

MPCOTool

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Chapter 1

MPCOTool

The Multi-Purposes Calibration and Optimization Tool. A software to perform calibrations or optimizations of empirical parameters.

VERSIONS

- 4.4.1: Stable and recommended version.

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WINDOWS EXECUTABLE FILES

This repository contains source and example files with the latest version of MPCOTool. Stable versions with executable files and manuals for Microsoft Windows systems can be downloaded in [digital.csic](#)

TOOLS AND LIBRARIES REQUIRED TO BUILD THE EXECUTABLE

- [gcc](#) or [clang](#) (to compile the source code)
- [make](#) (to build the executable file)
- [autoconf](#) (to generate the Makefile in different operative systems)
- [automake](#) (to check the operative system)
- [pkg-config](#) (to find the libraries to compile)
- [gsl](#) (to generate random numbers)
- [libxml](#) (to deal with XML files)
- [glib](#) (extended utilities of C to work with data, lists, mapped files, regular expressions, using multicores in shared memory machines, ...)
- [json-glib](#) (to deal with JSON files)
- [genetic](#) (genetic algorithm)

OPTIONAL TOOLS AND LIBRARIES

- `gettext` (to work with different locales)
- `gtk+3` (to create the interactive GUI tool)
- `openmpi` or `mpich` (to run in parallelized tasks on multiple computers)
- `doxygen` (standard comments format to generate documentation)
- `latex` (to build the PDF manuals)

FILES

The source code has to have the following files:

- 4.4.1/configure.ac: configure generator.
- 4.4.1/Makefile.in: Makefile generator.
- 4.4.1/config.h.in: config header generator.
- 4.4.1/*.c: source code files.
- 4.4.1/*.h: header code files.
- 4.4.1/mpcotool.ico: icon file.
- 4.4.1/build.sh: shell script to build all.
- 4.4.1/logo.png: logo figure.
- 4.4.1/Doxyfile: configuration file to generate doxygen documentation.
- TODO: tasks to do.
- README.md: this file.
- license.md: license file.
- tests/testX/*: several tests to check the program working.
- locales/*/LC_MESSAGES/mpcotool.po: translation files.
- manuals/*.eps: manual figures in EPS format.
- manuals/*.png: manual figures in PNG format.
- manuals/*.tex: documentation source files.
- applications/*/*: several practical application cases.
- check_errors/*.xml: several mistaken files to check error handling.

BUILDING INSTRUCTIONS

On Fedora 29, in order to use OpenMPI compilation, do in a terminal (in 64 bits version):

```
$ export PATH=$PATH:/usr/lib64/openmpi/bin
```

On Microsoft Windows systems you have to install [MSYS2](#) and the required libraries and utilities. You can follow detailed instructions in [install-unix](#). Optional Windows binary package can be built doing in the terminal:

```
$ make windist
```

