

Non-Linear Dynamics and Chaos (NLD)

Watch the Video on [NLD-Chaos](#) and view the [Reprints](#)

Student's Name _____

Partner's Name _____

Pre-lab Discussion Questions and sign off sheets

It is your responsibility to discuss this lab with a professor or GSI on the first day of your scheduled lab period. This signed sheet must be included as the first page of your report. Without it you will lose 1/3 of a grade for the report (e.g. A- \rightarrow B+). You should think about and be prepared to discuss at least the following before you come to lab:

1. What is Non-linear Dynamics? (NLD) Specifically what is it that is non-linear?
2. What is chaos? What are the defining characteristics of chaos?
3. Present and solve at the board the problems 9.3.1 and 11.4.2 in Ref. 1.
4. What is the Feigenbaum ratio? What does it mean?

See <http://mathworld.wolfram.com/FeigenbaumConstant.html> and <http://mathworld.wolfram.com/Chaos.html> and http://en.wikipedia.org/wiki/Bifurcation_diagram for help.

5. What is a Poincaré map? See http://en.wikipedia.org/wiki/Poincar%C3%A9_map
6. What is a return map?
7. What is a Fourier Transform? What does the power spectrum of a square wave look like?
What is aliasing?

Staff Signature _____

Completed on the *first* day of lab? (circle) Yes / No

Mid-lab Questions and sign off sheets

1. Demonstrate the Cobweb VI that you wrote, showing regions of chaos and periodicity.

Staff Signature _____

Completed on the *fourth* day of lab? (circle) Yes / No

INCLUDE THESE SHEETS AS THE FIRST PAGES OF YOUR REPORT

Physics 111 Advanced Lab	Student Evaluation of Experiment
---------------------------------	---

Now that you have completed this experiment, we would appreciate your comments. Please take a few moments to answer the questions below, and feel free to add any other comments. Since you have just finished the experiment it is *your* critique that will be the most helpful. Your thoughts and suggestions will help to change the lab and improve the experiments.

Please be as specific as possible, using both sides of the paper as needed, and turn this in with your report. Thank you!

Experiment name: _____ Date: _____

How was the write-up for this experiment? How could it be improved?

How easily did you get started with the experiment? What sources of information were most/least helpful in getting started? Were the reprints appropriate? Did the Pre-lab discussion help? Did you need to go outside the course materials for assistance? What additional materials could you have used?

What did you like and/or dislike about the experiment?

Would you recommend this lab to fellow student? Why or why not?

What advice would you give to a friend just starting this experiment?

If the course materials were available over the Internet (WWW, FTP, etc.), would you (a) have access to them and (b) would you prefer to get them this way?

Please circle the abbreviations of the other labs you have completed. ATM BMC BRA COM CO ₂ GMA HAL HOL JOS LIF LLS MNO MOT MUO NLD NMR OPT OTZ RUT SHE XRA	Overall quality of this experiment? 1 2 3 4 5 Poor Average Good
--	---