Vortex-Panel-Method Documentation

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Contents:

CHAPTER 1

aerotools

1.1 aerotools package

1.1.1 Submodules

1.1.2 aerotools.vpm module

class aerotools.vpm.**Airfoil**(*NACA_Name*, *Chord_Length=1*, *NUM_SAMPLES=100*, *Angle_Of_Attack=0*)

Bases: object

Airfoil handles calculations made on 4-digit series NACA airfoil.

The Airfoil class calculates the x-y coordinates of all boundary points on an NACA 4-digit series airfoil.

Parameters

- **NACA_ID** – The NACA 4-digit series airfoil name i.e. "NACA0012"
- **chord** – The chord length of the airfoil
- **NUM_SAMPLES** – The number of samples / panels considered
- **angle_of_attack** – The angle of attack of the airfoil
- **max_camber** – The maximum camber of the airfoil i.e "0/100, 1/100"
- **position_max_camber** – The position of the max. camber i.e. "4/100"
- **thickness** – The maximum thickness of the airfoil i.e. "12/100", "08/100"
- **x_boundary_points** – The x-locations of each boundary point on the airfoil
- **y_boundary_points** – The y-locations of each boundary point on the airfoil
- **full_coefficient_lift** – The coefficient of lift of the airfoil
- **pressure_coefficient** – The pressure coefficient at each (x,y) point

get_airfoil_coordinates()
Returns the coordinates of the airfoil.

Returns An array of x-coordinates and y-coordinates of boundary points. [X,Y]

Return type tuple

get_coefficient_lift()
Returns the coefficient of lift.

Returns The airfoil's coefficient of lift (per meter span), Cl.

Return type float

get_panel_coordinates()
Returns the coordinates of the midpoints of the panels.

Returns An array of x-coordinates and y-coordiantes of the panel mid- points. [X, Y]

Return type tuple

get_pressure_coefficients()
Returns the pressure coefficient at the midpoint of each panel.

Returns Pressure coefficient at each boundary point, Cp.

Return type float[]

set_airfoil(*NACA_ID*)
Sets the airfoil type used.

Parameters **NACA_ID** – The 4-digit series airfoil name. Example: 'NACA0012'

set_angle_of_attack(*angle*)
Sets the angle of attack to use for next calculations.

Parameters **angle** – The new angle of attack

set_chord_length(*length*)
Sets the chord length used in the calculations.

Parameters **length** – The chord length of the airfoil.

set_num_samples(*samples*)
Sets the number of panels used for sampling the airfoil.

Parameters **samples** – The number of samples / panels used for airfoil calculations.

1.1.3 Module contents

CHAPTER 2

Indices and tables

- genindex
- modindex
- search

Python Module Index

a

Index