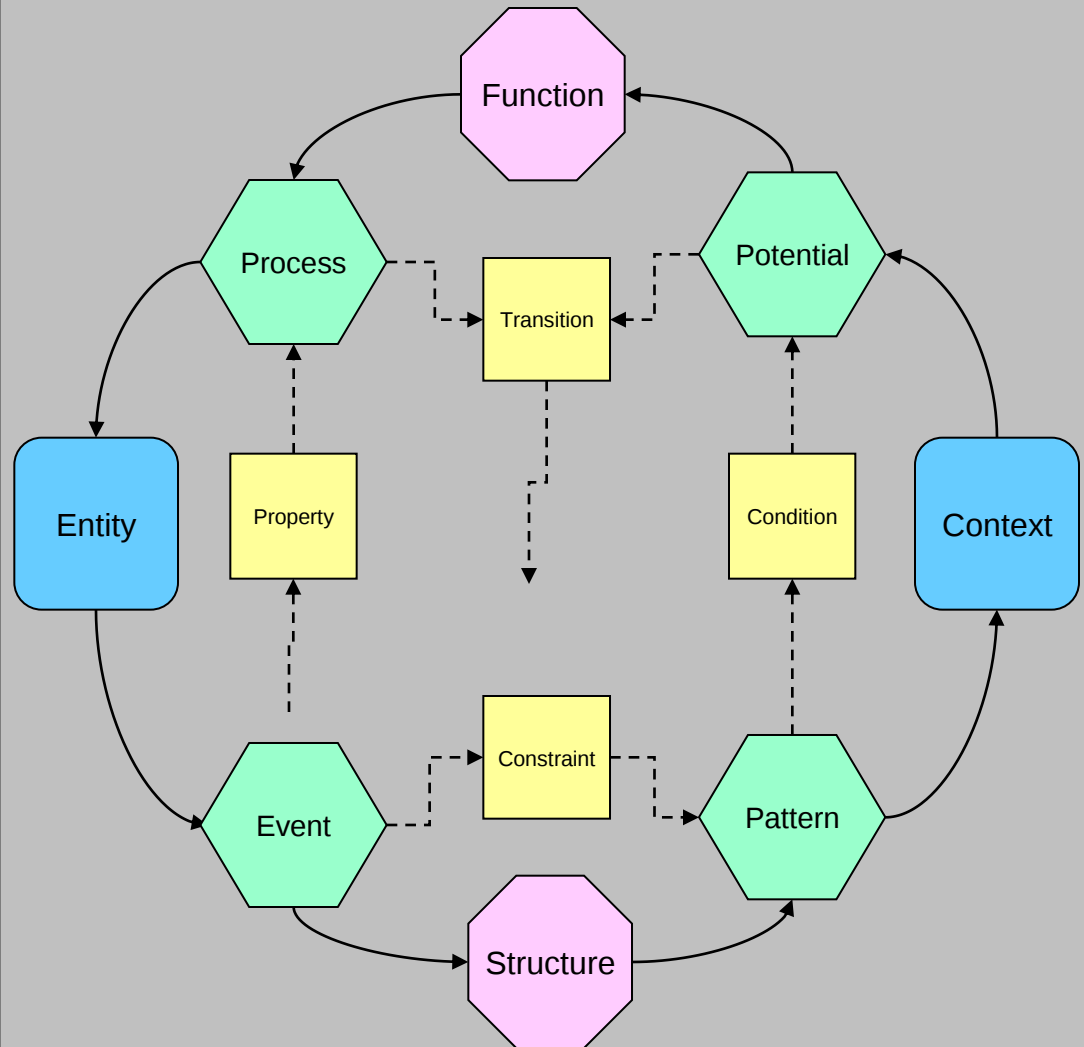
☐ Transition

Select all

Enter all

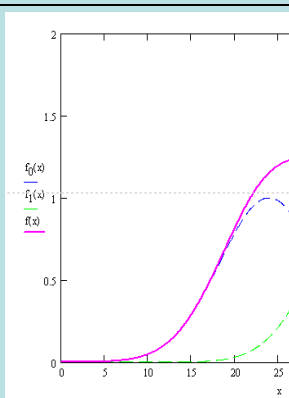
...enter/select element keywords

...click Enter

