
AtmoSwing Documentation

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Welcome to the AtmoSwing's user documentation

CHAPTER 1

The Downscaler

You will find here the documentation for AtmoSwing Downscaler. This document can also be downloaded as a pdf or epub using the bottom left menu.

The Downscaler manual is divided into the following topics:

1.1 Installation

Todo: write

CHAPTER 2

The Forecaster

You will find here the documentation for AtmoSwing Forecaster. This document can also be downloaded as a pdf or epub using the bottom left menu.

The Forecaster manual is divided into the following topics:

2.1 Installation

Todo: write

CHAPTER 3

The Viewer

You will find here the documentation for AtmoSwing Viewer. This document can also be downloaded as a pdf or epub using the bottom left menu.

The Viewer manual is divided into the following topics:

3.1 Installation

Todo: write

You will find here the documentation for AtmoSwing Optimizer. This document can also be downloaded as a pdf or epub using the bottom left menu.

The Optimizer manual is divided into the following topics:

4.1 Installation

Todo: write

4.2 Genetic algorithms

Todo: write

See more details in: Horton, P., Jaboyedoff, M., & Obled, C. (2017). Global Optimization of an Analog Method by Means of Genetic Algorithms. *Monthly Weather Review*, 145(4), 1275–1294. <http://doi.org/10.1175/MWR-D-16-0093.1>

4.2.1 Options presets

The optimization by genetic algorithms is controlled by many parameters. To facilitate its use, the recommended configurations were predefined and can be called as presets. Providing the following numbers (1-5) to the option *ga-config* is equivalent to these corresponding presets (for example, *-ga-config=2* corresponds to the multiscale mutation with predefined options):

1. Chromosome of adaptive search radius: *-ga-conv-steps 30 -ga-pop-size 500 -ga-interm-gen 0.5 -ga-ope-nat-sel 0 -ga-ope-coup-sel 2 -ga-ope-cross 7 -ga-cross-bin-pt-nb 2 -ga-cross-bin-share-b 1 -ga-ope-mut 8*

2. Multiscale mutation: *-ga-conv-steps 30 -ga-pop-size 500 -ga-interm-gen 0.5 -ga-ope-nat-sel 0 -ga-ope-coup-sel 2 -ga-ope-cross 7 -ga-cross-bin-pt-nb 2 -ga-cross-bin-share-b 1 -ga-ope-mut 9 -ga-mut-multi-scale-p 0.1*
3. Nonuniform mutation (pmut=0.1, Gmr=50, w=0.1): *-ga-conv-steps 30 -ga-pop-size 500 -ga-interm-gen 0.5 -ga-ope-nat-sel 0 -ga-ope-coup-sel 2 -ga-ope-cross 7 -ga-cross-bin-pt-nb 2 -ga-cross-bin-share-b 1 -ga-ope-mut 4 -ga-mut-non-uni-p 0.1 -ga-mut-non-uni-gens 50 -ga-mut-non-uni-min-r 0.1*
4. Nonuniform mutation (pmut=0.1, Gmr=100, w=0.1): *-ga-conv-steps 30 -ga-pop-size 500 -ga-interm-gen 0.5 -ga-ope-nat-sel 0 -ga-ope-coup-sel 2 -ga-ope-cross 7 -ga-cross-bin-pt-nb 2 -ga-cross-bin-share-b 1 -ga-ope-mut 4 -ga-mut-non-uni-p 0.1 -ga-mut-non-uni-gens 100 -ga-mut-non-uni-min-r 0.1*
5. Nonuniform mutation (pmut=0.2, Gmr=100, w=0.1): *-ga-conv-steps 30 -ga-pop-size 500 -ga-interm-gen 0.5 -ga-ope-nat-sel 0 -ga-ope-coup-sel 2 -ga-ope-cross 7 -ga-cross-bin-pt-nb 2 -ga-cross-bin-share-b 1 -ga-ope-mut 4 -ga-mut-non-uni-p 0.2 -ga-mut-non-uni-gens 100 -ga-mut-non-uni-min-r 0.1*

Any of these options can be overridden by specifying it along with *ga-config*.

4.2.2 All options

The different operators can be controlled with the following options:

- *ga-ope-nat-sel*: operator choice for natural selection
- *ga-ope-coup-sel*: operator choice for couples selection
- *ga-ope-cross*: operator choice for chromosome crossover
- *ga-ope-mut*: operator choice for mutation
- *ga-pop-size*: size of the population
- *ga-conv-steps*: number of generations for convergence
- *ga-interm-gen*: ratio of the intermediate generation
- *ga-nat-sel-tour-p*: natural selection - tournament probability
- *ga-coup-sel-tour-nb*: couples selection - tournament candidates (2-3)
- *ga-cross-mult-pt-nb*: standard crossover - number of points
- *ga-cross-blen-pt-nb*: blending crossover - number of points
- *ga-cross-blen-share-b*: blending crossover - beta shared (1/0)
- *ga-cross-lin-pt-nb*: linear crossover - number of points
- *ga-cross-heur-pt-nb*: heuristic crossover - number of points
- *ga-cross-heur-share-b*: heuristic crossover - beta shared (1/0)
- *ga-cross-bin-pt-nb*: binary-like crossover - number of points
- *ga-cross-bin-share-b*: binary-like crossover - beta shared (1/0)
- *ga-mut-unif-cst-p*: uniform mutation - probability
- *ga-mut-norm-cst-p*: normal mutation - probability
- *ga-mut-norm-cst-dev*: normal mutation - standard deviation
- *ga-mut-unif-var-gens*: variable uniform mutation - generations nb
- *ga-mut-unif-var-p-strt*: variable uniform mutation - starting probability
- *ga-mut-unif-var-p-end*: variable uniform mutation - end probability

- *ga-mut-norm-var-gens-p*: variable normal mutation - generations nb for probability
- *ga-mut-norm-var-gens-d*: variable normal mutation - generations nb for std deviation
- *ga-mut-norm-var-p-strt*: variable normal mutation - starting probability
- *ga-mut-norm-var-p-end*: variable normal mutation - end probability
- *ga-mut-norm-var-d-strt*: variable normal mutation - starting std deviation
- *ga-mut-norm-var-d-end*: variable normal mutation - end std deviation
- *ga-mut-non-uni-p*: non uniform mutation - probability
- *ga-mut-non-uni-gens*: non uniform mutation - generations nb
- *ga-mut-non-uni-min-r*: non uniform mutation - minimum rate
- *ga-mut-multi-scale-p*: multi-scale mutation - probability

You will find here some documentation about the required data for AtmoSwing. This document can also be downloaded as a pdf or epub using the bottom left menu.

This section is divided into the following topics:

5.1 Reanalyses

Todo: write

5.2 Predictand DB

Todo: write

CHAPTER 6

FAQ

You will find here the FAQ. This document can also be downloaded as a pdf or epub using the bottom left menu.

The FAQ is divided into the following topics:

CHAPTER 7

Indices and tables

- `genindex`
- `modindex`
- `search`