FISH 6004. Assignment 5

Due December 15, 2020

Marks: 25% of course total (optional)

Please copy R scripts and outputs into a word file and submit to me. Organize and label your results clearly. Use captions for any tables or figures you create. You will be marked for clarity of presentation as well as correct results. Email your completed assignment to me, noel.cadigan@mi.mun.ca

1. Using the R code provided as part of lecture 10, replicate the R ADAPT for 3NO cod that was presented in class. Demonstrate that you get the same parameter estimates as in class. Save the populations estimates (i.e. pop = Npop(xN_Y,xN_Aest,pop.dat)). 20 marks

2a. Fit the 3NO cod R ADAPT with a separate variance parameter for each of the three survey indices (Spring, Juvenile, and Fall) used to estimate model parameters. The observation model is $R_{say} = q_{sa}N_{ay}exp(\varepsilon_{say}), \varepsilon_{say} \sim N(0, \sigma_s^2)$. The ε_{say} are all independent but with variances that are possibly different for each survey. This is sometimes referred to as self-weighted survey indices. Which survey does the ADAPT model fit best? 25 marks

2b. From 2a, provide figures and tables of parameter estimates, stock estimates (SSB, etc) and fishing mortality rates (F at age, and average F), and also residual diagnostic plots to assess the model goodness-of-fit. Examples of plots were presented in class, but feel free to do better ones! 40 marks

2c. Provide plots that compare SSB and average F (ages 4-6) from the ADAPT runs in 1 and 2a. 15 marks.