ARTIFICIAL LIFE AND EVOLUTIONARY GAMES

CIS 400/600 — Spring 1998

Mon & Wed evening 7:00 – 8:20

CIS 400 (Juniors and Seniors) / CIS 600 (Graduate Students)

The general prerequisite is to have a broad competency in programming appropriate for at least an upper level computer science or computer engineering undergraduate major. Students will learn about noncooperative games such as prisoner's dilemma and the role such games have in the evolution of complex systems. The emphasis will be on experimentation. The course will be conducted in a seminar format with students and the instructor together exploring the area with particular attention on the relations between genetic algorithms, game theory, and evolving cellular automata. The course will be supported by readings drawn from a variety of sources to be available through the reserve services of the SU libraries, as well as course notes distributed by the instructor. Students will be expected to carry out computational experiments with the assistance of the instructor and make several presentations during the semester. An extra paper will be required of students taking the course as CIS 600 appropriate for graduate-level work. The paper may be either primarily expository or a report of original results.

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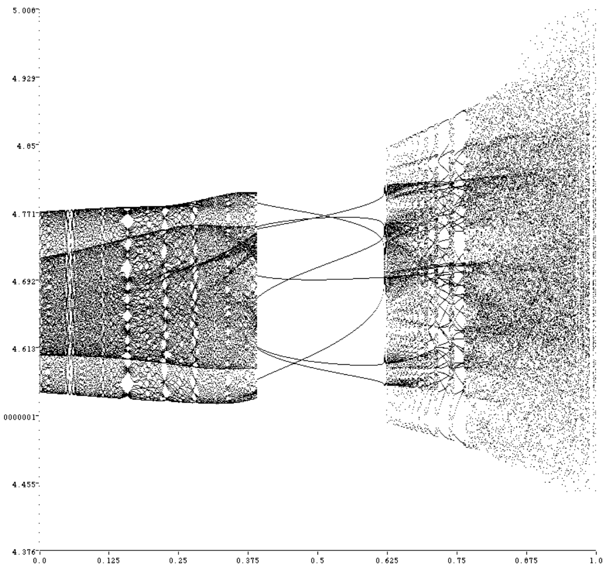

Preliminary Bibliography:

1. Andre, D., Bennett, F.H., & Koza, J.R. "Evolution of Intricate Long Distance Communications Signals in Cellular Automata Using Genetic Programming." In *Artificial Life V.* MIT Press, 1997.

2. Langton, Chris G. "Computation at the Edge of Chaos: Phase Transitions at the Edge of Chaos." In *Emergent Computation.* Stephanie Forrest, (ed.) MIT/North Holland, 1991.

3. Mitchell, Melanie. *An Introduction to Genetic Algorithms.* MIT Press, 1996.

4. Poundstone, William. *Prisoner's Dilemma.* Doubleday, 1992.

5. Straffen, Philip D. *Game Theory and Strategy.* Mathematical Association of America, 1993.

6. Weibull, Jörgen. *Evolutionary Game Theory.* MIT Press, 1995,