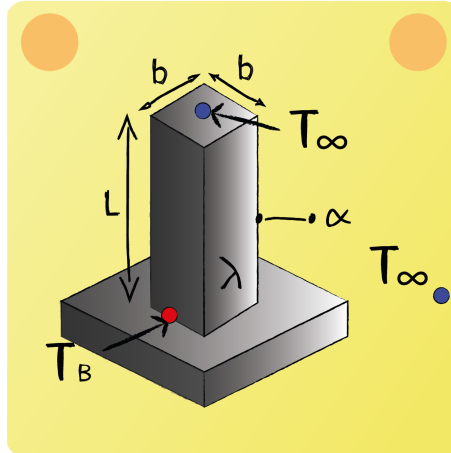




Lecture 12 Question 3

Derive an expression for the fin efficiency.



$$\eta_R = \frac{\dot{Q}_{\text{cond,base}}}{\dot{Q}_{\text{max}}}$$

$$\dot{Q}_{\text{cond,base}} = \lambda \cdot A_c \cdot \frac{\Theta_B \cdot m}{\tanh(mL)}$$

$$\dot{Q}_{\text{max}} = A_s \cdot \alpha \cdot \Theta_B$$

$$\Rightarrow \eta_R = \frac{\lambda \cdot A_c \cdot \frac{\Theta_B \cdot m}{\tanh(mL)}}{U \cdot L \cdot \alpha \cdot \Theta_B}$$

$$= \frac{\tanh(m \cdot L)}{m \cdot L \cdot \tanh(m \cdot L)}$$