ENSC-283

Assignment #9

Assignment date: Monday Mar. 30, 2009

Due date: Monday Apr. 6, 2009

Problem1

The pressure drop, Δp, for steady, incompressible viscous flow through a straight horizontal pipe depends on the pipe length, l, the average velocity, V, the fluid viscosity, μ, the pipe diameter, D, the fluid density, ρ, and the average roughness, e height. Determine a set of dimensionless groups that can be used to correlate data.

Problem 2

The drag of a sonar transducer is to be predicted, based on wind tunnel test data. The prototype, $0.3\ m$ diameter sphere, is to be towed at $3\ m/s$ in sea water at 5℃. The model is $10\ cm$ in diameter. Determine the required test speed in air. If the drag of the model at these test condition is $0.25\ N$, estimate the drag of the prototype.