

Problem 115F

A particular planar, incompressible flow is given by:

$$\psi = Axyt$$

where A is constant in time and space.

- (a) Sketch the streamlines for this flow at a particular instant in time (say $t = 1$). What is the typical equation for such a streamline?
- (b) Write down expressions for the velocity components, $u(x, y, t)$ and $v(x, y, t)$.
- (c) Find the parametric equations, $x(x_0, y_0, t)$ and $y(x_0, y_0, t)$, for the pathline of a particle whose position at time $t = 0$ is (x_0, y_0) .