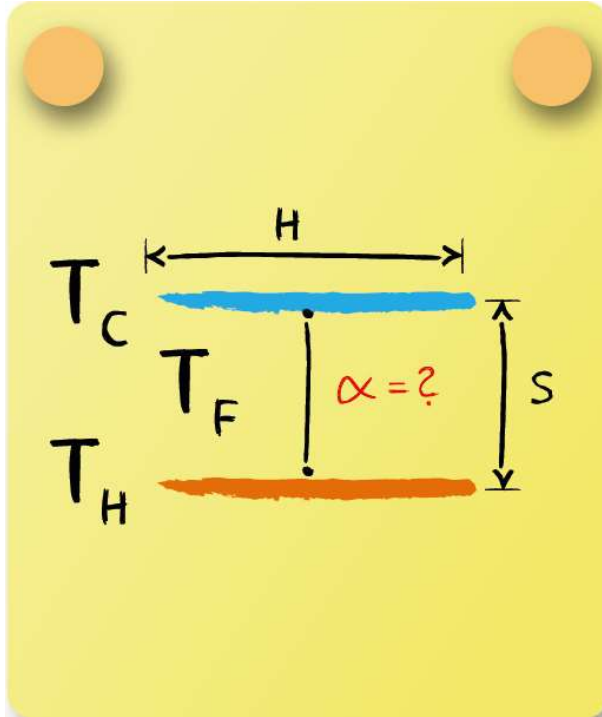


Heat Transfer Correlation 22.3



A gap between two horizontal plates is filled with an ideal gas. Calculate the mean heat transfer coefficient $\bar{\alpha}$ on the upper surface.

Coefficient of volume expansion for an ideal gas:

$$\beta = \frac{1}{T_F} = 0.0027 \text{ K}^{-1}$$

And thus:

$$\text{Gr}_s \cdot \text{Pr} = \frac{g \cdot \beta \cdot (T_H - T_C) \cdot s^3}{\nu^2} \cdot \text{Pr} = 2.19 \cdot 10^3$$



Nusselt number:

$$\overline{\text{Nu}}_s = 0.21 \cdot (\text{Gr}_s \cdot \text{Pr})^{1/4} = 1.43$$

Heat transfer coefficient:

$$\bar{\alpha} = \frac{\overline{\text{Nu}}_s \cdot \lambda_f}{s} = 10.96 \text{ W/m}^2\text{K}$$