

B.E.E.R. Fall 2015

Workshop: Biomath Computer Labs with WeBWorK

By Joseph Mahaffy

WeBWorK access: http://webwork.sdsu.edu/webwork2/Workshop_F15/

Username: Student_____

Password: BEER_____

Outline

1. Introduction
 - a. Workshop website: http://www-rohan.sdsu.edu/~jmahaffy/courses/BEER/BEER_info.html
2. HW warmup
 - a. Opportunity to try WeBWorK as a student with basic problems. (You too can experience the thrill of seeing “GREEN.”)
 - b. Log into special WeBWorK Workshop – Click on the **HW warmup** assignment
 - c. Suggest you Click on the **Download PDF** at the bottom to view all problems
 - d. Select one or two problems to try as a student
3. Demonstrate the Instructor side of this (after some results are available)
4. Overview of Computer Lab experience – Brief Discussion
5. Work Lab problem on Beetle Population – Discrete Dynamical Model
 - a. Select **ABioc2Lab10** from assignment list, then select **Problem 1**
 - b. There is a Help page available at http://www-rohan.sdsu.edu/~jmahaffy/courses/f15/math124/Lab/Lab_Help_10.htm
 - c. There is a [downloadable worksheet, Beetle.xlsx](#) to help start this lab.
 - d. Instructions will be given to help work through the problem, showing important features in Excel
 - e. Participants will work on this problem and check their answers in WeBWorK
 - f. Discussion
 - i. What are the mathematical and biological questions?
 - ii. What problems do students encounter?
 - iii. What are expectations from the students?
 - iv. A set of [solutions](#) is available for comparison
6. Interlude with some lecture about my experience
7. Open discussion
8. Participants explore different problem – Choose one of the four listed
 - a. [Optimal Foraging \(A3\)](#). A study of seagulls dropping clams is examined for optimal foraging strategies. (**ABiocLab9 – Problem 3**)
 - b. [Allegheny Forest \(E3\)](#). Model volume of trees as a function of diameter or height. Compare linear and allometric models. (**ABiocLab3 – Problem 3**)

- c. [Fourier Fit to Population \(D3\)](#). Data on lynx or hares gathered by the Hudson Bay company are fit with a series of trigonometric functions, providing increasing accuracy with additional functions. (**ABioc2Lab7 – Problem 3**)
- d. [SIR Model for Influenza \(L3\)](#). A discrete dynamical system with susceptible and infected individuals is compared to CDC data for the spread of influenza. The model is used to examine different strategies to lessen the effect of the disease. (**ABioc2LabExtra – Problem 2**)