

Computational Fluid Dynamics (AE/ME 339)
MAEEM Dept., UMR, Fall 2001

HomeWork Problem 15

Flow Over a Cylinder

You are to write a program to numerically solve the problem of potential flow over a cylinder using the SOR technique discussed in class. Inputs to the program are to include: I, the number of intervals in the σ ($=1/r$) direction; $\Delta\sigma$, the step size, J the number of intervals in the θ direction, and ε , the specified tolerance for the potential ϕ . Use symmetry condition and solve only one half of the flow field. You will need to approximate the far field boundary condition. You may choose the first value of $\sigma = 1/I$ as an approximation.

- i) Include the program listing containing enough comments/remarks so that the program flow is clear.
- ii) Include the output containing the complete velocity profile at the stagnation point and $\theta = 90$ deg. Show the number of iterative steps required to converge to the printed velocity profile.
- iii) Plot the pressure coefficient along the stagnation streamline.

