

FISH 6004 Lab 3

This lab provides problems that are related to lecture 3. You will simulate basic population dynamics and calculate management reference points. Note there are quite a few functions in this lab - make sure you understand what each is doing before you move on to the next one. Also, ask questions if part of the code is unclear!

Part I:

1. Simulate simple logistic population dynamics, with $r = 0.5, 1.5, 2.9$ (Hint, see Lecture 3 slide 18). Note that most of the code is written for you, but you have to fill in the function that simulates the population dynamics.
2. Write a surplus production model, with $C = HB$, and then calculate equilibrium $C(F)$ (Hint, see Lecture 3 slide 26). Compute F_{msy} and verify $Y_{msy} = rK/4$. Again, most of the code is written for you, but the surplus production function needs to be written.
3. This question is about getting to know the YPR and SPR functions and the impacts of various inputs on the calculation of F_{max} and $F_{0.1}$. Most of the code is written for you, but add changes when prompted in the R code.
4. Calculate F_{msy} and B_{msy} for the Beverton-Holt stock recruit model using the code provided. There are slides on github that derive the equilibrium recruitment if you are interested.

If you have extra time, the code for the continuous time YPR and SPR functions are given. Use the code to calculate the given reference points.