

Team Exercise Solutions #10

Problem 1

Consider an infinite slab of material described by diffusion coefficient D and macroscopic cross section Σ_a . The material extends infinitely in two dimensions, but has vacuum boundaries at $x = a$ and $x = 0$. At $x = 0$ there is also a uniformly distributed source plane with strength s'' [neutrons per area]. Find the flux in this geometry. (You may use the substitution $L = \sqrt{\frac{D}{\Sigma_a}}$.)

Problem 2

Consider an infinite slab of material described by diffusion coefficient D and macroscopic cross section Σ_a . The material extends infinitely in two dimensions, but has vacuum boundaries at $x = \pm a$. Inside the slab is a uniformly distributed source with strength s''' [neutrons per volume]. Find the flux in this geometry. (You may use the substitution $L = \sqrt{\frac{D}{\Sigma_a}}$.)