On NetBSD 8.0, to compile with last GCC version you have to do first on the building terminal:

```
$ export PATH=/usr/pkg/gcc8/bin:$PATH" </blockquote> On OpenBSD 6.4 you have to do first on the
building terminal to select adequate versions and deactivate OpenMPI (does not link) building with
CLang: <blockquote>$ export AUTOCONF_VERSION=2.69 AUTOMAKE_VERSION=1.16 CC=clang
</blockquote> On OpenIndiana Hipster, in order to enable OpenMPI compilation, do in a terminal:
<blockquote>$ export PATH=$PATH:/usr/lib/openmpi/gcc/bin </blockquote> On OpenSUSE Leap,
in order to enable OpenMPI compilation, in 64 bits version do in a terminal (OpenMPI configure
script does not work in last OpenSUSE versions then does not apply this step): <blockquote>$ export
PATH=$PATH:/usr/lib64/mpi/gcc/openmpi/bin </blockquote> This software has been built and tested in
the following operative systems: * Debian 9 (Linux, kFreeBSD and Hurd) * DragonFly BSD 5.2 * Dyson
Illumos * Fedora Linux 29 * FreeBSD 11.2 * Linux Mint DE 3 * Manjaro Linux * Microsoft Windows 7 *
Microsoft Windows 10 * NetBSD 8.0 (from source with modular xorg) * OpenBSD 6.4 * OpenIndiana
Hipster * OpenSUSE Linux Leap 15 * Ubuntu Mate Linux 18.04 * Xubuntu Linux 18.10 Probably, it can
be built in other systems, distributions, or versions but it has not been tested. 1. Download the latest <a
href=" https://github.com/jburguete/genetic" >genetic</a> doing on a terminal↵
: <blockquote>$ git clone https://github.com/jburguete/genetic.git </blockquote> 2. Build the genetic
library: <blockquote>$ cd genetic/3.0.0 $ sh build.sh </blockquote> 3. Download this repository:
<blockquote>$ cd ../.. $ git clone https://github.com/jburguete/mpcotool.git </blockquote> 4. Link the
latest genetic version to genetic: <blockquote>$ cd mpcotool/4.4.1 $ ln -s ../..genetic/3.0.0 genetic $
ln -s genetic/libgenetic.so (or .dll in Windows systems) </blockquote> 5. Build doing on a terminal:
<blockquote>$ sh build.sh </blockquote> Building no-GUI version on servers <hr> On servers or
clusters, where no-GUI with MPI parallelization is desirable, replace the 5th step of the previous sec-
tion by: <blockquote>$ sh build_without_gui.sh </blockquote>Linking as an external library <hr>
MPCOTool can also be used as an external library: 1. First copy the dynamic libraries (libmpcotool.so
and libgenetic.so on Unix systems or libmpcotool.dll and libgenetic.dll on Windows systems) to your
program directory. 2. Include the function header in your source code: <blockquote>extern int mp-
cotool (int argn, char **argc); </blockquote> 3. Build the executable file with the linker and compiler
flags: <blockquote>$ gcc -L. -Wl,-rpath=. -lmpcotool -lgenetic ... `pkg-config --cflags --libs gsl glib-2.0
json-glib-1.0 ...` </blockquote> 4. Calling to this function is equivalent to command line order (see next
chapter USER INSTRUCTIONS): * argn: number of arguments * argc[0]: "mpcotool" * argc[1]: first
command line argument. ... * argc[argn-1]: last argument. FINAL VERSIONS <hr> Optionally, final
compact versions without debug information can be built doing on the terminal: <blockquote>$ make
strip </blockquote> <h1>MAKING MANUALS INSTRUCTIONS </h1> On UNIX type systems you
need <a href=" https://www.tug.org/texlive" >texlive</a> installed. On Windows sys-
tems you need <a href=" http://miktex.org" >MiKTeX</a>. In order to compile the manuals
you can type on a terminal: <blockquote>$ make manuals </blockquote> <h1>MAKING TESTS
INSTRUCTIONS </h1> In order to build the tests follow the next instructions: 1. Link some tests
that needs genetic library doing in a terminal (assuming that you are in the directory mpcotool/4.4.1):
<blockquote>$ cd ../tests/test2 $ ln -s ../..genetic/3.0.0 genetic $ ln -s genetic/libgenetic.so (or .dll
on Windows systems) $ cd ../test3 $ ln -s ../..genetic/3.0.0 genetic $ ln -s genetic/libgenetic.so (or
.dll on Windows systems) $ cd ../test4 $ ln -s ../..genetic/3.0.0 genetic $ ln -s genetic/libgenetic.so (or
.dll on Windows systems) </blockquote> 2. Build all tests doing in the same terminal: <blockquote>$
cd ../..4.4.1 $ make tests </blockquote> <h1>USER INSTRUCTIONS </h1> Optional arguments
```

are typed in square brackets. * Command line in sequential mode (where X is the number of threads to execute and S is a seed for the pseudo-random numbers generator): `<blockquote>$./mpcotoolbin [-nthreads X] [-seed S] input_file.xml [result_file] [variables_file] </blockquote>` * Command line in parallelized mode (where X is the number of threads to open for every node and S is a seed for the pseudo-random numbers generator): `<blockquote>$ mpirun [MPI options] ./mpcotoolbin [-nthreads X] [-seed S] input_file.xml [result_file] [variables_file] </blockquote>` * The syntax of the simulator has to be: `<blockquote>$./simulator_name input_file_1 [input_file_2] [input_file_3] [input_file_4] output_file </blockquote>` * The syntax of the program to evaluate the objective function has to be (where the first data in the results file has to be the objective function value): `<blockquote>$./evaluator_name simulated_file data_file results_file </blockquote>` * On UNIX type systems the GUI application can be open doing on a terminal: `<blockquote>$./mpcotool </blockquote>`

