

Problem 1B.1

Velocity profiles and the stress components τ_{ij} . For each of the following velocity distributions, draw a meaningful sketch showing the flow pattern. Then find all the components of $\boldsymbol{\tau}$ and $\rho\mathbf{v}\mathbf{v}$ for the Newtonian fluid. The parameter b is a constant.

(a) $v_x = by, v_y = 0, v_z = 0$

(b) $v_x = by, v_y = bx, v_z = 0$

(c) $v_x = -by, v_y = bx, v_z = 0$

(d) $v_x = -\frac{1}{2}bx, v_y = -\frac{1}{2}by, v_z = bz$