I will want to probably use the midpoint between the two control points for the induced angle of attack.

Get surface out of System. Ie do System.surfaces or induced\_velocity(rcp, system.surfaces[1], system.\Gamma ).

(System.surfaces[1])[i j].rcp will give me the rcp. I must access each panel individually and iterate through all the panels to get the xyz values of each panel.

Optimize Stability is the main goal. Could optimize twist, chord length, etc all at once or individually. Write code flexible enough for feasibility ie make it easy to add or subtract variables from the optimization.

In the final report write about what I can do to make this work for more scenarios and be more efficient.

Compare some of my data with actual data from a wing. Use that to decide whether I choose the induced velocity at the leading-edge vs mid chord or quarter chord. Between control points somewhere would be best. This is because you are interpolating between control points but extrapolating at the leading-edge.

Look for convergence in the number of panels I am using. It will probably happen when the lift converges. Consider thinking of what the aspect ratio must be initially.

I’ll likely use VLM over a range of angles of attack and compare it to the Cessna 172 lift curves to see how accurate my method is. After that I will optimize.

Use web plot digitizer to interpolate any graphs that I’m pulling from research.

For a 2d Airfoil, the 3d lift coefficient is multiplied by the wing area then divided by the chord length. Page 8 in the aerodynamics textbook has the definition for a 2d lift coefficient that is calculated by Xfoil.

**Comparing results to the study done in the paper “Comparative Study and Aerodynamic Analysis of Rectangular Wing Using High-Lift Systems.”**

For figure 23 the lift coefficient at 2 degrees angle of attack is 0.519.

For figure 23 the lift coefficient at 0 degrees angle of attack is 0.484 (0.288 using the 2d definition).

An interesting thing I found out is that at 0-degree angle of attack, the 2d lift coefficient calculated using Xfoil at a Reynolds number of 50000 is very close to what was calculated in this study. It predicts a lift coefficient of 0.286 compared to the 0.288 predicted by the study.