Homework #1

Deadline: February 27, 2018, 12:20.

Consider a steady simple shear flow of the incompressible Navier-Stokes fluid between two infinite parallel plates located in y = -1 and y = 1. At the boundary assume three different boundary conditions:

- Navier's slip at upper plate and no-slip at lower plate
- perfect slip at upper plate and no-slip at lower plate
- no-slip at both plates

Find the solution u(y) assuming that the flow is normalized by

$$Q := \int_{-1}^1 u(y) \,\mathrm{d}y.$$

Use the following material parameters in the calculations: kinematic viscosity $\nu^* = 1 \text{ m}^2/\text{s}$, Navier-slip coefficient $\gamma^* = 1 \text{ Pa.s/m}$.