13.024 Problem Set 8:

Due: April 29, 2003

Panel Methods

For this homework, you will extend the 2-Dimensional panel method that you developed in problem set 6 to handle lift.
Your input grid should now include a series of points for the wake. You might find it easier to take the convention of having the trailing edge as the first and last points of the body grid. The first panel and control point could be on the bottom and sequential panels and control points could wrap around the section with the N'th panel going to the trailing edge on the top. That way you can easily find the panels to enforce the Kutta Condition. Add additional panels on the wake. It may be easiest to have the free stream coming from the –x direction and rotate the airfoil by the angle of attach.

1. Test your code for an NACA 64012 section "64a012.fin" whose file is available in J. Milgram's Public Directory. Use angles of 1, 2, 3, and 4 degrees. Make Matlab plots of the pressure coefficient or of $(u/U)^2$ as a function of chordwise position x.