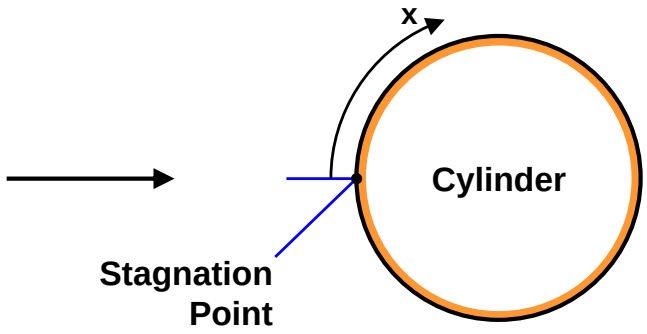
Problem 241B

The planar flow close to a stagnation point on any bluff, cylindrical body (for example, the circular cylinder shown below) has a potential flow solution in which the velocity outside the boundary layer is proportional to the distance, x, measured along the surface from the stagnation point. This is expressed as $U = Ax$ where A is a known constant. The kinematic viscosity of the fluid is denoted by ν.



Use the chart of Falkner-Skan solutions (below) to find an expression for the boundary layer thickness (defined as the distance from the wall at which $u/U = 0.99$). This expression will include A and ν.