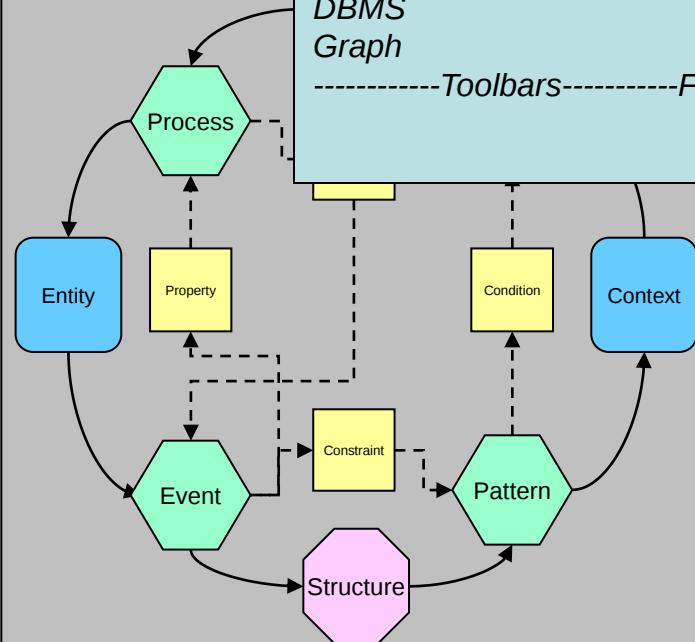


Relational Informatics and Modeling System

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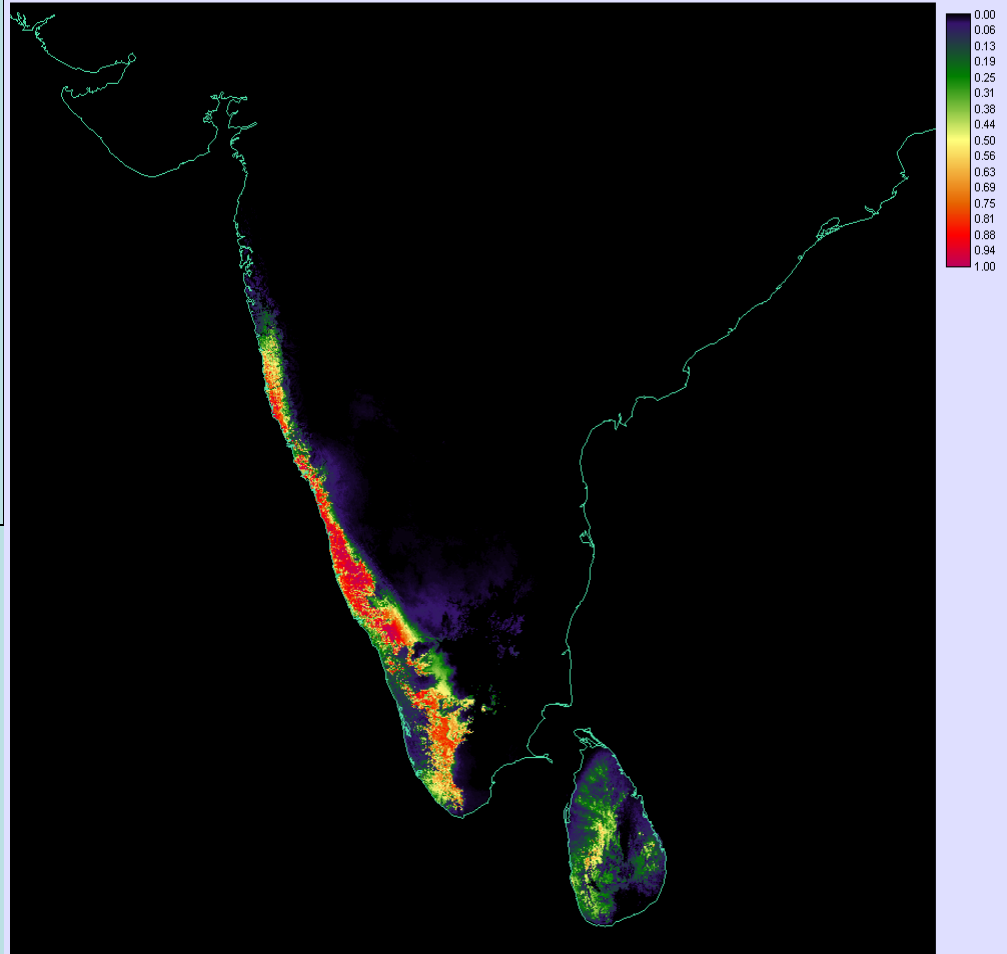


