Homework 3: AE550, Viscous Fluid Flow

Sept. 25 2008

Due: October 3, 2008 (beginning of class)

Problem 1.

A sphere with density $\rho_{sphere}=7,800 \ kg/m^3$ is droppted into oil of specific gravity $\rho_{oil}=880 \ kg/m^3$ and viscosity $\mu=0.15 \ Pa \cdot s$. Estimate the terminal velocity (velocity when the weight of the sphere is balanced by the drag on the sphere) if its diameter is 0.1mm, 1mm and 10mm. At which of these diameters is the oil fluid dynamics "creeping".