Thomas Connor McKinnon

My name is Connor McKinnon! I am a senior studying Aerospace Engineering at Auburn University and Formula SAE design engineer with two years of competition experience. I will be graduating in Spring 2025 and seeking full-time positions to contribute to project success in modeling and simulation, satellite and spacecraft missions, and manufacturing.

Projects

Formula SAE Rear Wing Design and Manufacturing

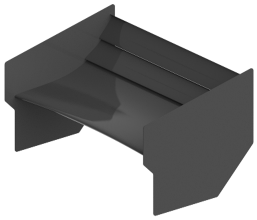
Responsibilities and Achievements:

- Designed and manufactured the rear aerodynamic package for the Auburn FSAE '23 vehicle
- Improved the rear wing downforce to drag ratio from 1.5 in previous years to 2.75.
- Collaborated with an aerodynamics student team to set and fulfill design targets for downforce, drag, weight, and center of pressure location.
- Modeled the rear wing package in a full vehicle assembly to ensure integration of all subsystems.

Software Tools and Skills:

- CAD modeling | Siemens NX
- RANS Computational Fluid Dynamics | Siemens STAR-CCM+
- Carbon fiber composites manufacturing
- Manual lathe and mill machining

Final Model and Implementation



Aircraft 6DOF Simulation

- MATLAB 6DOF script to model elevator impulse response of a Learjet C-21
- Final project for AERO 3230 Flight Dynamics course

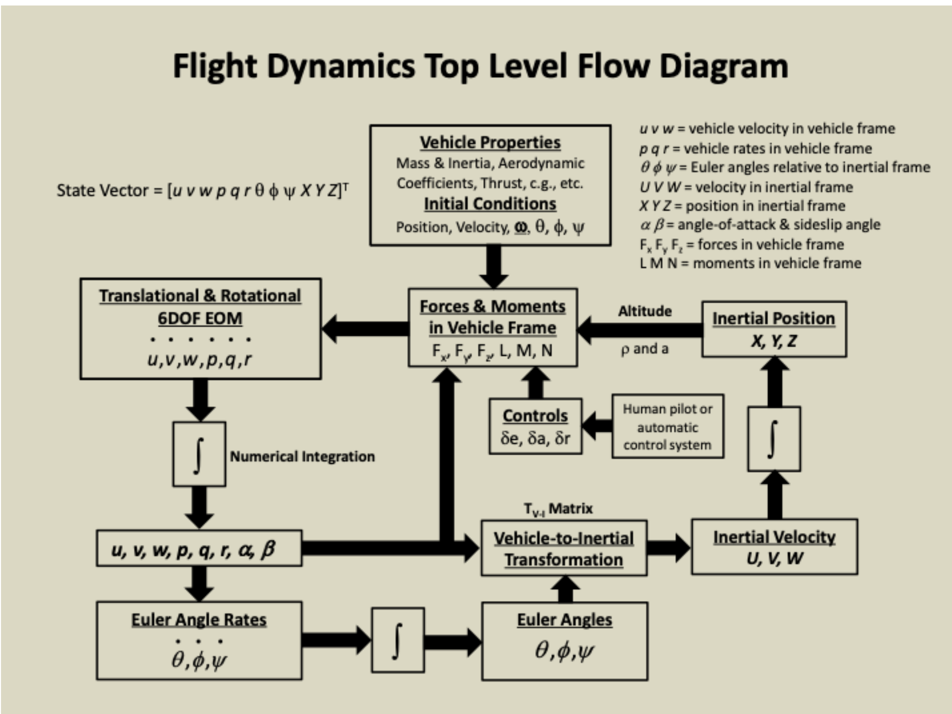
Inputs:

- Learjet C-21 aircraft parameters
- Elevator, aileron, or rudder deflection function

Outputs:

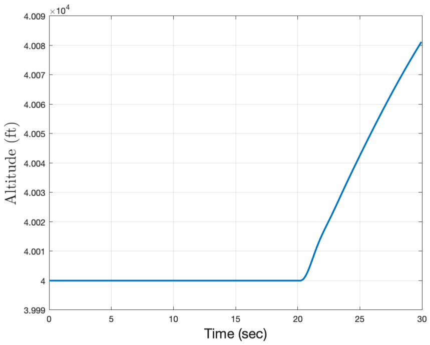
- Time response plots of aircraft state vector and flight parameters

