

The Creation of Novelty in Artificial Chemistries

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ALife8
(Foil_{TEX} Presentation)

Outline

- The Problem
- ABM's and Novelty
- Closed vs. Open Agents
- Novelty and (Dynamic?) Hierarchy
- A Model (Hand Waving?!)
- Conclusion...

The Problem

- Naturalistic Axiom (*Computer Models*)
- (Coda: Indeterminism is not enough...)
- von Neumann Complexity (and its growth)
- Proof-of-principle: Biosphere

ABM's and Novelty

- Agents, Agent-state, Micro-state
- Macrostates
- Microstate Novelty?
- Macrostate Novelty?
- Open-ended (perpetual) Novelty?

Closed vs. Open Agents

- Closed:
 - Pre-specified behavioral repertoire
 - Evolution in (pre-specified) parameter space
- Open:
 - “Programmable” Agents (Tierra et al)
 - Pre-specified Agent Interfaces

Novelty and (Dynamic) Hierarchy

- Artificial Chemistries
- *Closed* ABM
- Novel (emergent, hierarchical, macroscopic) agents
- Open agent behaviors *and* interfaces?

A Model (Hand Waving?!)

- Any old AC will not do!
- Cf. SCL (computational autopoiesis)
- The Ansatz (Rasmussen et al)?
- “Artificial” LMA? (molbugs...)

Conclusion

- *Put your Model where your Mouth is!* — Bedau, 2002.

Related Online Resources

- Full Paper:
 - <http://www.eeng.dcu.ie/~alife/dg-alife8-2002/>
- DCU Alife Laboratory:
 - <http://www.eeng.dcu.ie/~alife/>
- Research Institute for Networks and Communications Engineering (RINCE):
 - <http://www.rince.ie/>

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