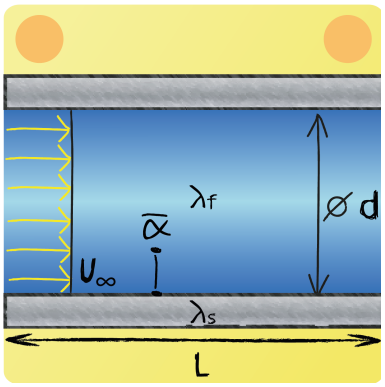
Lecture 9 Question 5

Give an expression for the Nusselt number $\overline{\mathrm{Nu}}$ for the given situation.



The standard expression for the Nusselt number is:

$$\overline{\mathrm{Nu}} = \frac{\alpha L_\mathrm{c}}{\lambda_\mathrm{fluid}}$$

The characteristic length has to be determined. For pipe flow in a cylindrical pipe, this is the diameter of the pipe.

Which thus is:

$$L_\mathrm{c} = d$$

And therefore the Nusselt number can be expressed as:

$$\overline{\mathrm{Nu}} = \frac{\alpha d}{\lambda_\mathrm{f}}$$