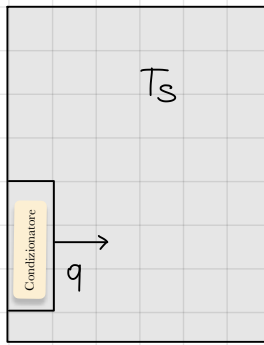


# MODELLI TERMICI



$$\textcircled{C} \frac{dT}{dt} = q$$

↑ Capacità Termica

← Flusso Termico

$$q = \frac{dQ}{dt}$$

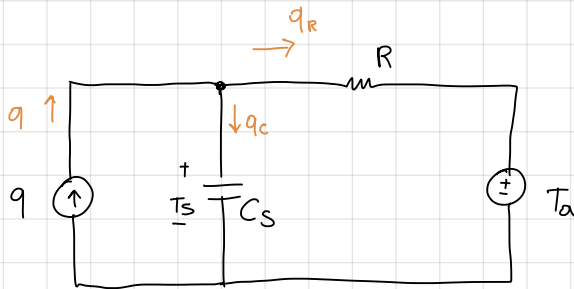
$$C = \frac{Q}{\Delta T}$$

↑ Variazione di Temp

← CALORE

$\begin{cases} 1 \rightarrow q \\ 2 \rightarrow T \end{cases}$ 
 Circuiti  $\rightarrow$  Termic.

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



$$(1) \quad C_s \frac{dT_s}{dt} = q - q_R \quad \text{con} \quad q_R = \frac{T_s - T_a}{R}$$

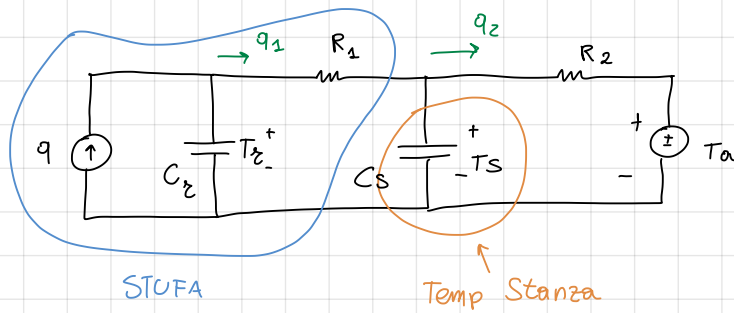
$u_1 = q \quad u_2 = T_a \quad x = T_s$

$$G(s) = \frac{T_s(s)}{Q(s)} = \dots$$

$$s C_s T_s = Q - \frac{T_s - T_a}{R} \rightarrow (s C_s + \frac{1}{R}) T_s = Q + \frac{1}{R} T_a$$

$\rightarrow mcm \rightarrow T_s = \frac{R}{s R C_s + 1} Q + \frac{1}{s R C_s + 1} T_a$ 
 Influenza della Temp. esterna

# IL RADIATORE



$$C_z \frac{dT_z}{dt} = q - q_1$$

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

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

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

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

$$x_1 = T_z \quad x_2 = T_s$$

$$S C_z T_z = Q - Q_1 \quad \rightarrow \text{Sub } Q_1 \rightarrow S C_z T_z = Q - \frac{T_z}{R_1} + \frac{T_s}{R_1} \rightarrow \text{Trovo } T_z \quad (1)$$

$$S C_s T_s = Q_1 - Q_2 \quad \rightarrow \text{Sub } Q_2 \rightarrow S C_s T_s = \frac{T_z}{R_1} - \frac{T_s}{R_2} + \frac{T_s}{R_2} - \frac{T_a}{R_2} \quad (2)$$

$$\text{dalla (2)} \rightarrow \left( S C_s + \frac{1}{R_1} + \frac{1}{R_2} \right) T_s = \frac{T_z}{R_1} + \frac{T_a}{R_2}$$

$$L \left( S C_s + \frac{1}{R_1} + \frac{1}{R_2} \right) T_s = \frac{1}{1 + S R_1 C_z} Q + \frac{\frac{1}{R_1}}{1 + S R_1 C_z} T_s + \frac{T_a}{R_2}$$