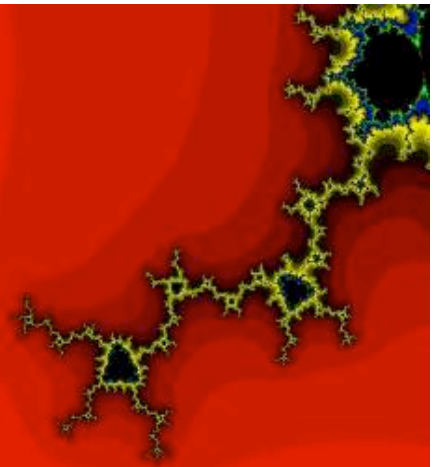
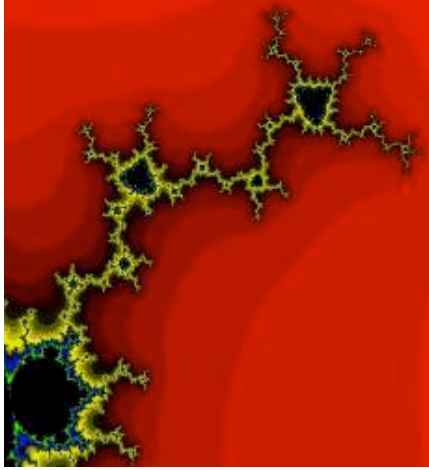
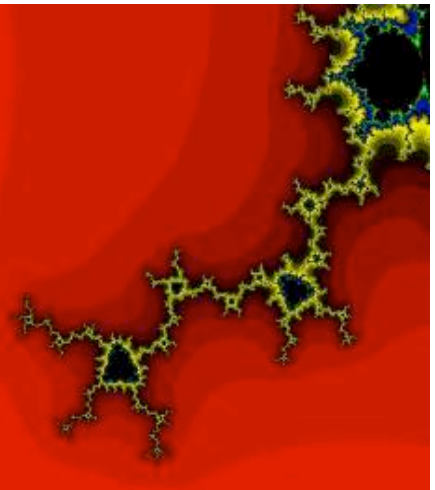
The Dynamical Approach to Cognitive Science



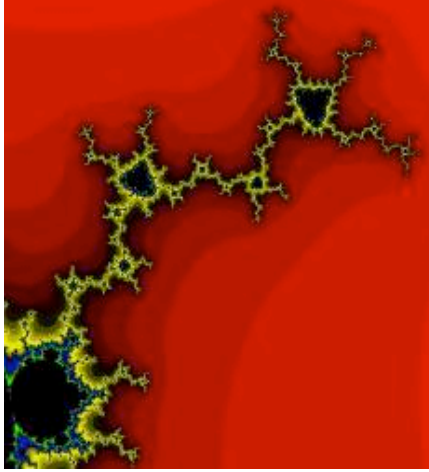
A Philosophical Argument Concerning the Nature of Time



Overview

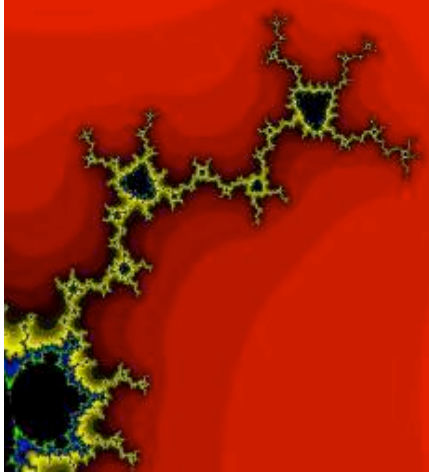


- Brief Intro to Dynamics
- Relation to Other Approaches
- Why the Dynamical Hypothesis is pursued
- Arguments against its conception
- Counterpoints to objections

