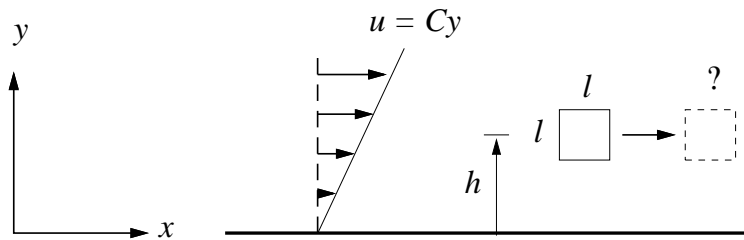


- a) The flow inside a boundary layer near a wall has a simple linear velocity distribution $u = Cy$, $v = 0$. Determine the vorticity and strain rate of the fluid.
- b) A fluid element centered on height $y = h$ initially has a square shape with sides of length ℓ . Determine and sketch its shape a short time Δt later. Specifically, determine the lengths and angles of its four sides at time Δt .



- c) Determine a streamfunction $\psi(x, y)$ for this flow. Is it possible to find a potential $\phi(x, y)$ for this flow? Explain.
- d) Consider now another boundary layer flow with $u = Cy^{1/2}$, $v = 0$. Repeat questions a), b), c) above. For b), assume that $\ell \ll h$ (i.e. treat the element as being infinitesimally small).