Concept questions

Discussion Week 7

What is the mathematical relationship between the neutron reproduction factor, η, and the various macroscopic cross sections?

a) $\eta(E) = \dfrac{\nu\Sigma_f(E)}{\Sigma_a(E)}$

b) $\eta(E) = \dfrac{\Sigma_f(E)}{\Sigma_t(E)}$

c) $\eta(E) = \dfrac{\nu\Sigma_f(E)}{\Sigma_t(E)}$

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We have an infinite reactor.

$$k = \varepsilon p f \eta P_{FNL} P_{TNL}$$

$$k_\infty = \varepsilon p f \eta \qquad\qquad P_{FNL} P_{TNL} = 1$$

By increasing the moderator-to-fuel ratio in a reactor, which factor in the four-factor formula also increases? Which factor decreases?

a) η, f

b) f, η

c) p, f

d) f, ε

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a) η, f

c) p, f

b) f, η

d) f, ε

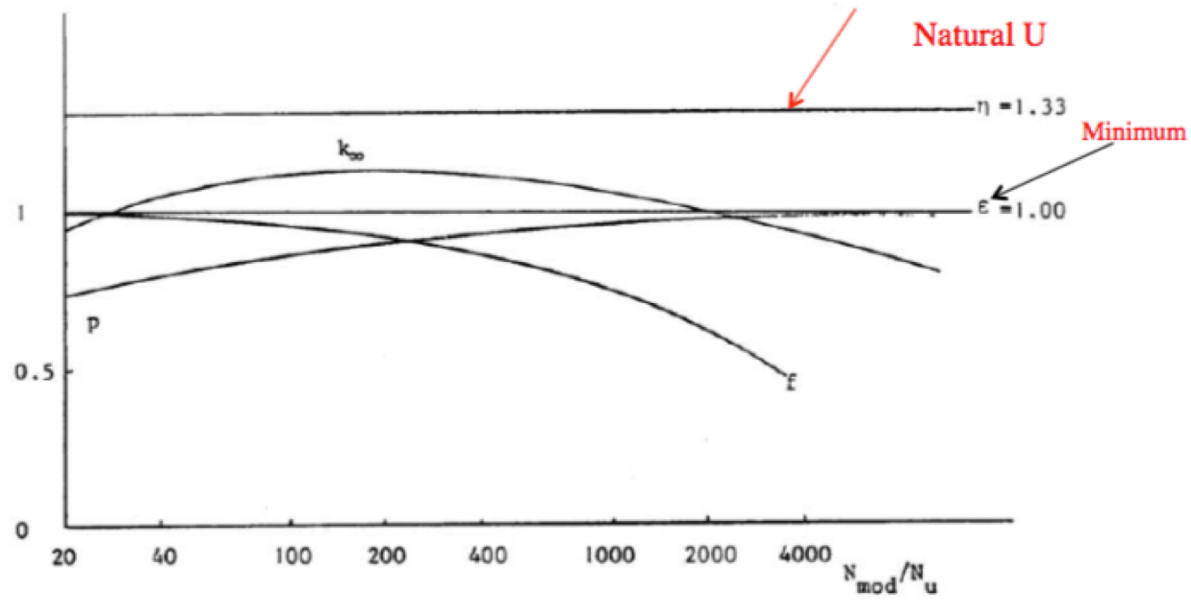

Figure 6.8. Dependence of k_∞ on the moderator-to-fuel ratio