Tesis PL

19:40
25/3/2020

9. a)

1 Escribir ecuaciones
2 transformadas
3 Dominio en Diagramas
4 Mover Diagramas
5 Determinar funcion de transferencia.

$$q = \frac{T_1(t) - T_2(t)}{R}$$ formula

q - heat energy flow
$T_1(t)$ & $T_2(t)$ - temperatures.
0

$$\frac{(T_0 - T_m(t))}{R} = C \frac{d}{dt}(T_m(t) - T_m(0))$$

$$\Updownarrow$$

$$R \times C \frac{d}{dt} T_m + T_m = T_0$$ = formula.

9.a) $FT = \frac{T_{m(s)}}{T_{a(s)}}$

formulas

$$q = \frac{T_{1(t)} - T_{2(t)}}{R_1 - R_2}$$

R - Radio

$$q = C \frac{d}{d(t)} T_{(t)}$$

$$q_r = \frac{T_{1(t)} - T_{2(t)}}{(R_1 - R_2)}$$

$T_{a(s)} \rightarrow$ $Q_{1(s)} \rightarrow$ $T_{v(s)} \rightarrow$

$Q_{2(s)} \rightarrow$ $T_{m(s)} \rightarrow$

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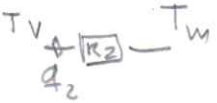
9a)

$$q_{1(t)} = \frac{T_{a(t)} - T_{v(t)}}{R_1}$$

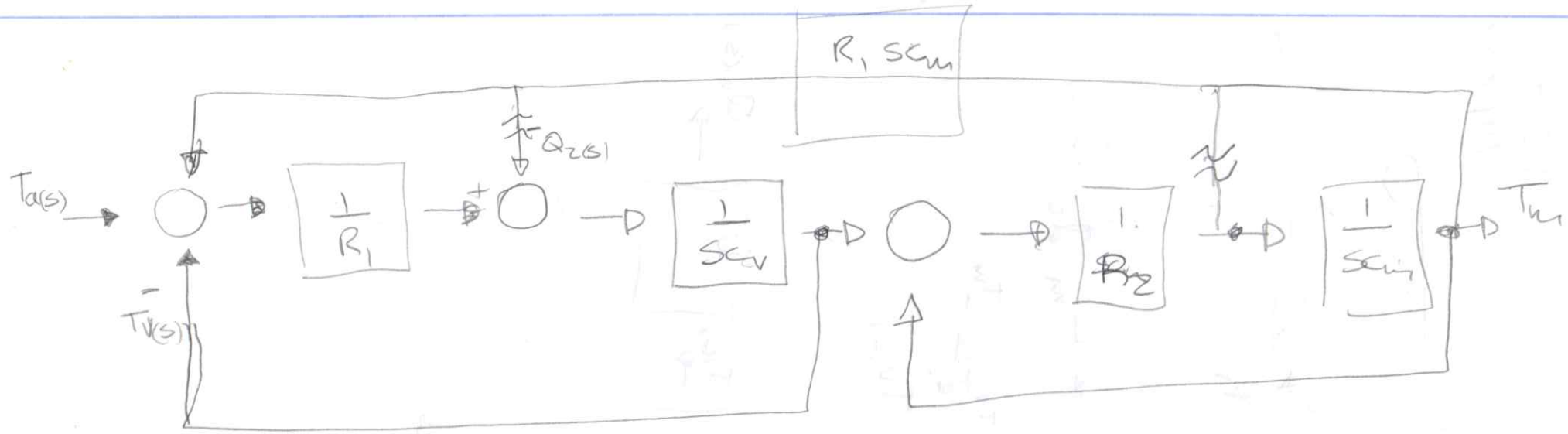
$$q_{2(t)} = \frac{T_{r(t)} - T_{m(t)}}{R_2} = C_m \frac{d}{dt} T_{m(t)}$$



