

Module 4: Assignment

- **LEARNING THE SUBJECT:**
 - a. Try to read the following. For each paper, write a ~1 paragraph summary (in your own words, don't just copy the abstract) of what you found most interesting.
 - i. Hoppols.gatech.edu/pages/Resources/papers/Community-dynamics-with-intraguild-predation-13.pdf
 - ii. Hoppols.gatech.edu/pages/Resources/papers/LotkaPNASpnas01916-0016.pdf
 - iii. Hoppols.gatech.edu/pages/Resources/papers/Maylimitcycles1736713.pdf
 - iv. Hoppols.gatech.edu/pages/Resources/papers/shertzerPredPrey.pdf

- **ANALYZING THE IMAGES:**
 - a. In either MATLAB or ImageJ, count the number of rotifers in your images and plot beginning and final numbers. If you took several images, report average \pm std.
 - b. Get a measure of the amount of "green" in your images in regions away from rotifers (use either MATLAB or ImageJ, and if stuck, see me). Plot this vs time. Do these plots cycle? If they do, plot them on the same graph. Do you see a phase lag between curves? If you need inspiration, see the paper by Hiltunen et al in our Dropbox folder.
 - c. Using your phonescope or webscope, record a movie of a rotifer eating algae

- **SOLVING FOR PERIODIC BEHAVIOR:**
 - a. In his book, Mathematical Biology, 3.1 and 3.3, Murray has a nice discussion of the Lotka-Volterra model and modifications of the equations to incorporate limit cycle behavior. Try to numerically integrate the LV model and the model in Eq 3.18 (modified LV) and compare behavior of the system to changes in initial conditions. (You can use pplane9.m in MATLAB or write your own.)
 - i. Hoppols.gatech.edu/pages/Resources/papers/Pages-from-MurraymathBiol.pdf
 - b. While you are at it learn how to interpret a "phase plane" and a "phase portrait". Write a paragraph describing what these terms mean.

- **BONUS:**
 - a. Perform a fit of your experimental data to a numerical integration of either LV or modified LV. Again, for inspiration, take a look at <http://www-rohan.sdsu.edu/~jmahaffy/courses/f09/math636/lectures/lotka/qualde2.html>