ZOO 800

Homework Week 1

Submission instructions

Submit a single, well-commented r script (.r file) on Canvas

Problem

The continuous time logistic population growth equation is:

$$N_t = \frac{K}{\left(\frac{K - N_0}{N_0}\right) e^{-rKt} + 1}$$

where: N_t is the population size at time t, K is the carrying capacity, r is the intrinsic rate of increase, and N_0 is the initial population size. In terms of Objective 1, below, $N_{1950} = N_0$ and t=1 in 1951.

Assume:

K = 1,000

r = 0.0005

N_0 = 1

Objective 1

Create two vectors (or a two-column matrix) containing: (1) years 1950 to 2025 and (2) the predicted population size for each year

Useful functions: `seq(), exp()`

Objective 2

Plot on the same graph (i.e., two lines): (1) the population size over time for the model above and (2) the population size over time for a population with the same carrying capacity and initial size but double the intrinsic rate of increase. Note: ***plot only the years 1950 to 2000***. Label axes in a readable font size and add a legend to help distinguish the two lines.

Useful functions: `plot(), lines(), legend()`

Objective 3

Export the plot from Objective 2 as a .png file to a folder called “Figures”

Useful functions: `png()`