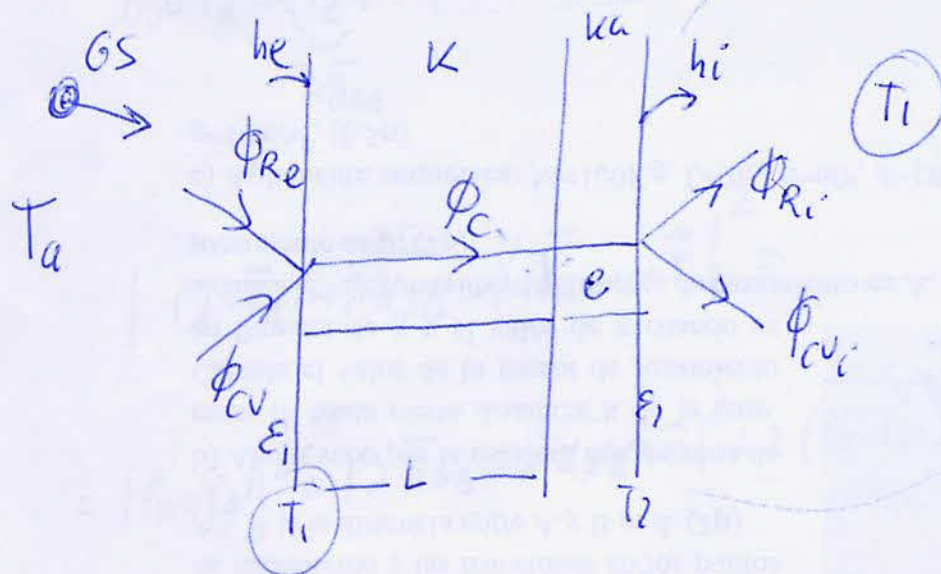


PROBLEMA 1



$$(1) \phi_{Re} + \phi_{Cv_e} = \phi_C$$

valor de (e) para que T_e valga algo

$$(2) \phi_C = \phi_{Ri} + \phi_{Cv_i}$$

datos todos salvo (T_2) y (e)

$$(1) \epsilon_1 q_s - \epsilon_1 \sigma (T_1^4 - T_a^4) + h_e (T_a - T_e) = \frac{T_1 - T_2}{\frac{L}{K} + \frac{e}{K_a}} \quad \begin{matrix} 2 \text{ es con} \\ 2 \text{ magnitudes.} \end{matrix}$$

$$(2) \frac{T_1 - T_2}{\frac{L}{K} + \frac{e}{K_a}} = \epsilon_2 \sigma (T_2^4 - T_e^4) + h_i (T_2 - T_e) \quad \begin{matrix} (e) \text{ y } (T_2) \end{matrix}$$

Los datos son: $\epsilon_1 = 0,3$ $\epsilon_2 = 0,8$ $T_a = 35^\circ\text{C}$ $T_s = 39^\circ\text{C}$ $q_s = 1500 \text{ W/m}^2$
 $h_e = 100 \text{ W/m}^2\text{K}$ $h_i = 10 \text{ W/m}^2\text{K}$ $K = 50 \text{ W/m}^\circ\text{K}$ $K_a = 0,3 \text{ W/m}^\circ\text{K}$
 $L = 1 \text{ m}$, $T_i = 22^\circ\text{C}$

La solución del sistema anterior es: $T_2 = 297,85^\circ\text{C} = \underline{\underline{24,85^\circ\text{C}}}$
 $e = 0,095 \text{ m} = \underline{\underline{9,5 \text{ cm}}}$

Problema 2



Sol: $\phi_1 + \phi_2 + \phi_3 = 0$ con $\phi_2 = 0$ (refractiva)

$$\left. \begin{aligned} \phi_1 &= \phi_{12} + \phi_{13} \\ \phi_3 &= \phi_{31} + \phi_{32} \end{aligned} \right\} \phi_1 + \phi_3 = 0 \Rightarrow \phi_{12} + \phi_{13} + \phi_{31} + \phi_{32} = 0$$

$\phi_{12} + \phi_{32} = 0$

$$\phi_{12} = S_1 F_{12} (T_1 - T_2) \quad \text{y} \quad J_1 = \epsilon_1 \sigma T_1^4 + (1 - \epsilon_1) (F_{12} J_2 + F_{13} J_3)$$

$$\phi_{32} = S_3 F_{32} (T_3 - T_2)$$

$$S_1 F_{12} (\epsilon_1 \sigma T_1^4 - \sigma T_2^4 + (1 - \epsilon_1) (F_{12} \sigma T_2^4 + F_{13} \sigma T_3^4)) + S_3 F_{32} \sigma (T_3^4 - T_2^4) = 0$$

es una ecuación en (T_2) donde

$$F_{11} + F_{12} + F_{13} = 1 \Rightarrow F_{12} = 1 - F_{13} = 0,98 \quad F_{31} = 0,5$$

$$F_{31} + F_{32} + F_{33} = 1 \Rightarrow F_{32} = 1 - F_{31} = 1 - \left(\frac{S_1 F_{13}}{S_3} \right) = 1 - \frac{\pi R^2}{4\pi r^2} \cdot 0,02$$

$$\pi F_{12} [\epsilon_1 T_1^4 - T_2^4 + (1 - \epsilon_1) (F_{12} T_2^4 + F_{13} T_3^4)] + \frac{1}{4} F_{32} (T_3^4 - T_2^4) = 0$$

Solución

$$F_{12} = 0,98 \quad F_{23} = 0,01 \quad F_{32} = 0,5$$

$$F_{21} = 0,49 \quad F_{31} = 0,5$$

$T_1 = 298,09 \text{ K}$

25,09°C