INPUT FILE FORMAT

The format of the main input file is as: `<code{xml} <?xml version="1.0"?> <optimize simulator="simulator_name" evaluator="evaluator_name" algorithm="algorithm_type" nsimulations="simulations_number" iterations="iterations_number" tolerance="tolerance_value" nbest="best_number" npopulation="population_number" ngenerations="generations_number" mutation="mutation_ratio" reproduction="reproduction_ratio" adaptation="adaptation_ratio" direction="direction_search_type" nsteps="steps_number" relaxation="relaxation_parameter" nestimates="estimates_number" threshold="threshold_parameter" norm="norm_type" p="p_parameter" seed="random_seed" result_file="result_file" variables_file="variables_file"> <experiment name="data_file_1" template1="template_1_1" template2="template_1_2" ... weight="weight_1"/> ... <experiment name="data_file_N" template1="template_N_1" template2="template_N_2" ... weight="weight_N"/> <variable name="variable_1" minimum="min_value" maximum="max_value" precision="precision_digits" sweeps="sweeps_number" nbits="bits_number" step="step_size"/> ... <variable name="variable_M" minimum="min_value" maximum="max_value" precision="precision_digits" sweeps="sweeps_number" nbits="bits_number" step="step_size"/> </optimize> @endcode`

with: * **simulator**: simulator executable file name. * **evaluator**: optional. When needed is the evaluator executable file name. * **seed**: optional. Seed of the pseudo-random numbers generator (default value is 7007). * **result_file**: optional. It is the name of the optime result file (default name is "result"). * **variables_file**: optional. It is the name of all simulated variables file (default name is "variables"). * **precision**: optional, defined for each variable. Number of precision digits to evaluate the variable. 0 apply for integer numbers (default value is 14). * **weight**: optional, defined for each experiment. Multiplies the objective value obtained for each experiment in the final objective function value (default value is 1). * **threshold**: optional, to stop the simulations if objective function value less than the threshold is obtained (default value is 0). * **algorithm**: optimization algorithm type. * **norm**: error norm type. Implemented algorithms are: * **sweep**: Sweep brute force algorithm. It requires for each variable: * **sweeps**: number of sweeps to generate for each variable in every experiment. The total number of simulations to run is: `<blockquote>(number of experiments) x (variable 1 number of sweeps) x ... x (variable n number of sweeps) x (number of iterations) </blockquote>` * **Monte-Carlo**: Monte-Carlo brute force algorithm. It requires on calibrate: * **nsimulations**: number of simulations to run in every experiment. The total number of simulations to run is: `<blockquote>(number of experiments) x (number of simulations) x (number of iterations) </blockquote>` * **orthogonal**: Orthogonal sampling brute force algorithm. It requires for each variable: * **sweeps**: number of sweeps to generate for each variable in every experiment. The total number of simulations to run is: `<blockquote>(number of experiments) x (variable 1 number of sweeps) x ... x (variable n number of sweeps) x (number of iterations) </blockquote>` * Three former brute force algorithms can be iterated to improve convergence by using the following parameters: * **nbest**: number of best simulations to calculate convergence interval on next iteration (default 1). * **tolerance**: tolerance parameter to increase convergence interval (default 0). * **iterations**: number of iterations (default 1). It multiplies the total number of simulations: `<blockquote>x (number of iterations) </blockquote>` * Moreover, brute force algorithms can be coupled with a direction search method by using: * **direction**: method to estimate the optimal direction. Two options are currently available: * **coordinates**: coordinates descent method. It increases the total number of simulations by: `<blockquote>(number of experiments) x (number of iterations) x (number of steps) x 2 x (number of variables) </blockquote>` * **random**: random method. It requires: * **nestimates**: number of random checks to estimate the optimal di-

