

Problem 116Ex

Consider the planar flow of an incompressible fluid given by:

$$\psi = Axyt$$

where the coordinate y is vertically upward and A is constant in time and space. The flow is inviscid and the only body force is that due to gravity, g .

(a) Determine whether or not this flow is irrotational.

(b) Find the pressure, p , within the flow as a function of A , ρ (the fluid density), g , x , y and t . (The result contains an arbitrary constant which could be evaluated by assuming that the pressure is known at any one point in the flow, for example at the origin.)