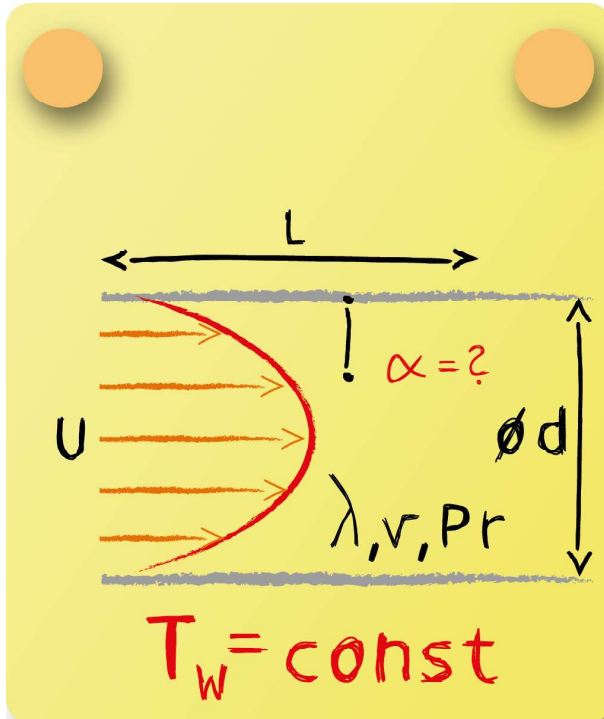


## Heat Transfer Correlation 13.5



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

Reynolds number:

$$Re_d = \frac{u \cdot d}{\nu} = 214.29$$

Thermal entry length:

$$L_{th} = 0.05 \cdot Re_d \cdot Pr \cdot d = 0.065 \text{ m} > L$$



Nusselt number:

$$\overline{Nu_d} = \left( 3.66 + \frac{0.0677 \cdot (Re_d \cdot Pr \cdot \frac{d}{L})^{1.33}}{1 + 0.1 \cdot Pr \cdot (Re_d \cdot \frac{d}{L})^{0.83}} \right) \cdot \left( \frac{\eta}{\eta_w} \right)^{0.14} = 5.80$$

Heat transfer coefficient:

$$\bar{\alpha} = \frac{\overline{Nu_d} \cdot \lambda_f}{d} = 128.93 \text{ W/m}^2\text{K}$$