rection. </blockquote> It increases the total number of simulations by: <blockquote>(number of experiments) x (number of iterations) x (number of steps) x (number of estimates) </blockquote> Former methods require also: * nsteps: number of steps to perform the direction search method, * relaxation: relaxation parameter, and for each variable: * step: initial step size for the direction search method. * genetic: Genetic algorithm. It requires the following parameters: * npopulation: number of population. * ngenerations: number of generations. * mutation: mutation ratio. * reproduction: reproduction ratio. * adaptation: adaptation ratio. and for each variable: * nbits: number of bits to encode each variable. The total number of simulations to run is: <blockquote>(number of experiments) x (npopulation) x [1 + (ngenerations - 1) x (mutation + reproduction + adaptation)] </blockquote> Implemented error norms are: * euclidian: Euclidian norm. * maximum: maximum norm. * p: p-norm. It requires the parameter: * p: p exponent. * taxicab: Taxicab norm. Alternatively, the input file can be also written in JSON format as: @code{json} { "simulator": "simulator_↵ name", "evaluator": "evaluator_name", "algorithm": "algorithm_type", "nsimulations": "simulations_↵ number", "niterations": "iterations_number", "tolerance": "tolerance_value", "nbest": "best_number", "npopulation": "population_number", "ngenerations": "generations_number", "mutation": "mutation_↵ _ratio", "reproduction": "reproduction_ratio", "adaptation": "adaptation_ratio", "direction": "direction_↵ _search_type", "nsteps": "steps_number", "relaxation": "relaxation_parameter", "nestimates":↵ : "estimates_number", "threshold": "threshold_parameter", "norm": "norm_type", "p": "p_parameter", "seed": "random_seed", "result_file": "result_file", "variables_file": "variables_file", "experiments"↵ : [{ "name": "data_file_1", "template1": "template_1_1", "template2": "template_1_2", ... "weight": "weight_1", }, ... { "name": "data_file_N", "template1": "template_N_1", "template2": "template_↵ N_2", ... "weight": "weight_N", },], "variables": [{ "name": "variable_1", "minimum": "min_value", "maximum": "max_value", "precision": "precision_digits", "sweeps": "sweeps_number", "nbits": "bits_↵ _number", "step": "step_size", }, ... { "name": "variable_M", "minimum": "min_value", "maximum": "max_value", "precision": "precision_digits", "sweeps": "sweeps_number", "nbits": "bits_↵ _number", "step": "step_size", }] } @endcode <h1>SOME EXAMPLES OF INPUT FILES </h1> Example 1 <hr> * The simulator program name is: pivot * The syntax is: <blockquote>\$./pivot input_file output_file </blockquote> * The program to evaluate the objective function is: compare * The syntax is: <blockquote>\$./compare simulated_file data_file result_file </blockquote> * The calibration is performed with a sweep brute force algorithm. * The experimental data files are: <blockquote>27-48.txt 42.txt 52.txt 100.txt </blockquote> * Templates to get input files to simulator for each experiment are: <blockquote>template1.js template2.js template3.js template4.js </blockquote> * The variables to calibrate, ranges, precision and sweeps number to perform are: <blockquote>alpha1, [179.70, 180.20], 2, 5 alpha2, [179.30, 179.60], 2, 5 random, [0.00, 0.20], 2, 5 boot-time, [0.0, 3.0], 1, 5 </blockquote> * Then, the number of simulations to run is: 4x5x5x5x5=2500. * The input file is: @code{xml} <?xml version="1.0"?> <optimize simulator="pivot" evaluator="compare" algorithm="sweep"> <experiment name="27-48.↵ txt" template1="template1.js"/> <experiment name="42.txt" template1="template2.js"/> <experiment name="52.txt" template1="template3.js"/> <experiment name="100.txt" template1="template4.↵ js"/> <variable name="alpha1" minimum="179.70" maximum="180.20" precision="2" nsweeps="5"/> <variable name="alpha2" minimum="179.30" maximum="179.60" precision="2" nsweeps="5"/> <variable name="random" minimum="0.00" maximum="0.20" precision="2" nsweeps="5"/> <variable name="boot-time" minimum="0.0" maximum="3.0" precision="1" nsweeps="5"/> </optimize> @end- code * A template file as template1.js: @code{json} { "towers" : [{ "length" : 50.11, "velocity" : 0.02738, "@variable1" : @value1@, "@variable2@" : @value2@, "@variable3@" : @value3@, "@variable4@" : @value4@, { "length" : 50.11, "velocity" : 0.02824, "@variable1@" : @value1@, "@variable2@" : @value2@, "@variable3@" : @value3@, "@variable4@" : @value4@, { "length" : 50.11, "velocity" : 0.03008, "@variable1@" : @value1@, "@variable2@" : @value2@, "@variable3@" : @value3@, "@variable4@" : @value4@, { "length" : 50.11, "velocity" : 0.03753, "@variable1@" : @value1@, "@variable2@" : @value2@, "@variable3@" : @value3@, "@vari- able4@" : @value4@ }], "cycle-time" : 71.0, "plot-time" : 1.0, "comp-time-step": 0.1, "active-percent" : 27.48 }

