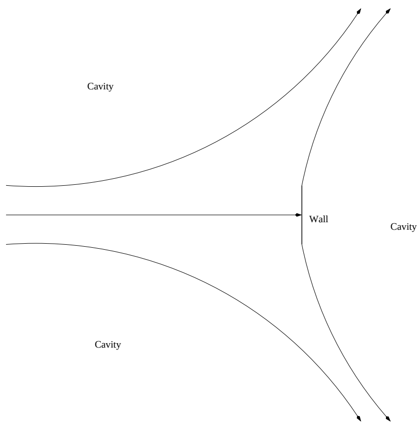
MA 342H
Assignment 4
Due never

`Id: 342H-s2014-4.m4,v 1.3 2014/04/26 18:24:58 john Exp john`

1. An inviscid, incompressible, irrotational, steady planar flow has a free stream which hits a (finite) wall and splits into two free streams, as in the diagram. The directions of the outgoing streams form an angle $\pm\varphi$ with that of the incoming stream. Find the free streamlines.



   Note: For simplicity, assume units have been chosen such that the free stream speed is 1, the density of the fluid is 1 and the rate of flow is 2π. Choose the origin of the coordinate system at the centre of the wall and assume the stream function and velocity potential are zero there. Orient the coordinate system so that the wall runs along the y-axis.
   Hint: Use the complex hodograph method. The flow is symmetric about the x-axis, so you need only consider the part of the flow in the upper half-plane.