**Ecol 8990**

**Assignment # 2**

**Due Wed Sep 27, 5 pm**

Note: The work should be individual. Use R Markdown to complete the assignment. The Markdown (.Rmd) file itself is part of the assignment.

**Exercise 1**

Using the ‘Growth.csv’ file in the Assignment 2 folder, fit two nonlinear models relating growth rate to diameter: a Ricker and a quadratic. Include a plot showing the raw data and the two fitted lines in your Markdown document.

**Exercise 2**

In the Assignment 2 folder there is an incomplete R script called ‘Slope\_optimizer.r’. It is a completely unnecessary piece of code that “sweeps” a line through a cloud of x-y data to find the slope that best fits the data. In other words, it is a very simple numerical optimizer. I wrote the parts of the code that generate the x-y data and set up a vector of “candidate” slopes to search through and a loop to cycle through these slopes. Your job is to complete the code to find the residual sums of squares for a given slope. Conveniently, the intercept is zero. Show your final code and plot the residual sums of squares as a function of the candidate slope values.

**Exercise 3**

The file ‘Wildebeest.csv’ contains annual census data for the Serengeti wildebeest going back to 1960. We don’t have data for all years, so many values are just interpolated to make this exercise easier, giving a mixture of data and pseudodata. Let’s assume that that the wildebeest population grew according to the logistic equation:

N(t+1) = N(t) + rN(t)(1 – N(t) / K)

We need to estimate r and K. You need to rearrange this equation to produce a linear relationship between two variables. Then fit a linear regression to the transformed variables and estimate r and K. This is a “linearization” exercise similar to the one we did with the Type II functional response. Do the transformation and regression in R and show your estimated parameter values.

Please put a hard copy of the final Markdown .pdf or Word document in my mailbox, and email me the .Rmd file that generated the document.

If any of this is unclear, let me know.