

## Problem 2B.4

**Laminar slit flow with a moving wall (“plane Couette flow”).** Extend Problem 2B.3 by allowing the wall at  $x = B$  to move in the positive  $z$  direction at a steady speed  $v_0$ . Obtain (a) the shear-stress distribution and (b) the velocity distribution. Draw carefully labeled sketches of these functions.

$$\text{Answers: } \tau_{xz} = \left( \frac{\mathcal{P}_0 - \mathcal{P}_L}{L} \right) x - \frac{\mu v_0}{2B}; \quad v_z = \frac{(\mathcal{P}_0 - \mathcal{P}_L)B^2}{2\mu L} \left[ 1 - \left( \frac{x}{B} \right)^2 \right] + \frac{v_0}{2} \left( 1 + \frac{x}{B} \right)$$