(19.4) Calculate the number of collisions required to reduce a fast fission neutron \( (E_n^0 = 2 \text{ MeV}) \) to thermal energy \( (E_n = 0.025 \text{ eV}) \) in a light-water-moderated reactor, assuming that the data in Table 19.3 are valid.

Data, constants, and units:

\[ eV := 1.6021773 \times 10^{-19} \text{ joule} \quad \xi := 0.927 \]

Data given in the text:

\[ E_{0n} := 2 \times 10^6 \text{ eV} \quad E_n := 0.025 \text{ eV} \]

Calculations:

\[ n := \xi^{-1} \cdot \ln \left( \frac{E_{0n}}{E_n} \right) + 1 \quad \text{Eqn. (19.7)} \quad n = 20.63 \]

\[ n = 21 \quad \text{average number of collisions} \]