- produces simulator input files to reproduce the experimental data file 27-48.txt as:

```
{
  "towers" :
  [
```

```
{
  "length"      : 50.11,
  "velocity"    : 0.02738,
  "alpha1"     : 179.95,
  "alpha2"     : 179.45,
  "random"     : 0.10,
  "boot-time"  : 1.5
},
{
  "length"      : 50.11,
  "velocity"    : 0.02824,
  "alpha1"     : 179.95,
  "alpha2"     : 179.45,
  "random"     : 0.10,
  "boot-time"  : 1.5
},
{
  "length"      : 50.11,
  "velocity"    : 0.03008,
  "alpha1"     : 179.95,
  "alpha2"     : 179.45,
  "random"     : 0.10,
  "boot-time"  : 1.5
},
{
  "length"      : 50.11,
  "velocity"    : 0.03753,
  "alpha1"     : 179.95,
  "alpha2"     : 179.45,
  "random"     : 0.10,
  "boot-time"  : 1.5
}
},
"cycle-time"    : 71.0,
"plot-time"     : 1.0,
"comp-time-step": 0.1,
"active-percent" : 27.48
}
```

Chapter 2

Data Structure Index

2.1 Data Structures

Here are the data structures with brief descriptions:

Experiment	Struct to define the experiment data	11
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Optimize	Struct to define the optimization ation data	20
Options	Struct to define the options dialog	33
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Chapter 3

File Index

3.1 File List

Here is a list of all documented files with brief descriptions:

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experiment.c	Source file to define the experiment data	87
experiment.h	Header file to define the experiment data	98
input.c	Source file to define the input functions	105
input.h	Header file to define the input functions	133
interface.c	Source file to define the graphical interface functions	140
interface.h	Header file to define the graphical interface functions	226
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variable.h	Header file to define the variable data	330

Chapter 4

Data Structure Documentation

4.1 Experiment Struct Reference

Struct to define the experiment data.

```
#include <experiment.h>
```

Data Fields

- char * [name](#)
File name.
- char * [stencil](#) [[MAX_NINPUTS](#)]
Array of template names of input files.
- double [weight](#)
Objective function weight.
- unsigned int [ninputs](#)
Number of input files to the simulator.

4.1.1 Detailed Description

Struct to define the experiment data.

Definition at line [45](#) of file [experiment.h](#).

4.1.2 Field Documentation

4.1.2.1 name

```
char* Experiment::name
```

File name.

Definition at line [47](#) of file [experiment.h](#).

4.1.2.2 ninputs

```
unsigned int Experiment::ninputs
```

Number of input files to the simulator.

Definition at line 50 of file [experiment.h](#).

4.1.2.3 stencil

```
char* Experiment::stencil[MAX_NINPUTS]
```

Array of template names of input files.

Definition at line 48 of file [experiment.h](#).

4.1.2.4 weight

```
double Experiment::weight
```

Objective function weight.

Definition at line 49 of file [experiment.h](#).

The documentation for this struct was generated from the following file:

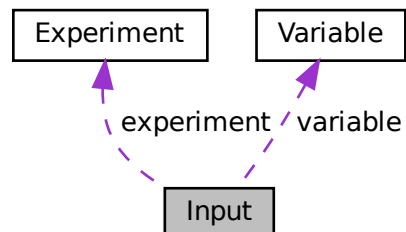
- [experiment.h](#)

4.2 Input Struct Reference

Struct to define the optimization input file.

```
#include <input.h>
```

Collaboration diagram for Input:



Data Fields

- `Experiment * experiment`
Array or experiments.
- `Variable * variable`
Array of variables.
- `char * result`
Name of the result file.
- `char * variables`
Name of the variables file.
- `char * simulator`
Name of the simulator program.
- `char * evaluator`
Name of the program to evaluate the objective function.
- `char * directory`
Working directory.
- `char * name`
Input data file name.
- `double tolerance`
Algorithm tolerance.
- `double mutation_ratio`
Mutation probability.
- `double reproduction_ratio`
Reproduction probability.
- `double adaptation_ratio`
Adaptation probability.
- `double relaxation`
Relaxation parameter.
- `double p`
Exponent of the P error norm.
- `double threshold`
Threshold to finish the optimization.
- `unsigned long int seed`
Seed of the pseudo-random numbers generator.
- `unsigned int nvariables`
Variables number.
- `unsigned int nexperiments`
Experiments number.
- `unsigned int nsimulations`
Simulations number per experiment.
- `unsigned int algorithm`
Algorithm type.
- `unsigned int nsteps`
Number of steps to do the hill climbing method.
- `unsigned int climbing`
Method to estimate the hill climbing.
- `unsigned int nestimates`
Number of simulations to estimate the hill climbing.
- `unsigned int niterations`
Number of algorithm iterations.
- `unsigned int nbest`

- Number of best simulations.*
 - unsigned int [norm](#)
Error norm type.
 - unsigned int [type](#)
Type of input file.

