Aero Multidisciplinary Optimization Tool

Some Aircraft Company

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Contents

1 Introduction

Sharks are a part of the chondricthyes family.

1.1 A subsection

More text.

2 Airplanes

An airplane is defined as a python dictionary. This dictionary should be stored in src¿airplanes¿"name"¿plane.py file. The dictionary should have the name plane. There is an example file in the src¿airplanes¿example directory. The plane dictionary includes many components as key value pairs. There are also nested key value pairs that indicate parent-child relationships. The plane includes a wings, a fuselage, propulsion, weights. The following sections define the ky value pairs and thier contents.

2.1 Wings

More text.

2.1.1 Flaps

More text.

	Deflection	Sense	Primary effect
Ailerons	Right wing trailing edge up	+	Positive roll moment
Elevators	Trailing edge up	+	Positive pitch moment
Rudder	Trailing edge right	+	Positive yaw moment

2.2 Fuselage

More text.

3 Analysis

Your text goes here.

3.1 Balanced Field Length

More text.

3.2 Range

More text.

3.3 Specific Excess Power

More text.

3.4 Trim

More text.

3.4.1 Linear Trims

More text.

3.4.2 Non-Linear Trims

Various nonlinear trim routines are available in this software package. Thses are available through the scipy.optimize.minimize function.

4 Modeling

Your text goes here.

4.1 Aerodynamics

There are currently two aerodynamic modeling methods. The first is using DATCOM, and the latter is using the Mark Drela Athena Vortex Lattice software. Note that only lifting surfaces are modeled in AVL, other components like fuselages and langing gear are modeled with DATCOM methods. The long term vision of this package is to provide four aerodynamic modeling methods, DATCOM, panel method, inviscid method (CART3D), and viscous method (SU2, Overflow, or FUN3D). The default model used is the DATCOM method. If the user wants to use the AVL method, a model should be made using the create aero model avl method in aerodynamics.py. This method will require a plane and requirements dictionary. If the model is placed in the airplane your plane directory, it will be the new default model used in analysis.

4.2 Athena Vortex Lattice

Link to MIT Athena Vortex Lattice Method (AVL):
http://web.mit.edu/drela/Public/web/avl/

AVL.exe is included in the repository, and should be added to the PATH of your system. The resulting data from AVL is obtained using the avlwrapper API.

4.3 Propulsion

More text.

4.4 Mass Properties

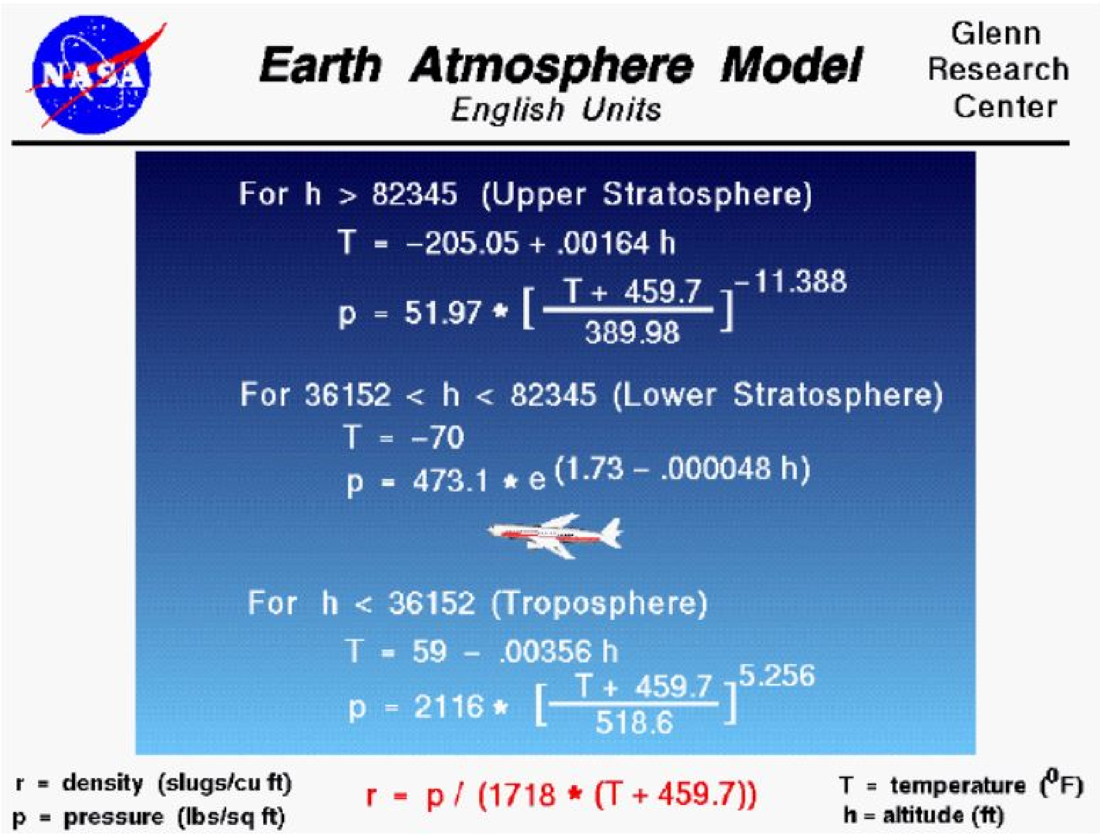
More text.

5 Common

Your text goes here.

5.1 Atmosphere

More text.



5.2 Earth

More text.

5.3 Equations of Motion

More text.

5.4 Rotations

More text.

References

[1] Douglas Wells, Bryce Horvath, Linwood McCullers. *TM-2017-219627 The Flight Optimization System Weights Estimation Method*. NASA, Hampton, VA, 2017.

[2] McDonnell Douglas Corporation. *United States Air Force Stability and Control DATCOM*. USAF, OH, 1977.