FLOW AROUND A CYLINDER: BL STRUCTURE AND CONVECTION HEAT TRANSFER

GENERAL FLOW STRUCTURE

Remarks:

VELOCITY PROFILE DEVELOPMENT

BL TRANSITION
**AVERAGE NUSSELT NUMBER**

\[
Nu_D = 0.3 + \frac{0.62 \text{Re}^{1/2} \text{Pr}^{1/3}}{1 + (0.4/\text{Pr})^{2/3}} \left[1 + \left(\frac{\text{Re}_D}{282,000}\right)^{5/8}\right]^{4/5}
\]

**Churchill and Bernstein relation**

(all properties evaluated at the film temperature)

**CYLINDERS WITH NON-CIRCULAR CROSS-SECTIONS**

For cylinders on non-circular cross-section, the Reynolds number can be calculated based on a characteristic length of the shape of interest: