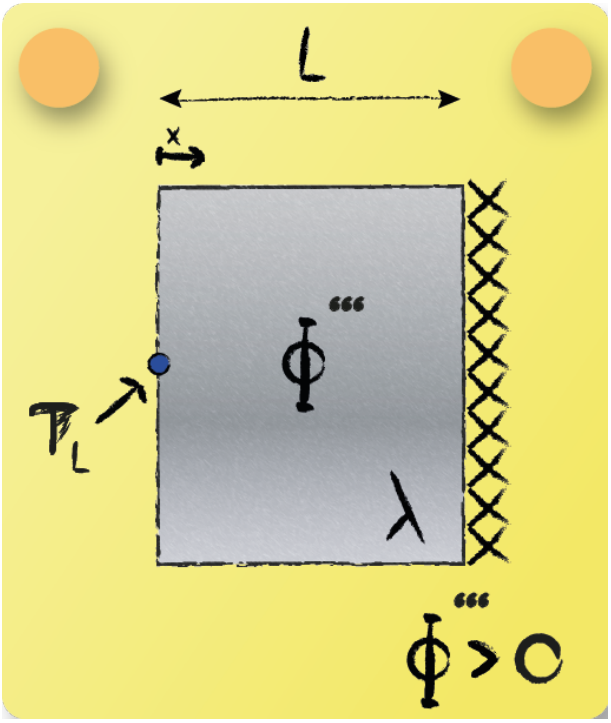
Energy Balance: Task 8



Choose the differential equation that describes the steady temperature profile in x-direction.

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The energy balance of an infinitesimal slice in x-direction yields:

$$0 = -A_q \lambda \frac{\partial T}{\partial x} + A_q \lambda \left(\frac{\partial T}{\partial x} + \frac{\partial^2 T}{\partial x^2} dx\right) + A_q \dot{\phi}''' dx$$

Canceling out recurring terms and rearranging for the second spatial temperature derivative one obtains the differential equation:

$$0 = \frac{\partial^2 T}{\partial x^2} + \frac{\dot{\phi}'''}{\lambda} \Theta$$