Agent-Based Simulations in Economics

The Fourth Herbert Simon Seminars Series

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Outline of Lectures

1. Introduction: models and simulation.

2. Agent-based models: What is an agent? How to model agents?

3. Learning and evolutionary models: Genetic Algorithms, Reinforcement Learning, Artificial Neural Nets.


5. Applications: Designing electricity markets and other markets.
Who am I and what is my interest?

2. MIT’s 1985/6 3-person computational strategy (differentiated Bertrand oligopoly) tournaments.
3. Axelrod’s use of John Holland’s Genetic Algorithm to replicate his 1984 Tit-for-Tat results.
Herbert Simon

The late Herbert Simon is perhaps best known to economists (apart from his Nobel prize) as the man who coined the terms:

• bounded rationality, and
• satisficing.

As we shall see, both ideas have a rôle to play in agent-based modelling:

• the agents must be boundedly rational, and
• reinforcement learning can model satisficing as a realistic response of agents.

An anecdote.
How we learn.

- Five 3-hour lectures.
- Start from modelling, then simulation, in theory.
- Then some hands-on simulations: Life, segregation.
- Four lectures on ACE models, agent learning of various kinds, applications.