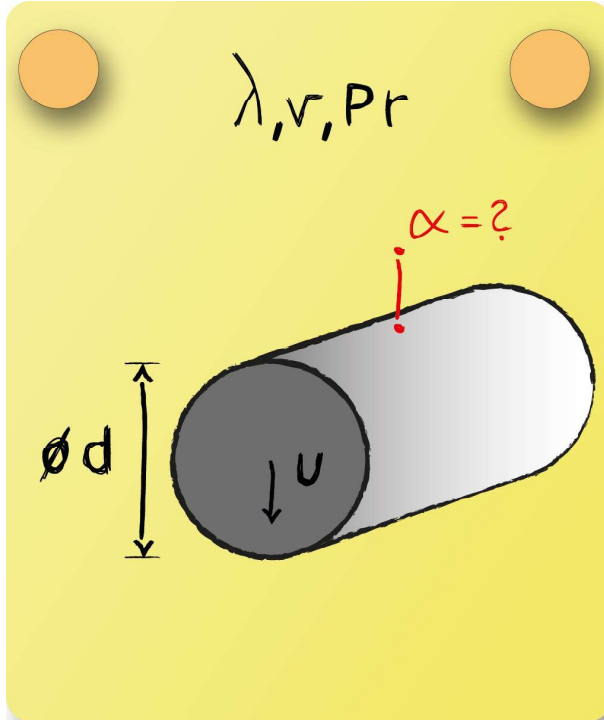# Heat Transfer Correlation 5.1

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

Reynolds number:

$$\mathrm{Re_d} = \frac{u \cdot d}{\nu} = 6.67 \cdot 10^4$$

Nusselt number:

$$\overline{\mathrm{Nu_d}} = 0.0266 \cdot \mathrm{Re_d}^{0.805} \cdot \mathrm{Pr}^{0.4} = 177.27$$

Heat transfer coefficient:

$$\bar{\alpha} = \frac{\overline{\mathrm{Nu_d}} \cdot \lambda_f}{d} = 23.05 \ \mathrm{W/m^2K}$$