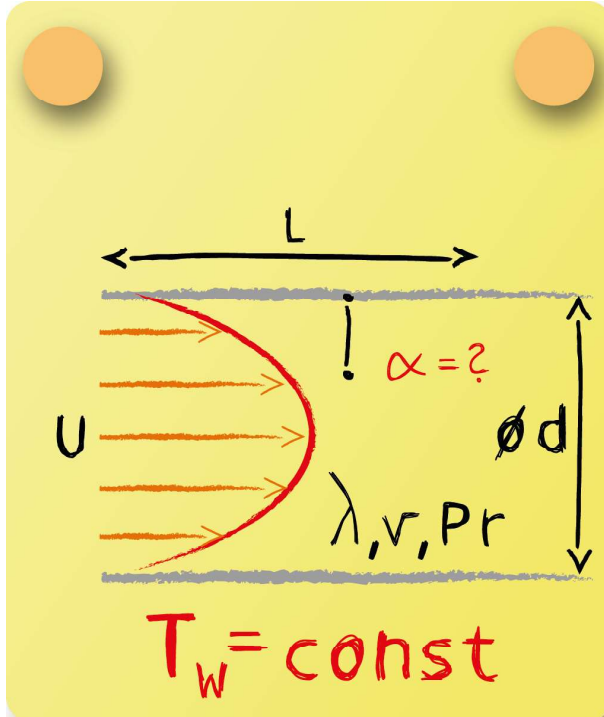


Heat Transfer Correlation 13.3



A fluid flows through a pipe with isothermal surface. Calculate the mean heat transfer coefficient $\bar{\alpha}$.

Reynolds number:

$$Re_d = \frac{u \cdot d}{\nu} = 1823.53$$

Thermal entry length:

$$L_{th} = 0.05 \cdot Re_d \cdot Pr \cdot d = 197.85 \text{ m} > L$$



Nusselt number:

$$\overline{Nu}_d = \left(3.66 + \frac{0.0677 \cdot (Re_d \cdot Pr \cdot \frac{d}{L})^{1.33}}{1 + 0.1 \cdot Pr \cdot (Re_d \cdot \frac{d}{L})^{0.83}} \right) \cdot \left(\frac{\eta}{\eta_w} \right)^{0.14} = 7.29$$

Heat transfer coefficient:

$$\bar{\alpha} = \frac{\overline{Nu}_d \cdot \lambda_f}{d} = 12.00 \text{ W/m}^2\text{K}$$