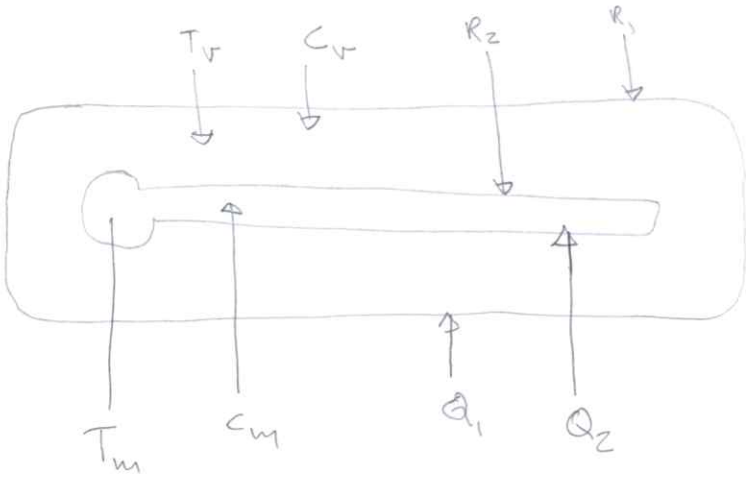
$$q_{1(t)} - q_{2(t)} = C_r \frac{d}{dt} T_{v(t)}$$

$$\begin{cases} Q_{2(s)} = \dfrac{T_{a(s)} - T_{m(s)}}{R_1} \\ Q_{1(s)} - Q_{2(s)} = C_r \, s \, T_{v(s)} \\ Q_{2(s)} = \dfrac{T_{r(s)} - T_{m(s)}}{R_2} \\ Q_{2(s)} = C_m \, s \, T_{m(s)} \end{cases}$$

q_6



9 a)

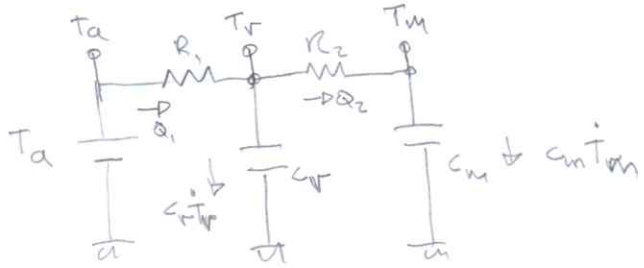


Funções

T_a Q_1

T_r Q_2

T_m



$$\frac{T_{m(s)}}{T_{a(s)}}$$

$$Q_1 = Q_2 + C_r \dot{T}_r \qquad \frac{T_a - T_r}{R_1} = Q_1$$

$$Q_2 = C_m \dot{T}_m \qquad \frac{T_r - T_m}{R_2} = Q_2$$

$$\begin{cases} Q_1 = Q_2 + sC_r T_r \\ Q_2 = sC_m T_m \end{cases} \qquad \begin{cases} T_a = Q_1 R_1 + T_r \\ T_r = Q_2 R_2 + T_m \end{cases}$$

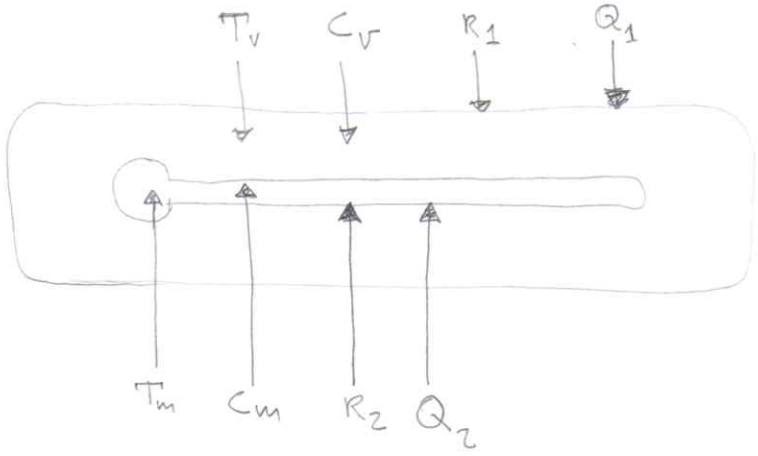
$$T_m = \frac{Q_2}{sC_m}$$

$$T_r = \frac{Q_1 - Q_2}{sC_r} = \frac{Q_1}{sC_r} - \frac{Q_2}{sC_r}$$

$$T_m = \frac{Q_2}{sC_m}$$

— II —

$$\begin{cases} T_a = Q_1 R_1 + \left(\frac{1}{sC_r} Q_1 - \frac{1}{sC_r} Q_2\right) \\ 0 = Q_2 R_2 + \frac{1}{sC_m} Q_2 - \left(\frac{1}{sC_r} Q_1 - \frac{1}{sC_r} Q_2\right) \end{cases}$$