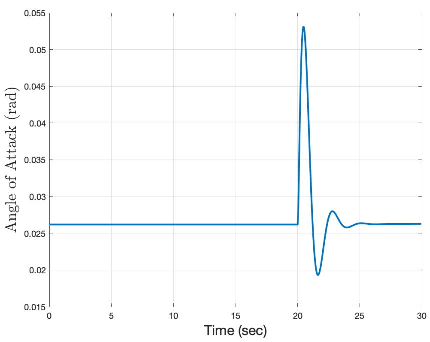
Computation Loop Overview

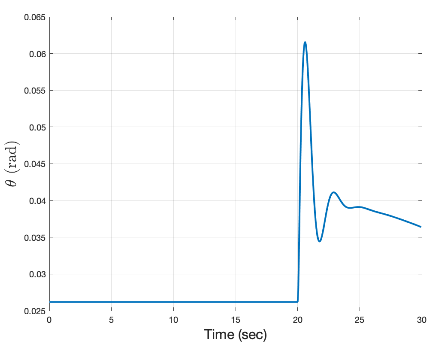


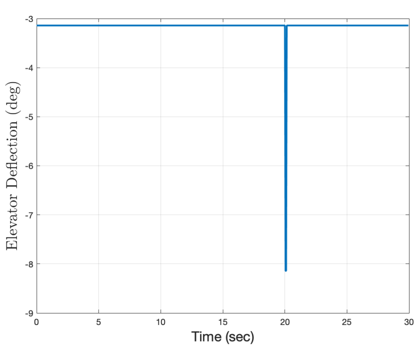
Time Response Plots

Altitude, angle of attack, and pitch angle response to a -5˚ elevator deflection for 0.1 seconds at t = 20 seconds









Linear Vorticity Panel Method

- A personal project to look deeper into pressure and lift approximation techniques discussed in coursework for inviscid aerodynamic theory.
- A MATLAB script that implements a panel method of a linear strength vorticity distribution to approximate the lift and pressure coefficient curve for a NACA 4-digit series airfoil.

Inputs:

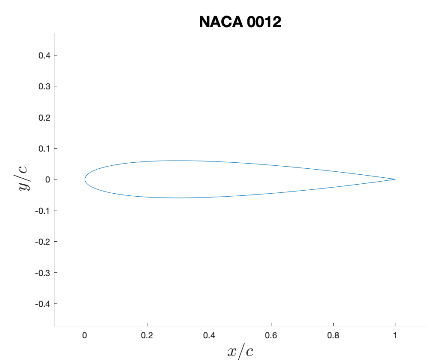
- NACA airfoil parameters (eg. NACA 0012)
- An array or single value for angle of attack (AoA)

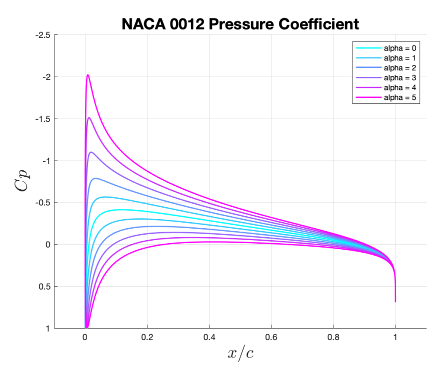
Outputs:

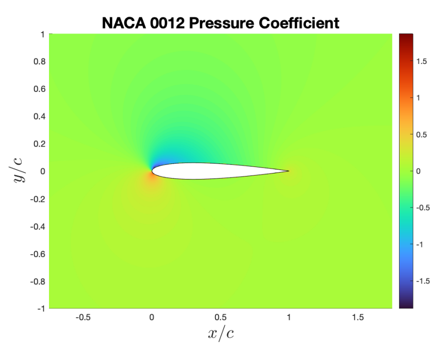
- Approximated section lift coefficient
- Pressure coefficient surface distribution
- Velocity field of flow domain

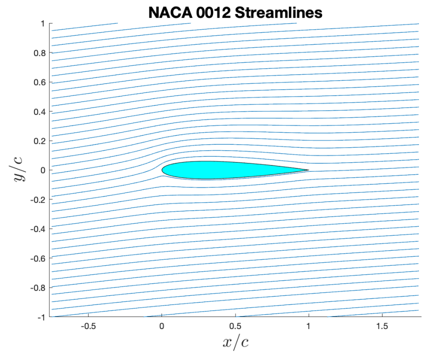
NACA 0012 Plots

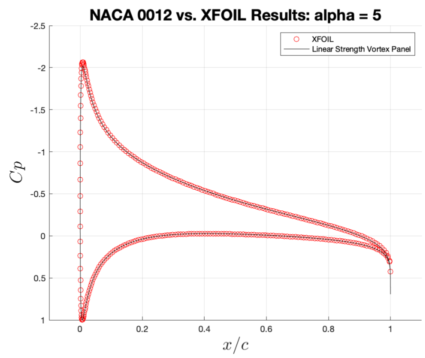
NACA 0012 geometry, Cp distribution, streamlines, flow field Cp, and XFOIL comparison for a 5° angle of attack








NACA 0012 Streamlines
y/c
x/c
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-0.5
0
0.5
1
1.5


NACA 0012 vs. XFOIL Results: alpha = 5
XFOIL
Linear Strength Vortex Panel
Cp
x/c
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
0
0.2
0.4
0.6
0.8
1