

Nuclear Engineering 150 – Discussion Section
Team Exercises #10

Problem 1

Consider a sphere composed of a homogeneous multiplying medium, and surrounded by a reflecting shell of non-multiplying material with a thickness equal to half the radius of the sphere. Outside of the reflector is vacuum.

- a.) Write the diffusion equation and boundary conditions describing this system.
- b.) Calculate the flux in both regions that are not vacuum.
- c.) Determine the reflector savings.

Problem 2

Consider a bare sphere composed of a homogeneous multiplying medium.

- a.) Give the steady-state, continuous energy diffusion equation. Assume that the diffusion coefficient (D) and the average neutrons produced from fission (ν) are constant for all energies.
- b.) Derive the multigroup equation corresponding to the case where there are three energy groups. Assume that there is no upscattering and all groups are directly coupled.
- c.) Write the multigroup equation you found as a matrix-equation.