NPRE 560 Fall 2024
HW 1 Due 2024.09.09

- Show your work.
- This work must be submitted online as a `.pdf` through Compass2g.
- Work completed with LaTeX or Jupyter earns 1 extra point. Submit source file (e.g. `.tex` or `.ipynb`) along with the `.pdf` file.
- If this work is completed with the aid of a numerical program (such as Python, Wolfram Alpha, or MATLAB) all scripts and data must be submitted in addition to the `.pdf`.
- If you work with anyone else, document what you worked on together.

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1. (20 points) Review any resource on the use of `git` and GitHub until you feel confident that you will be able to use GitHub Classroom to turn in your three computational projects. Create a GitHub account and provide your GitHub username as an answer to this question.
2. (10 points) (Ott Review Question 1.1) State three areas of kinetics or dynamics applications.
3. (10 points) (Ott Review Question 1.4) What is the main difference in the balance equations for the neutron flux in reactor dynamics versues fuel cycle analysis?
4. (Ott Homework Question 2.1)
   (a) (10 points) Calculate the average energy $\bar{E}_k$, of the delayed neutron groups 1 through 4, using the emission spectra $\chi_{dk}(E)$ given in table 2-V.
   (b) (10 points) Compare these values with $\bar{E}$ for the total $\chi(E)$ given in the same table and with $\bar{E}_k$ of Table 2-IV.
5. (10 points) (Ott Review Question 2.5) Give approximately the total precursor yields of ^{235}U, ^{238}U, and ^{239}Pu.
6. (10 points) (Ott Review Question 2.8) How many delayed neutron groups (families) are generally used per fissioning isotope?
7. (10 points) (Ott Review Question 2.9) What is the disadvantage of using isotope-dependent decay constants?
8. (10 points) (Ott Review Question 2.12) Give the approximate mean lifetime of the slowest and the fastest decaying precursor group.