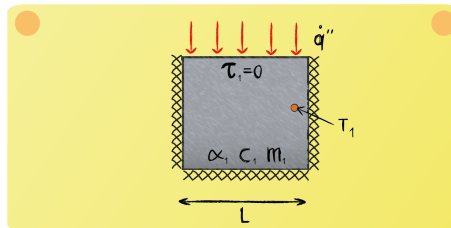# Energy Balance - Radiation - Transient 1

Setup the outer energy balance to compile a differential equation for the temporal variation of the homogeneous temperature T_1 of the grey cube. The body is exposed to a radiative heat flux $\dot{q}''$.

The side walls and bottom are adiabatic and the radiation of the surroundings can be neglected.

Energy balance:

$$\frac{dU}{dt} = \dot{Q} - \dot{Q}_1$$

Change of internal energy over time:

$$\frac{dU}{dt} = m_1 \cdot c_1 \cdot \frac{dT_1}{t}$$

Heat fluxes:

$$\dot{Q} = \dot{q}'' \cdot L^2$$

$$\dot{Q}_1 = \dot{Q}_{1\epsilon} + \rho_1 \cdot \dot{q}'' \cdot L^2$$

$$\dot{Q}_{1\epsilon} = \epsilon_1 \cdot \sigma \cdot L^2 \cdot T_1^4$$

Spectral properties:

$$\rho_1 = 1 - \alpha_1$$

$$\epsilon_1 = \alpha_1$$