EPS236 Section 1

Tianning Zhao

Introduction

- Section: Wednesdays 4:30 pm, Geo Museum 375
- Weekly sections if no further notice, not mandatory but strongly encouraged
- About the TF

Tianning Zhao

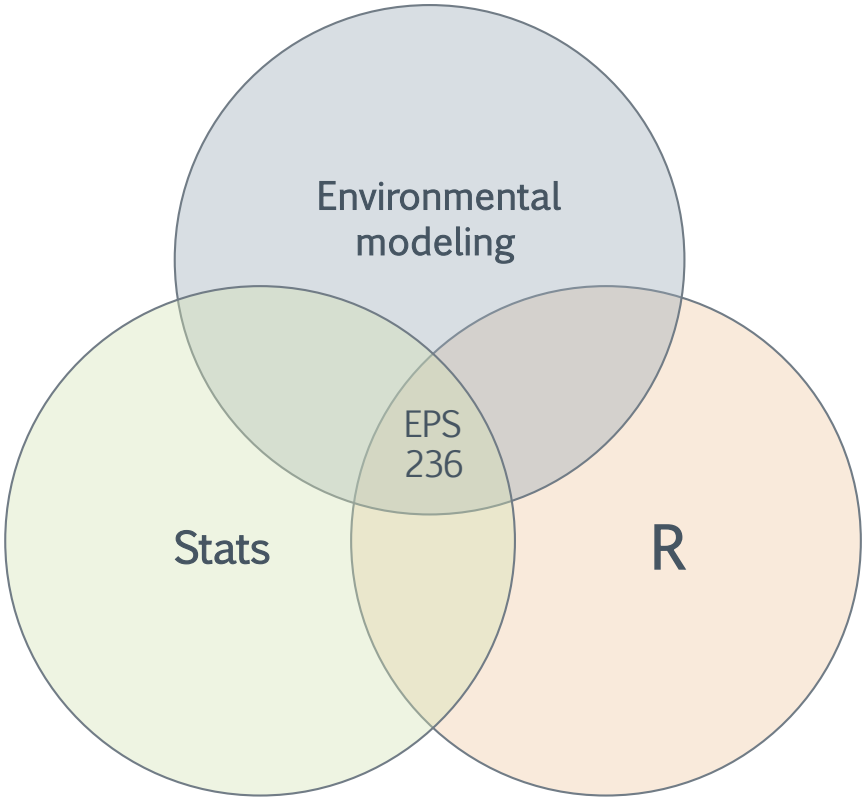
Email: zhaot@g.harvard.edu

Office hour: Thursday 4:30 - 5:30 pm, 58 Oxford Street, third floor lounge

PAIR UP WITH A MASTER

Find your partner to …

- Make life easier ☺
- Have more fun :p
- Learn more …



Week 1 Review

Time constant T*

$$\frac{dC}{dt} = -\frac{C}{T^*}$$

- Characteristic time for a perturbation to decay

Analytical solution

$$\frac{dC_1}{dt} = -\frac{k}{h}C_1 + \frac{k}{h}C_2 \quad (1)$$

$$\frac{dC_2}{dt} = \frac{k}{h}C_1 - \frac{k}{h}C_2 \quad (2)$$

Box Model

Markov chain

- "Bumble bee" example
- $\frac{k}{h}$ as a transition probability

Eigenvalue problem

- Geometric interpretation
- Physical interpretation

R Tutorial

1. Get R running
2. Cheat sheet
3. R tutorial on canvas
4. See the GitHub page for more coding related resources.

Warmup for R

Extending the bumble bee example:

- Two boxes (A, B) , transition probability = 0.1 for both directions, draw for 2000 times
- Write a function to calculate the Markov chain result given the initial state
- Read the initial states from the given csv file.
- Loop through initial states, and save the results in a “reasonable” data structure.
- Create one plot with four subplots showing the result, distribution of bumble bees in two boxes against time
- Try your best to beautify the plot and save the plot to an eps file.