WILD 4890

Lab 3 – Predator-Prey Dynamics

Reading and Activity: Donovan and Welden Ch. 10

Download and open the Lab 3 spreadsheet and follow the instructions in DW CH. 10. After working through the exercises, answer the following questions in a separate Word document. When you are finished, save both the Word document and the Excel spreadsheet as “Lab3\_YourLastName.xls/doc” and upload both to Canvas.

Formatting requirements for tables and figures (axes, titles, etc) still apply, now and always.

Notes:

* I’ve provided a partially-filled in spreadsheet for you to work from, to eliminate some busy work
* For Parts 3 and 4, make a copy of the current sheet and work from there
* For all questions that require work in Excel (e.g. making new graphs), be sure to save that work in a separate sheet so I can see how you worked through all problems.

Errata:

* The formula in part 1, step 7 should be =IF(C14+$H$8\*$H$9\*B14\***C14 - $H$7**\*C14>0, C14+$H$8\*$H$9\*B14\*C14-$H$7\*C14,0)

Questions:

1. Using the version of the model that assumes density-independent growth for both predator and prey (Part 1), briefly describe the resulting population dynamics under the following scenarios (keep all other parameters fixed at R = 0.25, q = 0.1, f = 0.008, a = 0.01):
   1. Increase prey population growth rate to XX
   2. Decrease predator starvation rate to XX
   3. Increase attack rate to XX
2. Using the Lotka-Volterra model with density-dependent prey population growth,
   1. What are the equilibrium solutions under the following parameters: R = 0.5, KV = 3000, q = 0.2, f = 0.03, a = 0.008 (in other words, what is the predator population size at which the prey population is not changing, and what is the prey population size under which the predator population is not changing?)
   2. Is this a stable equilibrium?