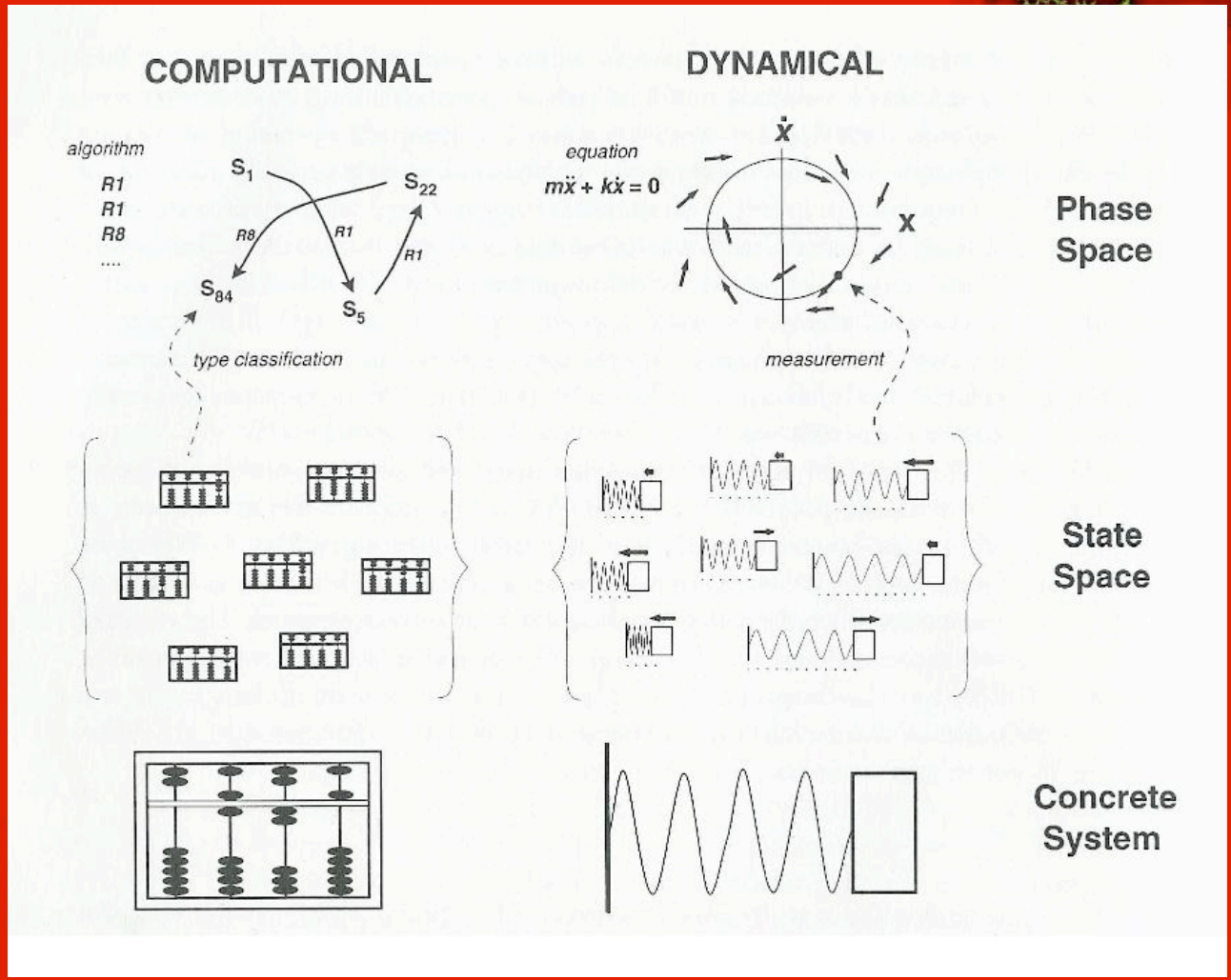


Dynamical Systems

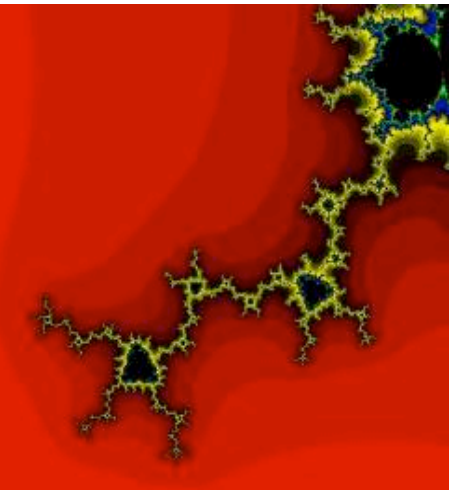
- Systems with numerical states
  that evolve over time according to a rule
- Current state always determines a unique future behavior
- Phase space consists of trajectories not just an ordering of symbols