4.2.1 Detailed Description

Struct to define the optimization input file.

Definition at line [65](#) of file [input.h](#).

4.2.2 Field Documentation

4.2.2.1 `adaptation_ratio`

```
double Input::adaptation_ratio
```

Adaptation probability.

Definition at line [79](#) of file [input.h](#).

4.2.2.2 `algorithm`

```
unsigned int Input::algorithm
```

Algorithm type.

Definition at line [88](#) of file [input.h](#).

4.2.2.3 `climbing`

```
unsigned int Input::climbing
```

Method to estimate the hill climbing.

Definition at line [91](#) of file [input.h](#).

4.2.2.4 directory

```
char* Input::directory
```

Working directory.

Definition at line 74 of file [input.h](#).

4.2.2.5 evaluator

```
char* Input::evaluator
```

Name of the program to evaluate the objective function.

Definition at line 72 of file [input.h](#).

4.2.2.6 experiment

```
Experiment\* Input::experiment
```

Array or experiments.

Definition at line 67 of file [input.h](#).

4.2.2.7 mutation_ratio

```
double Input::mutation_ratio
```

Mutation probability.

Definition at line 77 of file [input.h](#).

4.2.2.8 name

```
char* Input::name
```

[Input](#) data file name.

Definition at line 75 of file [input.h](#).

4.2.2.9 nbest

```
unsigned int Input::nbest
```

Number of best simulations.

Definition at line 95 of file [input.h](#).

4.2.2.10 nestimates

```
unsigned int Input::nestimates
```

Number of simulations to estimate the hill climbing.

Definition at line 92 of file [input.h](#).

4.2.2.11 nexperiments

```
unsigned int Input::nexperiments
```

Experiments number.

Definition at line 86 of file [input.h](#).

4.2.2.12 niterations

```
unsigned int Input::niterations
```

Number of algorithm iterations.

Definition at line 94 of file [input.h](#).

4.2.2.13 norm

```
unsigned int Input::norm
```

Error norm type.

Definition at line 96 of file [input.h](#).

4.2.2.14 nsimulations

```
unsigned int Input::nsimulations
```

Simulations number per experiment.

Definition at line 87 of file [input.h](#).

4.2.2.15 nsteps

```
unsigned int Input::nsteps
```

Number of steps to do the hill climbing method.

Definition at line 89 of file [input.h](#).

4.2.2.16 nvariables

```
unsigned int Input::nvariables
```

Variables number.

Definition at line 85 of file [input.h](#).

4.2.2.17 p

```
double Input::p
```

Exponent of the P error norm.

Definition at line 81 of file [input.h](#).

4.2.2.18 relaxation

```
double Input::relaxation
```

Relaxation parameter.

Definition at line 80 of file [input.h](#).

4.2.2.19 reproduction_ratio

```
double Input::reproduction_ratio
```

Reproduction probability.

Definition at line 78 of file [input.h](#).

4.2.2.20 result

```
char* Input::result
```

Name of the result file.

Definition at line 69 of file [input.h](#).

4.2.2.21 seed

```
unsigned long int Input::seed
```

Seed of the pseudo-random numbers generator.

Definition at line 83 of file [input.h](#).

4.2.2.22 simulator

```
char* Input::simulator
```

Name of the simulator program.

Definition at line 71 of file [input.h](#).

4.2.2.23 threshold

```
double Input::threshold
```

Threshold to finish the optimization.

Definition at line 82 of file [input.h](#).

4.2.2.24 tolerance

```
double Input::tolerance
```

Algorithm tolerance.

Definition at line 76 of file [input.h](#).

4.2.2.25 type

```
unsigned int Input::type
```

Type of input file.

Definition at line 97 of file [input.h](#).

4.2.2.26 variable

```
Variable* Input::variable
```

Array of variables.

Definition at line 68 of file [input.h](#).

