Special Problem 8-1

In this problem, we are going to learn about creeping flow around a sphere.

(a) Calculate the velocity field for creeping flow around a sphere. Use Example 8.4-2 in Deen as a guide to help you complete this problem.

(b) Using your solution from (a), compute the pressure and the surface shear stress on the sphere. Use these expressions to derive Stokes' law (Eq. 8.4-37)

$$F_D = 6\pi\mu UR \tag{1}$$

which gives the drag on a sphere in creeping flow.