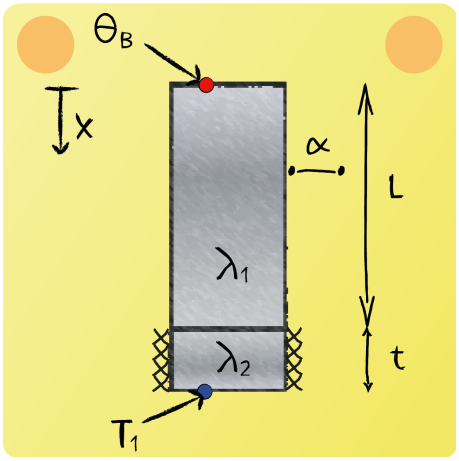
Fins - B.C.4

Choose the right boundary condition for a fin with the fin head attached to a plane wall of thickness t.



Definition of θ:

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

And thus

$$\theta(0) = T(0) - T_\infty = T_\mathrm{B} - T_\infty = \theta_\mathrm{B}$$

Energy balance at the transition from the fin towards the plane wall:

$$\dot{q}''_{\mathrm{cond,fin}} - \dot{q}''_{\mathrm{cond,planewall}} = 0$$

Where:

$$\dot{q}''_{\mathrm{cond,fin}} = -\lambda_1 \cdot \frac{d\theta}{dx}|_{x=L}$$

$$\dot{q}''_{\mathrm{cond,planewall}} = -\lambda_2 \cdot \frac{T(x=L) - T_1}{t}$$