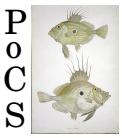

Principles of Complex Systems, Vols. 1, 2, & 3D
CSYS/MATH 300, 303, & 394
University of Vermont, Fall 2022
Assignment 15
Dangerous Beans

Due: Friday, January 27, by 11:59 pm
https://pdodds.w3.uvm.edu/teaching/courses/2022-2023pocsverse/assignments/15/
Some useful reminders:
Deliverator: Prof. Peter Sheridan Dodds (contact through Teams)
Assistant Deliverator: Dylan Casey (contact through Teams)
Office: The Ether
Office hours: See Teams calendar
Course website: https://pdodds.w3.uvm.edu/teaching/courses/2022-2023pocsverse
Overleaf: LaTeX templates and settings for all assignments are available at https://www.overleaf.com/project/631238b0281a33de67fc1c2b.

All parts are worth 3 points unless marked otherwise. Please show all your workingses clearly and list the names of others with whom you ~~conspired~~ collaborated.

For coding, we recommend you improve your skills with Python, R, and/or Julia. The (evil) Deliverator uses (evil) Matlab.

Graduate students are requested to use LaTeX (or related TeX variant). If you are new to LaTeX, please endeavor to submit at least n questions per assignment in LaTeX, where n is the assignment number.

Assignment submission:

Via Blackboard.

Please submit your project's current draft in pdf format via Blackboard by the same time specified for this assignment. For teams, please list all team member names clearly at the start.

- Please use Overleaf for writing up your project.
- Build your paper using:
  https://github.com/petersheridandodds/universal-paper-template
- Please use Github and Gitlab to share the code and data things you make.
- For this first assignment, just getting the paper template up is enough.

1. Come up with some rich, text-based stories for analysis.

   For example: One (longish) book, or a book series, or a TV series.

   Data would be the original text (books), subtitles, screenplay, or scripts (TV series).

   - You must be able to obtain the full text.
   - You will want something with at least around 10^5 words. More than 10^6 would be great.
   - Transcripts of shows may be good for extracting temporal character interaction networks.

   Please talk about possibilities with others in the class.

   For this assignment, simply list at least one possibility, noting the approximate text size in number of words.

2. Tokunaga's law is statistical but we can consider a rigid version. Take $T_1 = 2$ and $R_T = 2$ and draw an example network of order $\Omega = 4$ with these parameters.

   Please take some effort to make your network look somewhat like a river network.

3. Show $R_s = R_\ell$. In other words show that Horton's law of stream segments matches that of main stream lengths, and do this by showing they imply each other.