TSFOIL Analysis Interface Module (AIM)

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May 28, 2020

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1 Introduction

1.1 TSFOIL AIM Overview

A module in the Computational Aircraft Prototype Syntheses (CAPS) has been developed to interact (through input files) with the transonic airfoil analysis tool TSFOIL. TSFOIL can be downloaded from http://www.dept.aoe.vt.edu/~mason/Mason_f/MRsoft.html .

Note: In the tsfoil2.f file is may be necessary to comment out line 38 - "USE DFPORT"

An outline of the AIM's inputs and outputs are provided in AIM Inputs and AIM Outputs, respectively.

The accepted and expected geometric representation and analysis intentions are detailed in geomRepIntentTSFOIL.

Upon running preAnalysis the AIM generates two files: 1. "tsfoilInput.txt" which contains instructions for TSFOIL to execute and 2. "caps.tsfoil" which contains the geometry to be analyzed.

1.2 Assumptions

TSFOIL inherently assumes the airfoil cross-section is in the x-y plane, if it isn't an attempt is made to automatically rotate the provided body.

2 AIM Inputs

The following list outlines the TSFOIL inputs along with their default values available through the AIM interface.

- **Mach = 0.75**
  Mach number. Valid range for TSFOIL is 0.5 to 2.0 .
- **Re = 0.0**
  Reynolds number based on chord length.
- **Alpha = 0.0**
  Angle of attack [degree].

3 AIM Outputs

The following list outlines the TSFOIL outputs available through the AIM interface.

- **CL =** Coefficient of lift value.
- **CD =** Coefficient of drag value. (Calculated from momentum integral)

- **CD_Wave =** Wave drag coefficient value.
- **CM =** Moment coefficient value.
- **Cp_Critical =** Critical pressure coefficient (M = 1).