Aerodynamics – Homework set with Matlab or Scilab
Grade points per Problem of the Homework sets.

Hw.S.1

1. Plot figures that show equipotential and streamlines for each of the following 2-D elementary potential flows:

a) Uniform flow at an angle of 2 degrees with the x axis. 0.5
b) Corner flow with angle of 90 degrees at the corner. 0.5
c) Source at the origin. 1.0
d) Vortex ate the origin. 1.0
e) Doublet at the origin. 1.0
f) Rankine oval with a source at z=0 and a sink at z=1+0i. 1.0

2. 2-D Cylinder with Magnus effect. Plot streamlines, equi-potential and isobaric curve for a circle of unit radius at the origin, then add a clockwise circulation and a uniform flow, which is aligned with the real (x) axis. 2.0

3. Apply the Joukowisky transformation to the previous cylinder, só as to generate the corresponding airfoil. Then plot streamlines, equipotential and isobaric curves. The latter should be scaled in terms of the pressure coefficient, cp. 3.0

Hs.S.2

All the 5 problems from Chapter 5 of the book by Katz and Plotkin, "Low Speed Aerodynamics" on the Thin airfoil Theory. Each of the problems is worth 2.0 points.

Hw.S.3

Matlab implementation of Prandtl's Lifting Line Theory. It is worth 10.0 points.

The final grade is computed by the arithmetic mean of the grades the student got in the above Homework Sets:

MF = (HwS.1 + HwS.2 + Hws.3)/3