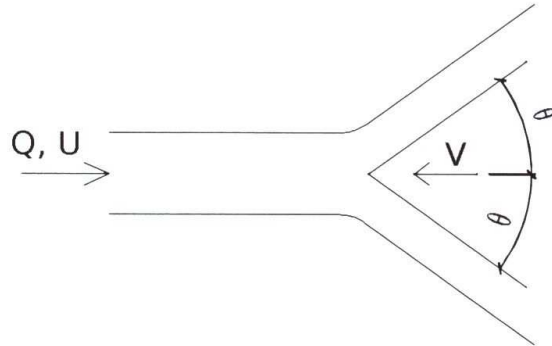


July 2, 2014

Fluid dynamics

Problem 1 (15 points)

Compute the force per unit length that the two-dimensional jet shown in the figure below exerts on the wedge. The wedge is moving with constant velocity V towards the jet and it is disposed symmetrically with respect to the jet direction. Assume that the flow is steady for an observer moving with the wedge. Let U be the uniform velocity within the jet and Q the corresponding volume flux per unit length. Neglect the role of gravity and viscosity.



Theoretical question (15 points)

Explain the difference between spatial (Eulerian) and material (Lagrangian) description of the kinematics of fluids and show how a material derivative can be computed making use of spatial coordinates.