(19.9) The LOPO reactor in exercise 19.6 has a neutron age τ = 31.4 cm^2, and diffusion area L^2 1.87 cm^2. Calculate (a) the fast neutron leakage factor, and (b) the critical radius for the homogeneous sphere, if $k_{infinity}$ = 1.50.

$\tau := 31.4 \cdot cm^2$ $L_2 := 1.87 \cdot cm^2$ $k_{inf} := 1.50$ $f := 0.75$

(a) Leakage factor:

$M_2 := L_2 + \tau$ $B_2 := \frac{k_{inf} - 1}{M_2}$ $\Lambda_{th} := \frac{1}{1 + B_2 \cdot L_2}$ $\Lambda_f := \exp\left(-B_2 \cdot \tau\right)$

$\Lambda := \Lambda_f \Lambda_{th}$ $\Lambda = 0.607$

(b) Radius of critical sphere:

$radius := \sqrt{\frac{\pi^2}{B_2}}$ $radius = 0.256 \cdot m$