-----Window----- F1
Normal
Cascade
Tabs
-----Main----- F2
Holon
Holarchy
S-F Table
Graph
Map
-----Task Pane----- F3
Holon
Holarchy
DBMS
Graph
-----Toolbars----- F4



Map View

R. malabaricus Niche Model 1.1

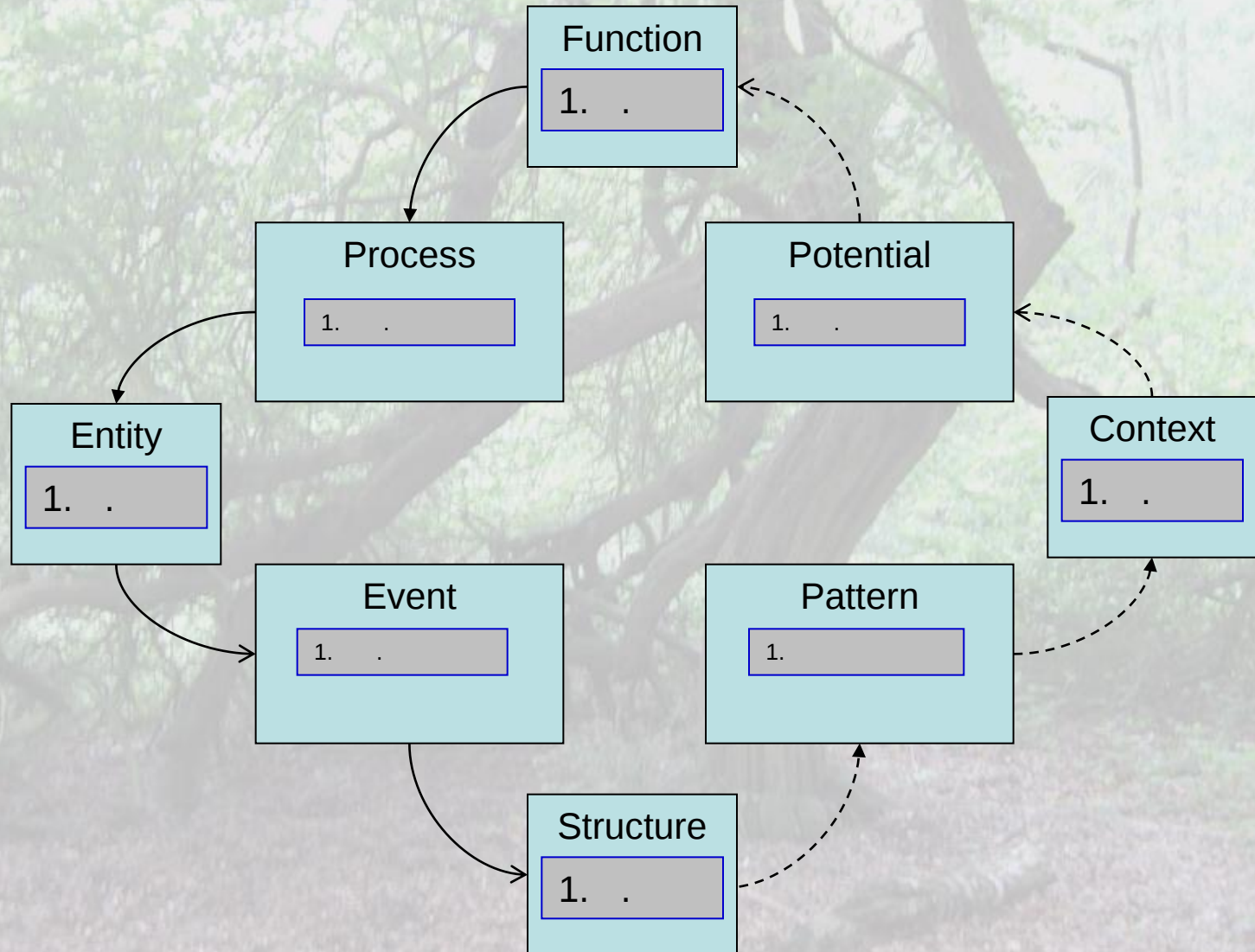


Step 1: Define Experiments

Project Name:

Niche model for slender loris, Jan2008

Help



Apple Snail Niche Model

