How to Run the R Scripts for Exit Time and Survival Time

Due to dependencies on R version, it's best to first update R to the latest version, then update your existing libraries and add any new ones that you need.

If you are using RStudio, it will automatically open the latest version of R and offer to update all of your existing packages. Click to accept the updates.

To update packages that are new to your computer, open 'Step0_SetUp.R'. RStudio will automatically offer to install additional packages that you need. Click to accept the installations.

If you do not use RStudio, first update R and then run 'Step0_SetUp.R'.

To calculate Exit and Survival time:

Open the 'Step1_DLM_Squeal2_withMendota2011 . . . .R' file. On line 24 choose the lake. On lines 26 and 27 give a name for the output file to which results will be written, and a title for plots.

Open the 'Step3 . . . R' file. On lines 23-31 select the input dataset, give a name for the output file to which results will be written, and a title for plots. The script is already set up for Peter and Tuesday from Squeal 2, so use comment symbols '#' to turn off the lines you do not want to use. On line 44 select the variate that you want to analyze, usually X.z (z-score of raw data), level, or standardized level.

Open the 'Step4 . . . .R' file with the name that matches the dataset you want to analyze. Step 4 can throw errors so I generally dedicate a script to each dataset that I might want to analyze. This step can be slow on some processors. Make sure that the computer is plugged in and you have something else to do for a few minutes, depending on your processor speed.

Open the 'Step5 . . . . R' file with the name that matches the dataset you are analyzing. This step makes plots with labels that are specific for a given dataset, so I make a dedicated file for each dataset.

Now you have calculated exit time for one experiment in one lake.

Once you have run the exit time series, select a 'Survival' program for the dataset and basin (left or right) that you want to analyze. These scripts require specific code for each boundary condition, so again I made a dedicated file for each dataset.

Now you have calculated survival time for one experiment in one lake.

References

Arani, B. M. S., Carpenter, S. R., Lahti, L., van Nes, E. H., & Scheffer, M. (2021). Exit time as a measure of ecological resilience. Science, 372(6547), eaay4895. doi:10.1126/science.aay4895

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