

Nonlinear Physics:
Modeling Chaos & Complexity

Jim Crutchfield
chaos@cse.ucdavis.edu; cse.ucdavis.edu/~chaos

Spring 2010
WWW: <http://cse.ucdavis.edu/~chaos/courses/nlp/>

Homework 4

Covering *NDAC* Chapters 8 and 10.

1. Write up your Project Proposal with the following sections. The result should be 2-3 pages long.
 - (a) Goal: Pick a dynamical system to investigate. Why is it interesting? What you would like to learn?
 - (b) System: Describe how the dynamical system is nonlinear and time-dependent. What's the state space? What's the dynamic?
 - (c) Properties: What properties are you going to investigate?
 - (d) Methods: What methods will you use? Why are they appropriate?
 - (e) Hypothesis: What is your current guess as to what you will find?
 - (f) Steps: List the appropriate steps for your investigation; for example, read literature, write simulator, do mathematical analysis, estimate properties from simulation, write up report, and so on.
 - (g) Time: Estimate how long each step will take. Can you complete the project within one month?
2. Problem 8.1.6.
3. Problem 8.3.1.
4. Problem 10.1.11 (Cubic map)
5. Problem 10.1.12 (Newton's Method)

Homework due one week after being assigned.