Looks good! Thanks for sharing it in Overleaf!-Richard

Chosen project

Write a multigroup 1D diffusion solver with vacuum boundary on the left and reflecting boundary on the right. It must account for heterogeneous media with at least two materials. I will follow the following schedule to complete this project by 2 Dec 2021. Also, I expect to finish the beginning deadlines early and will update later deadlines to give myself more leeway on the back end.

Due 22 Oct 2021

First thing I will do will be to write out the diffusion equation and get a better understanding of each part of the equation. I am first going to write my code with just one group to keep it simpler in the beginning. While writing it, I will keep in mind that it will get expanded to two or more groups and will write it so that it can be expanded easily by including comments and variables that will be easy to differentiate to which group they belong.

Due 3 Nov 2021

Next, the diffusion equation will need to be discretized. I will initially choose the midpoint method, but will look at others to see if one performs better given the boundary conditions. In setting up the discretized equation, I will begin to think about the geometric size of my model and how small I will discretize it based on the material parameters. This means that I will need to choose at least two materials to model. I will choose materials relevant to nuclear reactors (water, steel, zircaloy, etc.). After choosing the materials, I need to attain the cross section information relevant to the diffusion equation.

Also in this week, I will begin writing the report. It will be beneficial to start writing it now as the theory behind the code will be the bulk of the report. I would like to have it in an outline form with roughly 1-2 pages of content.

Due 12 Nov 2021

At this point, I will be ready to begin coding. I will write up a pseudo-code version to outline everything and identify anything that I may have missed when working through the previous parts of this project. This pseudo-code will incorporate functions and subroutines as needed

to help keep the code clear and concise. Early in this week, I will also analytically solve the diffusion equation to be able to compare the results of the code.

Due 19 Nov 2021

In this week, I will expand the pseudo-code into actual working code. I will start with the main portion of the code and will incorporate "dummy" subroutines initially. Next will be the input data subroutine. This one will be the easiest to run independently and check that it is working correctly, plus this will be fed into subsequent subroutines. I will finish up the other subroutines and get to a draft version of my final code.

The draft of a report should be mostly finished. I'm expecting to have roughly 8 pages at this point.

Due 26 Nov 2021

Testing will begin in earnest here. I will ensure that my code works properly and gives answers that are expected through analytical results. Revisions will be made on my paper and ideally I will have it at 10-12 pages, but will have to see how much is needed to explain my code. If time permits, I will attempt to add in additional details to my code. I will have been using GitHub, so this will be done in a branch so as not to mess up my previous success.

Due 2 Dec 2021

The final code and report is due on 2 Dec. In this week, if I have not already, I will get advice on final revisions. Most likely I will have asked for advice earlier, so it may not be needed. I will be preparing the presentation during this week. Ideally, I will have commented and kept notes so that developing a presentation will be no great feat.

Final thoughts

Much of this will probably change as I work through the next couple of months. This is a fairly big project and each part will have challenges that arise as I work through them. The timeline should give me the ability to adjust to anything that will come up and this document will get adjusted accordingly.