

Homework 1

Web Problem #1

1. Read the [Letter from Admiral Rickover](#) Regarding Paper vs. Real Reactors. Write an analysis of his points, and indicate whether you agree or disagree, and why? How can one transition from a paper to a real reactor?

TEAM HOMEWORK

2. As a team, develop functional requirements for your nuclear reactor concept (this is a team homework, so only a single copy needs to be submitted). These requirements will be the basis for my grading of your final project, so give serious consideration and thought to each of the requirements. They can change as your design evolves, but having a clear image of what you WANT to do helps to begin the design process. Include among these functional requirements that relate to the following:
 - a. Product (electricity? Isotopes? District Heating? Process Heat?)
 - b. Maintenance
 - c. Refueling
 - d. Waste Handling
 - e. Moderation
 - f. Reactivity Control (must have 3 independent means)
 - g. Heat Removal (both operating and transient/shutdown)
 - h. Accident Protection
 - i. Isotope Containment
 - j. Personnel Protection (radiation)
 - k. Structural Integrity (include earthquakes, if applicable)
 - l. Any other functional requirements pertaining to your design

In addition to the functional requirements, put together a list of your anticipated key design features, including the following:

- a. Power output rating (or isotope quantity annually, or district heating power)
- b. Reactor configuration (loop, pool, integral, etc.)
- c. Coolant Type (Metal, Water, Gas, Salt)
- d. Fuel type and configuration
- e. Forced or natural circulation (or no flow)
- f. Neutron Spectrum (and if applicable moderation)
- g. Safety systems
- h. Pump Types (radial, axial, mixed, Electromagnetic, etc.)
- i. Decay Heat removal systems (functions)
- j. Fabrication method (factory, on site, in hole)

- k. Implementation of reactivity control
 - l. Fuel cycle length
 - m. Maintenance strategy (timelines and methods)
 - n. Power generation system type/design
3. Please install OpenMC on your computer. This needs to be done today or tomorrow in order to be ready for the neutronics lecture for the next class. Please use the following links materials to set up your OpenMC:

Presentation: <https://youtu.be/18srwjXrwnE>

Handout:

http://www.et.byu.edu/~mjm82/che693R/Spring2021/Homework/OpenMC_Installation_Guide.pdf