T_a

$$\frac{T_a - T_v}{R_1} = Q_1 \qquad \frac{T_v - T_m}{R_2} = Q_2$$

$$Q_1 - Q_2 = C_v \cdot \frac{d}{dt} T_v$$

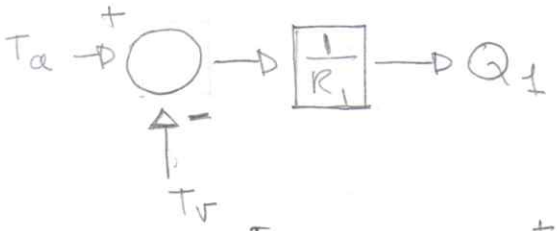
$$Q_2 = C_m \cdot \frac{d}{dt} T_m$$

$$FT = \frac{T_{m(s)}}{T_{a(s)}}$$

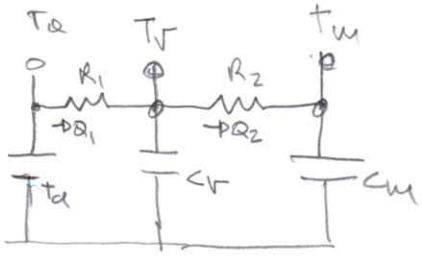
Q - caudal térmico

T - temperatura

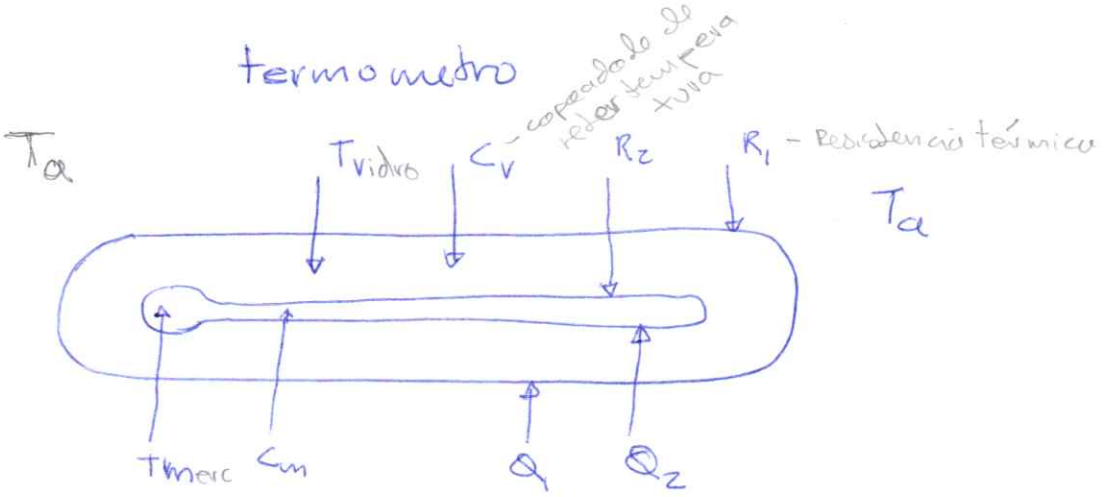
C - capacidade térmica.



$\frac{T_m}{T_a} = ?$



9. termometro



$$\begin{cases} Q_1(t) - Q_2(t) = C_v \dfrac{d}{dt}\{T_v(t)\} \\ Q_1(t) = \dfrac{T_a(t) - T_v(t)}{R_1} \quad \text{flow} \\ Q_2(t) = C_m \dfrac{d}{dt}\{T_m(t)\} \\ Q_2(t) = \dfrac{T_v(t) - T_m(t)}{R_2} \end{cases}$$

$$FT = \frac{T_{m(s)}}{T_{a(s)}} = \frac{1}{(1+sR_2 \cdot C_m)(1+sR_1C_v) + sR_1C_m}$$

$\dot{q}$ ou $\dot{Q}$ → condutal termico
heat flow