**Principles of Complex Systems, Vols. 1 and 2**
**CSYS/MATH 6701, 6713**
**University of Vermont, Fall 2025**
*"All right buddy, good luck!"*
**Assignment 05**

It's Always Sunny in Philadelphia ✪: Mac and Charlie Die, Part 1, S4E05 ✪
Episode links: IMDB ✪, Fandom ✪, TV Tropes ✪.

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**Due:** Friday, October 3, by 11:59 pm

https://pdodds.w3.uvm.edu/teaching/courses/2025-2026pocsverse/assignments/05/

*Some useful reminders:*

**Deliverator:** Prof. Peter Sheridan Dodds (contact through Teams)

**Office:** The Ether and/or Innovation, fourth floor

**Office hours:** See Teams calendar

**Course website:** https://pdodds.w3.uvm.edu/teaching/courses/2025-2026pocsverse

**Overleaf:** LATEX templates and settings for all assignments are available at
https://www.overleaf.com/read/tsxfwwmwdgxj.

Some guidelines:

1. Each student should submit their own assignment.

2. All parts are worth 3 points unless marked otherwise.

3. Please show all your work/workings/workingses clearly and list the names of others with whom you ~~conspired~~ collaborated.

4. We recommend that you write up your assignments in LATEX (using the Overleaf template). However, if you are new to LATEX or it is all proving too much, you may submit handwritten versions. Whatever you do, please only submit single PDFs.

5. For coding, we recommend you improve your skills with Python. And it's going to be a no for the catachrestic Excel. Please do not use any kind of AI thing unless directed. The (evil) Deliverator uses (evil) Matlab.

6. There is no need to include your code but you can if you are feeling especially proud.

**Assignment submission:**

Via **Brightspace** (which is not to be confused with the death vortex of the same name, just a weird coincidence). Again: One PDF document per assignment only.

**Please submit your project's current draft** in pdf format via Brightspace. For teams, please list all team member names clearly at the start. Make an Overleaf document and work together. An initial submission might be: "We have no idea what we're doing yet."

Project start up details.

- Here's the Deliverator's Overleaf LATEX template:

  https://github.com/petersheridandodds/universal-paper-template

  Not mandatory.

Notes for Baby Name analysis:

- You will have the baby name data sets on hand from the previous assignment.

- Recommended: Use the Allotaxonometer for All created by Jonathan St.-Onge and team.

  Here's the app (which should be the easiest to use):

  https://complexstories.uvm.edu/allotaxonometry

- Python version (may involve suffering):

  https://github.com/compstorylab/py-allotax

- Alternatively, if you 'love' Matlab:[1]

  https://gitlab.com/compstorylab/allotaxonometer.

  Note that you will need to separately install the command epstopdf (which should be part of a well stocked unix system with LATEX).

1. $(3 + 3 + 3 + 3 + 3 + 3)$

   Generate allotaxonographs comparing the following pairs with the stated values of $\alpha$ (6 plots):

   See alternative below if you cannot get any allotaxonometer code to work on your system.

   (a) Baby girl names in 2022 versus baby girl names in 2023 ($\alpha = 1/6$)

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[1] And suffering. A lot.

(b) Baby boy names in 2022 versus baby boy names in 2023 ($\alpha = 1/6$)

(c) Baby girl names in 1973 versus baby girl names in 2023 ($\alpha = \infty$)

(d) Baby boy names in 1973 versus baby boy names in 2023 ($\alpha = \infty$)

(e) Baby girl names in 1973 versus baby boy names in 1973 ($\alpha = \infty$)

(f) Baby girl names in 2023 versus baby boy names in 2023 ($\alpha = \infty$)

Note that the javascript version does not yet have contour lines which are needed to guide the choice of $\alpha$. Comparing baby name distributions in adjacent years (e.g., baby girl names in 2022 and 2023) will require an $\alpha$ close to 0. Here, we're going with $1/6$. But in general, if you can see contour lines, you can choose an $\alpha$ that fits best.

Online appendices for the main allotaxonometry papers is here:
http://compstorylab.org/allotaxonometry/.

More information for the Matlab version:

The gitlab repository:

https://gitlab.com/compstorylab/allotaxonometer/

For example baby names code, look through the main script here:

https://gitlab.com/compstorylab/allotaxonometer/figures/babynames/figures/

See if you can get this script to run as is.

Contains overview, examples, links to papers, figure-making code, etc.