Problemas con Generación y Pérdida.

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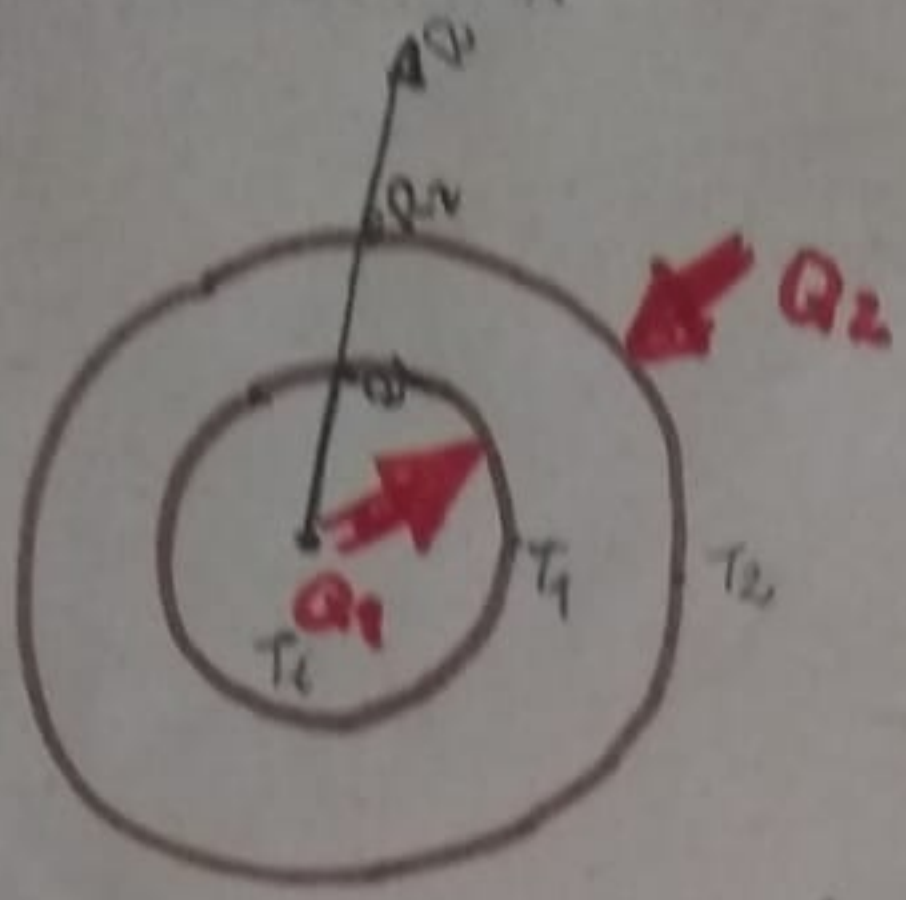

Ecuación General de Calor (Cilíndricas)

$$\frac{1}{r}\frac{\partial}{\partial r}\left(Kr\frac{\partial T}{\partial r}\right)+\frac{1}{r^2}\frac{\partial}{\partial \phi}\left(K\frac{\partial T}{\partial \phi}\right)+\left(K\frac{\partial T}{\partial z}\right)+\dot{e}gen=\rho c\frac{\partial T}{\partial t}$$

- Consideramos
  - → Steady State
  - → Parametros Constantes ⇒ K, h y r
  - → Transferencia en forma radial (unidireccional)

$$\frac{1}{r}\frac{d}{dr}\left(Kr\frac{dT}{dr}\right)+\dot{e}gen=0$$

$$\frac{d}{dr}\left(r\frac{dT}{dr}\right)+\frac{r\dot{e}gen}{K}=0 \Rightarrow \frac{d}{dr}\left(r\frac{dT}{dr}\right)+\frac{r\dot{e}_{con}}{K}=0$$

$$r\frac{dT}{dr}=\frac{-r^2\dot{e}_{con}}{2K}+C_1 \Rightarrow \boxed{\frac{dT}{dr}=\frac{-r\dot{e}_{con}}{2K}+\frac{C_1}{r}}$$

$$T=-\frac{r^2\dot{e}_{con}}{4K}+C_1\ln r+C_2$$

→ C.F.1

$r = R_2 \qquad T = T_2$ ——— ▶ se intercambia debido al consumo $\dot{e}_{con}$

$$h_E (T_2 - T_E) = -K \frac{dT}{dr}$$

→ C.F.2

$r = R_1 \qquad T = T_1$

$$h_i (T_i - T_1) = -K \frac{dT}{dr}$$

Sbr:/ **BF1**

$$h_i (T_i - T_1) = -K \left[\frac{-r \dot{e}_{con}}{2K} + \frac{C_1}{R_1} \right]$$

$$h_i \left(T_i + \frac{R_1^2 \dot{e}_{con}}{4 \cdot K} + C_1 \ln R_1 + C_2 \right) = -K \left[\frac{-R_1 \dot{e}_{con}}{2K} + \frac{C_1}{R_1} \right]$$ ①

CR2

$$h_E \left(\frac{R_2^2 \dot{e}_{con}}{4 \cdot K} + C_1 \ln R_2 + C_2 - T_E \right) = -K \left[\frac{R_2 \dot{e}_{con}}{2K} + \frac{C_1}{R_2} \right]$$ ①

- En el Min $\frac{dT}{dr} = 0$

$$T = \frac{-r^2 \dot{e}_{con}}{4K} + C_1 \ln r + C_2$$

$$0 = -\frac{r \dot{e}_{con}}{2K} + \frac{C_1}{r} \Rightarrow \frac{-r^2 \dot{e}_{cons}}{2K} + C_1 = 0$$

$$r_{min} = \left(+ \frac{C_1 \cdot 2K}{\dot{e}_{cons}} \right)^{1/2} \quad (1)$$

$$T = T(r_{min}) = \frac{-r_{min}^2 C_1 C_1}{4K} + C_1 \ln r_{min} + C_2$$

$$h_i T_i + \frac{R_1^2 \, x[1]}{4K} + \alpha[2] \ln R_1 + \alpha[5] = -K \left[\frac{R_1 \alpha[1]}{2K} + \frac{\alpha[2]}{R_1} \right]$$