Notes for Week 3 Lab Section

* A bit of housekeeping before we start:

1. Assignment:
2. Posted on both websites and feel free to send me questions
3. Written in English and submitted a Word or PDF file through NTU cool
4. Deadline would be the start of our next class
5. The link to the recorded lecture will be available on NTU cool soon later after the class

* Lab section:

1. Feel free to stop me anytime if you have questions or I’m not clear, like some technical glitches
2. Basically, lab section is designed for giving you some hands-on practice in programming and modeling the system you’ve learned in the lecture. So you will be able to get an idea of how ecological models are actually analyzed.
3. We will go over the code and explain what the functions are doing, and how you can modify the arguments for your specific need.
4. Code explanation Part 1: solving the differential equation for exponential population growth numerically using the R package “deSolve”
5. Install the package if haven’t done that yet
6. Phase 1 is to create a function that specifies the model structure
7. Three arguments: times (explain), state (explain), parms (explain)
8. Define an equation and return the object on the left hand side
9. Phase 2 is to specify the actual parameter values and run the equation solver
10. The solver ode() includes several arguments: func (explain), times (explain), y (explain), and parms (explain)
11. Any questions?
12. Code explanation Part 2: visualize the population trajectory
13. “tidyverse” package for the ggplot function; again install the package if haven’t done that yet
14. The most important part of the code chunk is the first two lines: convert the solver output into a data frame, tell the function what you want to plot on the x- and y-axis, and add the points
15. The rest of the code is just to modify the appearance of the plot, which is not the focus of the lab and so I won’t go into the details
16. Besides showing the population size on a liner scale, we can also do it on a log scale: this is achieved via the function “scale\_y\_log10”
17. Again, the arguments in the function are for adjusting the axis appearance and so really don’t get bothered if you can’t understand what they are doing
18. So on a log scale, the curve become a straight line. You can easily demonstrate this by taking the log of the analytical solution
19. Any questions?
20. The questions in your assignment will be similar to the exponential growth equation we’ve been talking about today but with an additional constant immigration term. Basically you just need to follow the code structure here and modify a few parts. If you understand what the code is doing, then you should be able to answer the questions with ease.

* Move to gather town and self-practice:

1. Time to get your R session ready and play around with the code.
2. You can take a seat in any of the private spaces; Prof. Ke and I will walk around to see if you guys have any questions, can be anything in the lecture, lab, or assignment.
3. Only people in the private space can chat with you so you don’t have to worry that you’re asking silly questions and maybe someone else would hear it. This is a space only for you.
4. You are free to go if you are fine with the lecture and lab today.
5. Again, remember to turn in the assignment by our next class.