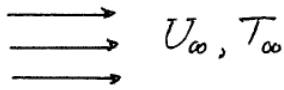
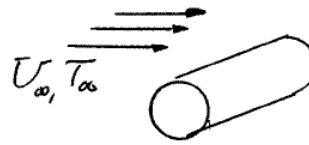


NOTES: External convection

BEFORE WE HAD

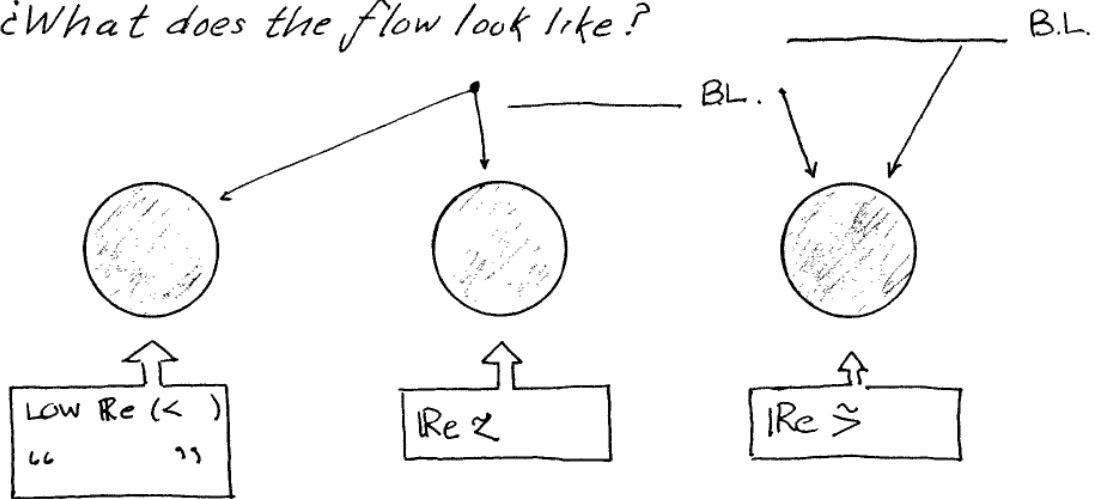


NOW WE HAVE



LET'S CONSIDER THE FLUID MECHANICS FIRST

What does the flow look like?



CAUTION

$$Re = \frac{\rho U_\infty L}{\mu} = \frac{U_\infty L}{\nu}$$

FLAT PLATE :

$$F_D = C_A \frac{1}{2} \rho U_\infty^2$$

↑
WHICH AREA?

HERE

$$F_D = C_A \frac{1}{2} \rho U_\infty^2$$

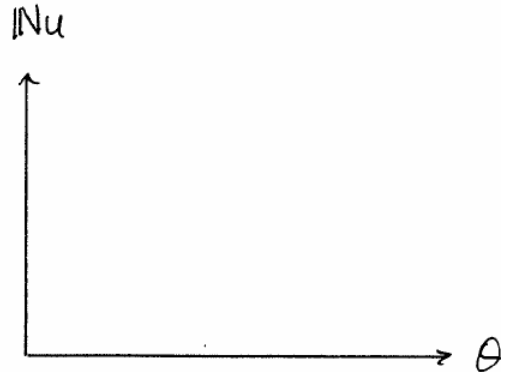
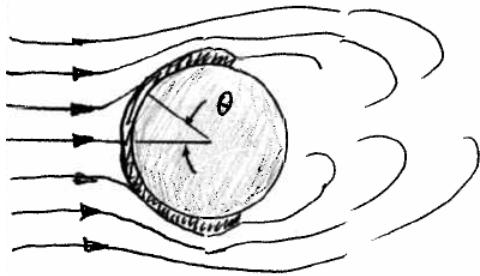
↑
WHICH AREA?

FIG GIVES C_D FOR CYLINDER & SPHERE (SMOOTH)

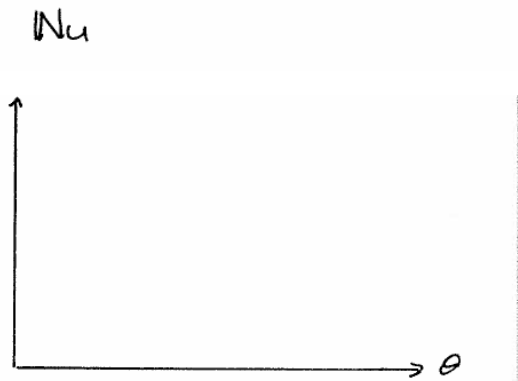
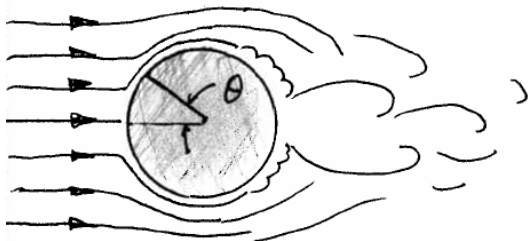
NOTES: External convection



LOW Re



HIGH Re



$Nu = \frac{h \square}{k}$

$$Nu_{cyl} = 0.3 + \left[\frac{0.62 Re^{1/4} Pr^{1/4}}{1 + \left(\frac{0.4}{Pr} \right)^{1/4}} \right] \left[1 + \left(\frac{Re}{282,600} \right)^{5/8} \right]^{4/5}$$

Like 👍

$Nu =$

Like 👍