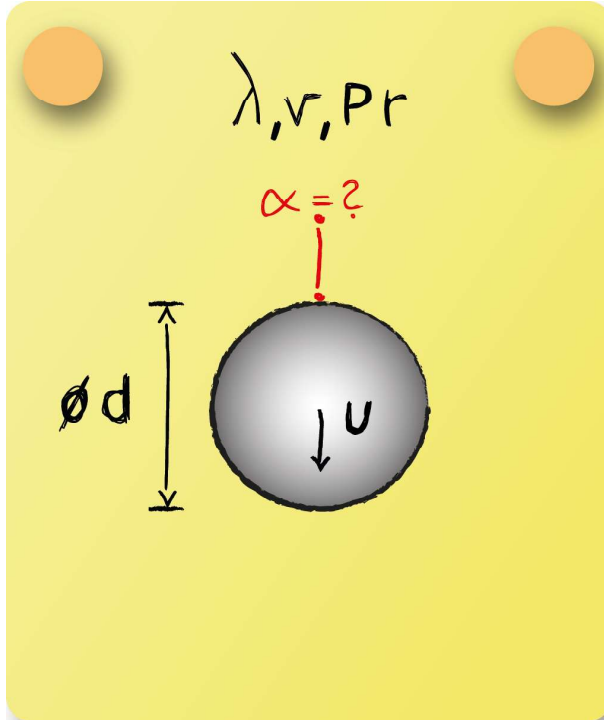


## Heat Transfer Correlation 11.4



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

Reynolds number:

$$\text{Re}_d = \frac{u \cdot d}{\nu} = 15.20$$

Nusselt number:



$$\overline{\text{Nu}}_d = 2 + \left( 0.4 \cdot \text{Re}_d^{\frac{1}{2}} + 0.06 \cdot \text{Re}_d^{\frac{2}{3}} \right) \cdot \text{Pr}^{0.4} \cdot \left( \frac{\eta_{\infty}}{\eta_w} \right)^{\frac{1}{4}} = 5.46$$

Heat transfer coefficient:

$$\bar{\alpha} = \frac{\overline{\text{Nu}}_d \cdot \lambda_f}{d} = 344.74 \text{ W/m}^2\text{K}$$