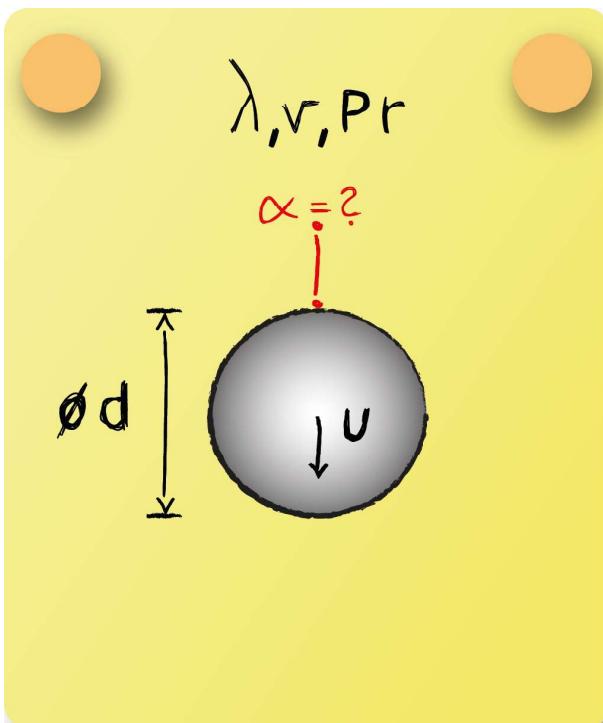


Heat Transfer Correlation 11.5



A sphere falls through a non-moving fluid. Calculate the mean heat transfer coefficient $\bar{\alpha}$.

Reynolds number:

$$\text{Re}_d = \frac{u \cdot d}{\nu} = 54.95$$

Nusselt number:



$$\overline{\text{Nu}}_d = 2 + \left(0.4 \cdot \text{Re}_d^{\frac{1}{2}} + 0.06 \cdot \text{Re}_d^{\frac{2}{3}} \right) \cdot \text{Pr}^{0.4} \cdot \left(\frac{\eta_{\infty}}{\eta_w} \right)^{\frac{1}{4}} = 16.04$$

Heat transfer coefficient:

$$\bar{\alpha} = \frac{\text{Nu}_d \cdot \lambda_f}{d} = 186.08 \text{ W/m}^2\text{K}$$