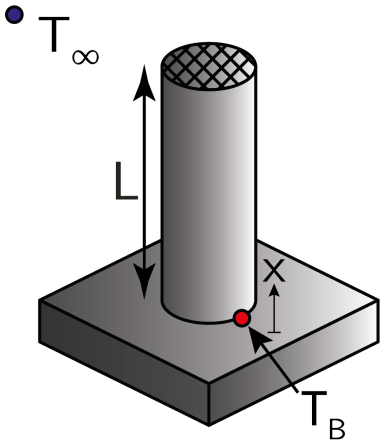
Fins - Boundary Conditions 2

Choose the right boundary condition at the tip $x = L$ for a fin, with an adiabatic head, for solving the fin equation.



Given the fin equation:

$$\frac{\partial^2 \theta}{\partial x^2} - m^2 \theta = 0$$

Where:

$$\theta(x) = T(x) - T_\infty$$

It is known that the head is adiabatic, implying that no heat is transferred at the tip. This can be stated as follows:

$$\dot{Q} = -\lambda A_c \frac{\partial T}{\partial x}|_{x=L} = -\lambda A_c \frac{\partial \theta}{\partial x}|_{x=L} = 0$$

Where dividing by the constants $-\lambda$ and A_c yields:

$$\rightarrow \frac{\partial \theta}{\partial x}|_{x=L} = 0$$