

Project II (Daily Assignment #12)

(due: Thursday, March 3, 9:30 am)

Announcement: To give you more time for the project II paper:

- project II: work & presentation due March 3
- project II: paper due March 8
- final version of first main paper due March 10

1. The Thursday class will be again in seminar form. Similar to project I you will each give 10-15 minute long talks about your project II. As part of project II (this assignment) you work on a variation of the discussed non-linear systems (see more details below), you write a paper about it, and you present your work in class in the form of a 10-15 minute long talk.⁴

1. Pick a project of your own choice within the topic of non-linear systems and/or molecular dynamics simulations. You may (a) change the system and/or (b) do more analysis on the logistic map or driven damped pendulum and/or (c) change the molecular dynamics algorithm. For (a): For more population dynamics models there are great books in our library from Robert M. May (“Theoretical Ecology,” and “Stability and Complexity in Model Ecosystems”). For (a,b): For non-linear systems we have the wonderful book of G.L. Baker and J.P. Gollub (“Chaotic Dynamics: an Introduction”)⁵ For (b): In the book of Baker and Gollub you find for example a description of the Lyapunov exponent and the Feigenbaumnumber. For (c): You might use for example the fourth order Runge-Kutta algorithm and might compare your results with the results of the Euler-Cromer algorithm. As before, choose a topic of whatever you enjoy most.⁶ Please let me know in case of any questions. For solutions of the in class work see:

`~kvollmay/classes.dir/capstone_s2005.dir/chaos.dir/chaos*.cc` (As answer to this assignment, send me the complete pathname of your program.)

2. Write a paper (2-3 pages) about your project. Your paper should include: (1) Definition of your model. In case of a molecular dynamics simulation you should specify the algorithm you used. (2) Parameters you used. (3) Results (4) Conclusions. (Please hand me a hardcopy of your paper.)

3. Prepare your 10-15 min long talk for Thursday. Prepare transparencies and/or demo simulation runs and/or what you would like to write at the blackboard.

4. What of the last class and this assignment did you find most interesting and/or most difficult?

⁴Your paper and talk of project II will be graded.

⁵I used their parameters for our in class work about the driven damped pendulum.

⁶For project I you were very creative. I am looking forward to your projects.