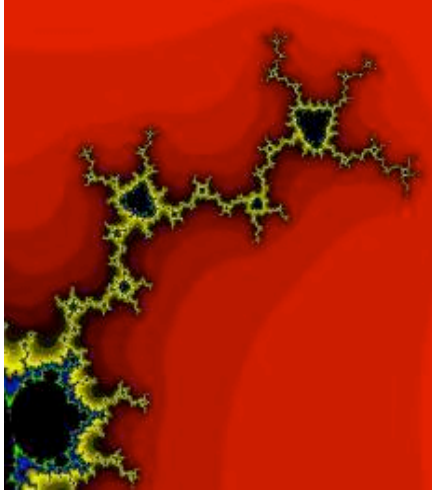
State-determined systems



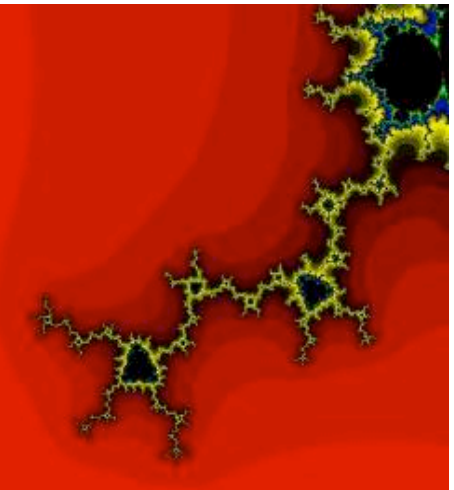
Comparison to Previous Approaches



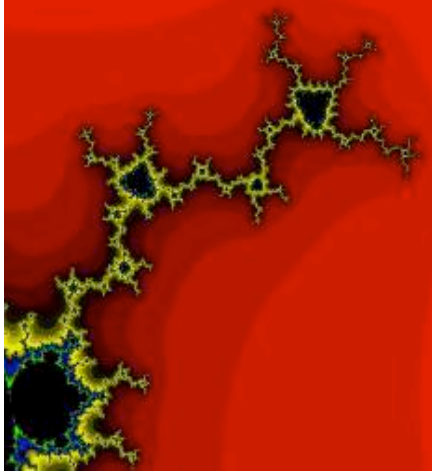
- Symbolic
  - Focus on Structure
- Computational
  - Flaw with Ersatz Time
- Connectionist
  - Focus on Architecture and Algorithm



Why the Dynamical Hypothesis?

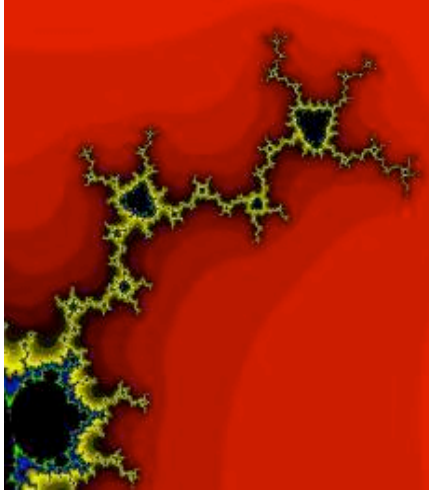


- Cognition and Time
- Continuity in State
- Multiple Simultaneous Interactions
- Multiple Time Scales
  - Self-Organization and Emergence of Structure
  - Embeddedness

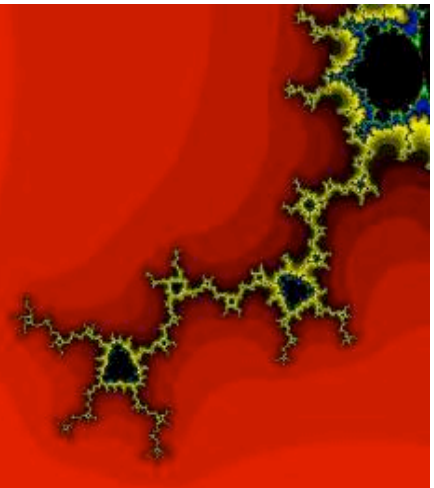


Arguments against Current Research and Theory

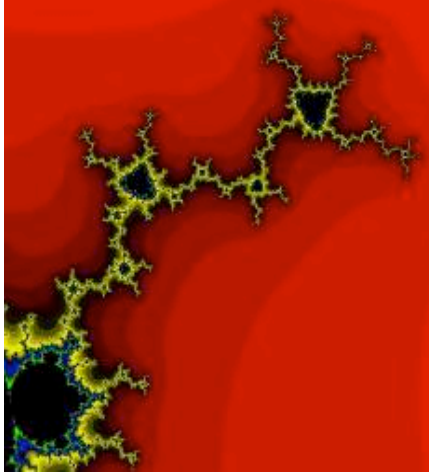
- Flaws in Mind as Motion
- Further Split in Lower vs. Higher Cognitive Processes
- Strong Coupling Thesis
- Experiments as Ersatz Imposters



Van Gelder's Response



- Discretely Defined Systems are not inherently incorrect
- "Quasi-real" time
- Metrics to define time/space distances
- Fundamental difference between ersatz and "quasi-real" discreteness



References

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- Grush, Rick. (1997) Yet another design for a brain? Review of Port and van Gelder (eds) *Mind as Motion*. *Philosophical Psychology*
- van Gelder, T. J. (1999) Bait and switch? Real time, ersatz time and dynamical models. *Dynamical Cognitive Science*
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