PROBLEM 13-13N QUESTION

Maximum Clad Temperature For LMFBR Reactor

Derive the relationship between the physical and extrapolated axial lengths for a LMFBR core such that the maximum clad temperature occurs at the core outlet during steady-state operating conditions. This relationship describes the truncation of the assumed sinusoidal thermal flux variation along the core axis.

Ignore the reactor blankets and assume the following remain constant along the axial length of the core:

(i) heated perimeter of channels
(ii) mass flux of coolant
(iii) coolant specific heat
(iv) film heat transfer coefficient