Background

The Vortex Lattice Method is an invscid method for the low-fidelity analysis of lifting bodies (wings). You can learn more about the theory from the ME 515 Book and/or a google search.

For this assignment, you will be utilizing a code produced by students in the FLOWLab. It is a Julia package called VortexLattice.jl. You will probably want to go through the Getting Started and Examples: Steady State Analysis of a Wing and Tail portions of the documentation to get familiar with how to use the code.

[todo: add more details to the background]

Assignment

Once you are familiar with using VortexLattice.jl, complete the following trade studies and write them up in your paper:

1. Explore and discuss the wing aspect ratio vs wing efficiency.
2. Explore the effects of tail volume ratio on the stability derivatives of an airframe. Be sure to discuss desirable signs for stability derivatives.
3. Explore the effects on angle of attack on the lift coefficient. Discuss the limitations of the VLM and explain which of your results are wrong due to those limitations.

Useful Resources

[todo: add links here to text resources, code documentation, etc.]

Rubric

The rubric for this assignment is broken into two categories. Table 1 shows details for the paper submission rubric, and table 2 shows details for the code submission rubric.

Table 1: Approximate Rubric for Paper (subject to change)

Points	**Item**
5	Correct Paper Format (see paper format example doc)
3	Helpful Introduction
6	Detailed Methodology
6	Clear Presentation of Results
6	Quality Figures, with correct internal references
6	Reasonable Discussion
3	Correct Bibliography and citations
35	**Total**

Table 2: Approximate Rubric for Code (subject to change)

Points	**Item**
5	Correct Code Submission and Version Control usage
5	Descriptive Comments in code and commits
5	Correct Docstrings in code
5	Code uses functions and scripts to produce all the results and figures included in the paper without modification
5	Code runs from a single run file without bugs on the long-term support release of Julia
25	**Total**