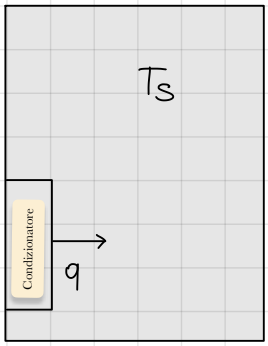
MODELLI TERMICI



$C \frac{dT}{dt} = q$ ← Flusso Termico

↑ Capacità Termica

↳ $q = \frac{dQ}{dt}$

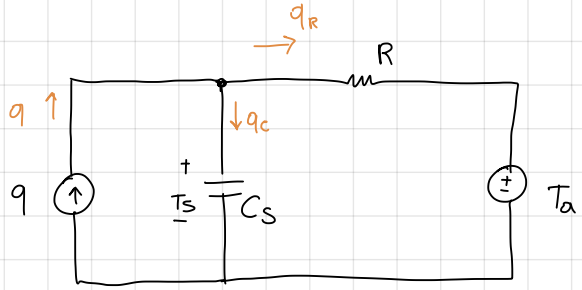
CALORE ↓

$C = \frac{Q}{\Delta T}$

↑ Variazione di Temp.

$\begin{cases} i \to q \\ v \to T \end{cases}$ Circuiti → Termic.

$R = \frac{\Delta T}{q}$ Resistenza Termica → funziona per $\begin{cases} \text{CONDUZIONE} \\ \text{CONVEZIONE} \end{cases}$



(1) $C_S \frac{dT_S}{dt} = q - q_R$ con $q_R = \frac{T_S - T_a}{R}$

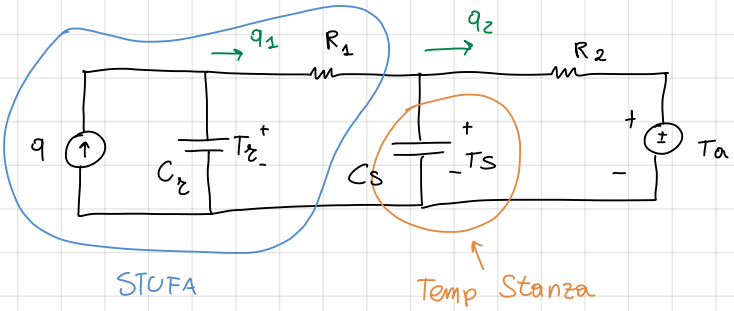
$u_1 = q$ $\quad u_2 = T_a$ $\quad x = T_S$

$G(s) = \frac{T_S(s)}{Q(s)} =$ → $sC_S T_S = Q - \frac{T_S - T_a}{R}$ → $\left(sC_S + \frac{1}{R}\right) T_S = Q + \frac{1}{R} T_a$

→ mcm → $T_S = \frac{R}{SRC_S + 1} Q + \frac{1}{SRC_S + 1} T_a$

Influenza della Temp. esterna

IL RADIATORE



$$C_r \frac{dT_r}{dt} = q - q_1$$

$$q_1 = \frac{T_r - T_s}{R_1}$$

$$C_s \frac{dT_s}{dt} = q_1 - q_2$$

$$q_2 = \frac{T_s - T_a}{R_2}$$

$u_1 = T_a \qquad u_2 = q$

$x_1 = T_r \qquad x_2 = T_s$

$SC_r T_r = Q - Q_1$ → Sub Q_1 → $SC_r T_r = Q - \frac{T_r}{R_1} + \frac{T_s}{R_1}$ → Trovo T_r (1)

$SC_s T_s = Q_1 - Q_2$ → Sub Q_2 → $SC_s T_s = \frac{T_r}{R_1} - \frac{T_s}{R_1} + \frac{T_s}{R_2} - \frac{T_a}{R_2}$ (2)

dalla (2) → $\left(SC_s + \frac{1}{R_1} + \frac{1}{R_2}\right) T_s = \frac{T_r}{R_1} + \frac{T_a}{R_2}$

$$\left(SC_s + \frac{1}{R_1} + \frac{1}{R_2}\right) T_s = \frac{1}{1 + SR_1C_r} Q + \frac{1/R_1}{1 + SR_1C_r} T_s + \frac{T_a}{R_2}$$