

Problem 116D

The velocity components of the unsteady flow of an incompressible and inviscid fluid (density, ρ) in a straight horizontal pipe parallel with the x -axis are:

$$u = U(t) \quad ; \quad v = w = 0$$

where $U(t)$ is a function only of time, t , so that the acceleration of the fluid in the x direction is dU/dt . Neglecting all body forces, find the difference in the pressure, p , between two points along the pipe separated by a length, L , in the x direction.