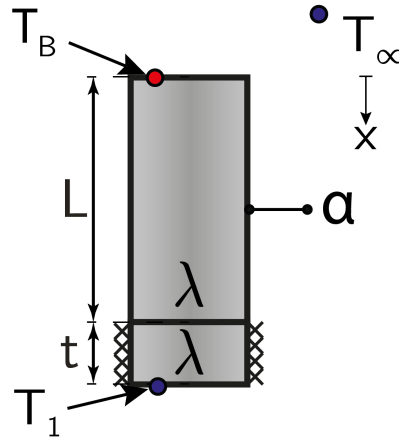# Fins - Boundary Conditions 5

Choose the right boundary condition at the tip $x = L$ for a fin, that has its tip attached to a plane wall system with identical thermal conductivty, 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 all heat left at the tip is transferred toward the plane wall system. From an energy balance, an the interface $(x = L)$ between both systems one finds that:

$$0 = -\lambda A_C \frac{\partial T}{\partial x}\Big|_{x=L} + \lambda A_C \frac{T(x = L) - T_1}{t}$$

Where rewriting yields:

$$\rightarrow \frac{\partial \theta}{\partial x}\Big|_{x=L} = \frac{T(x = L) - T_1}{t}$$