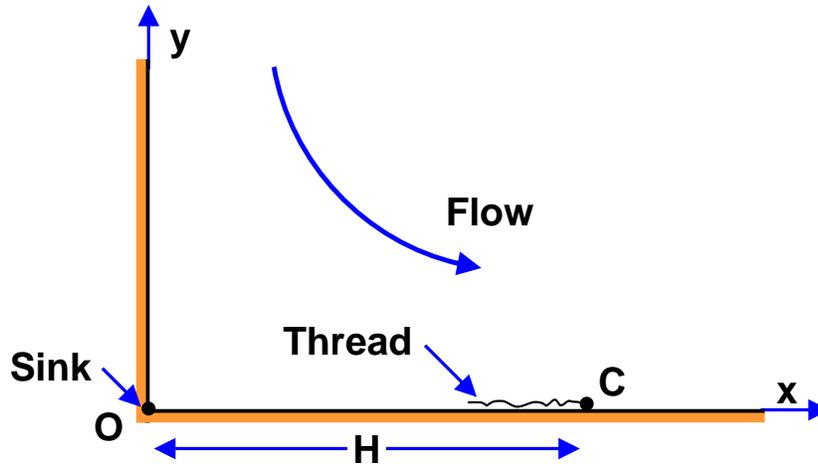


Problem 120A

The flow in the neighborhood of a corner in a rectangular ventilation duct is to be modelled as a planar potential flow of an incompressible, inviscid fluid and is therefore given by the streamfunction, $\psi = Axy$, where A is assumed known:



This flow is then changed by withdrawing fluid through pipes connected to the walls at the origin, O ; fluid is thereby withdrawn at a volumetric rate of q per unit depth normal to the sketch. Construct the velocity potential for the modified flow and find expressions for the velocity components in terms of x , y , A and q .

A piece of thread is attached by one end to a point, C , which is at a distance, H , from the origin. The flow will extend the free end of this thread either toward the origin or toward $x = \infty$. Find the condition under which it will extend toward the origin.