

Reference

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Xfoil_worker is a small command line tool to do various tasks around airfoil optimization. It is especially useful for automization of the optimization process.

Usage:

```
Xfoil_worker -w worker_action [Options]
```

Following actions are supported

-w polars	Generate polars for an airfoil
-w norm	Repanel and normalize an airfoil
-w smooth	Repanel, normalize and smooth an airfoil

The options for the various actions are described in the following sections.

Generating polars (-w polars)

A defined polar for an airfoil will be generated in Xfoils polar format. The polar file is ready to be imported into xflr5 or flow5 via the menu function "Polars / Import Xfoil Polar(s). The definition for the polar and Xfoils initial parameters are defined in an Xoptfoil input file. Please find the description of the parameters in the Xoptfoil(-JX) documentation.

Command line options used for polar generation:

-i input_file	<p>Name of an Xoptfoil input file to read the settings for the polar generation. Only the following namelists are needed for polar generation:</p> <pre>&polar_generation Settings for polar: polar type, based on cl oder alpha, value range &xfoil_run_options - optional Options for Xfoils aerodynamic calculations. Normally the default values are fine, so this namelist is optional &xfoil_paneling_options - optional Options for Xfoils repaneling which is done prior to the polar generation. Normally the default values are fine, so this namelist is optional</pre>
[-r xxxxxx]	<p>The desired Reynolds number of the polar. If the Reynolds number is not defined in the input file, the value is taken from this command line option. This is useful to have a single input file for different Reynolds numbers</p>
-a airfoil_file	<p>The name of the airfoil file</p>
-o output_prefix	<p>The generated polar will be written to the subdirectory</p> <pre>.\output_prefix_polars</pre>

Example:

```
Xfoil_worker -i iPolars.txt -r 600000 -a RG15.dat -o RG15
```

Repanel and normalize an airfoil (-w norm)

An airfoil will be repeneled by Xfoils PANGEN routine and normalized to have the leading edge at 0,0 and the trailing edge at 1,0. The new airfoil will have 7 decimals in the .dat file.

In addition to the new airfoil .dat file, a file *output_prefix_design_coordinates.dat* will be generated which allows to inspect the result of repeneled and normalized with Xoptfoil_visualizer-JX.

Command line options used for polar generation:

<code>[-i input_file]</code>	<p>- optional - Name of a Xoptfoil input file to read the settings for repeneled. Only the following namelists are used for repeneled:</p> <p><code>&xfoil_paneling_options</code> - optional -</p> <p>Options for Xfoils repeneled. Normally the default values are fine.</p> <p>If the input file or a namelist is missing default values will be taken.</p>
<code>-a airfoil_file</code>	The name of the airfoil file
<code>[-o output_prefix]</code>	<p>Name of the smoothed airfoil. Following files will be generated</p> <p><code><output_prefix>.dat</code></p> <p><code><output_prefix>_design_coordinates.dat</code></p> <p>If the option <code>output_prefix</code> is omitted, the name of the output file will be <code><prefix of input_file>_smoothed.dat</code></p>

Example:

```
Xfoil_worker -w norm -a RG15.dat -o RG15_smoothed
```

Smooth an airfoil (-w smooth)

An airfoil will be repeneled by Xfoils PANGEN routine, normalized and smoothed by Xoptfoil-JX smoothing algorithm ('Chaikin Corner Cut'). This action is useful either in preparing an airfoil for optimization or to improve the geometric quality of your airfoil collection.

In addition to the new airfoil .dat file, a file *output_prefix_design_coordinates.dat* will be generated which allows to inspect the result of repeneled, normalizing and smoothing with Xoptfoil_visualizer-JX.

Command line options used for polar generation:

<code>[-i input_file]</code>	<p>- optional - Name of an Xoptfoil input file to read the settings for repeneled and smoothing. Only the following namelists are used for smoothing:</p> <p><code>&smoothing_options</code> - optional</p> <p>Define <code>spike_threshold</code>.</p> <p><code>&constraints</code> - optional</p> <p>Define <code>curv_threshold</code> and <code>highlow_threshold</code></p> <p><code>&xfoil_paneling_options</code> - optional</p> <p>Options for Xfoils repeneled which is done prior to smoothing. Normally the default values are fine, so this namelist is optional</p>
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<code>-a airfoil_file</code>	The name of the airfoil file
<code>[-o output_prefix]</code>	Name of the smoothed airfoil. Following files will be generated <i>output_prefix.dat</i> <i>output_prefix_design_coordinates.dat</i> If the option <code>output_prefix</code> is omitted, the name of the output file will be <prefix of <code>input_file</code> >_smoothed.dat

Example:

```
Xfoil_worker -w smooth -i iSmooth.txt -a RG15.dat -o RG15_smoothed
Xfoil_worker -w smooth -a AG40.dat
```