4.2.2.27 variables

```
char* Input::variables
```

Name of the variables file.

Definition at line 70 of file [input.h](#).

The documentation for this struct was generated from the following file:

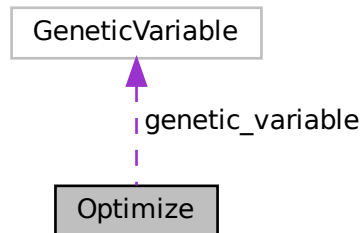
- [input.h](#)

4.3 Optimize Struct Reference

Struct to define the optimization ation data.

```
#include <optimize.h>
```

Collaboration diagram for Optimize:



Data Fields

- `GMappedFile ** file [MAX_NINPUTS]`
Matrix of input template files.
- `char ** experiment`
Array of experimental data file names.
- `char ** label`
Array of variable names.
- `gsl_rng * rng`
GSL random number generator.
- **`GeneticVariable * genetic_variable`**
Array of variables for the genetic algorithm.
- `FILE * file_result`
Result file.
- `FILE * file_variables`
Variables file.
- `char * result`
Name of the result file.
- `char * variables`
Name of the variables file.
- `char * simulator`
Name of the simulator program.
- `char * evaluator`
Name of the program to evaluate the objective function.
- `double * value`
Array of variable values.
- `double * rangemin`
Array of minimum variable values.

- double * [rangemax](#)
Array of maximum variable values.
- double * [rangeminabs](#)
Array of absolute minimum variable values.
- double * [rangemaxabs](#)
Array of absolute maximum variable values.
- double * [error_best](#)
Array of the best minimum errors.
- double * [weight](#)
Array of the experiment weights.
- double * [step](#)
Array of hill climbing method step sizes.
- double * [climbing](#)
Vector of hill climbing estimation.
- double * [value_old](#)
Array of the best variable values on the previous step.
- double * [error_old](#)
Array of the best minimum errors on the previous step.
- unsigned int * [precision](#)
Array of variable precisions.
- unsigned int * [nsweeps](#)
Array of sweeps of the sweep algorithm.
- unsigned int * [nbits](#)
Array of bits number of the genetic algorithm.
- unsigned int * [thread](#)
Array of simulation numbers to calculate on the thread.
- unsigned int * [thread_climbing](#)
- unsigned int * [simulation_best](#)
Array of best simulation numbers.
- double [tolerance](#)
Algorithm tolerance.
- double [mutation_ratio](#)
Mutation probability.
- double [reproduction_ratio](#)
Reproduction probability.
- double [adaptation_ratio](#)
Adaptation probability.
- double [relaxation](#)
Relaxation parameter.
- double [calculation_time](#)
Calculation time.
- double [p](#)
Exponent of the P error norm.
- double [threshold](#)
Threshold to finish the optimization.
- unsigned long int [seed](#)
Seed of the pseudo-random numbers generator.
- unsigned int [nvariables](#)
Variables number.
- unsigned int [nexperiments](#)
Experiments number.

- unsigned int [ninputs](#)
Number of input files to the simulator.
- unsigned int [nsimulations](#)
Simulations number per experiment.
- unsigned int [nsteps](#)
Number of steps for the hill climbing method.
- unsigned int [nestimates](#)
Number of simulations to estimate the climbing.
- unsigned int [algorithm](#)
Algorithm type.
- unsigned int [nstart](#)
Beginning simulation number of the task.
- unsigned int [nend](#)
Ending simulation number of the task.
- unsigned int [nstart_climbing](#)
Beginning simulation number of the task for the hill climbing method.
- unsigned int [nend_climbing](#)
Ending simulation number of the task for the hill climbing method.
- unsigned int [niterations](#)
Number of algorithm iterations.
- unsigned int [nbest](#)
Number of best simulations.
- unsigned int [nsaveds](#)
Number of saved simulations.
- unsigned int [stop](#)
To stop the simulations.
- int [mpi_rank](#)
Number of MPI task.

4.3.1 Detailed Description

Struct to define the optimization ation data.

Definition at line 45 of file [optimize.h](#).

4.3.2 Field Documentation

4.3.2.1 adaptation_ratio

```
double Optimize::adaptation_ratio
```

Adaptation probability.

Definition at line 86 of file [optimize.h](#).

4.3.2.2 algorithm

```
unsigned int Optimize::algorithm
```

Algorithm type.

Definition at line 101 of file [optimize.h](#).

4.3.2.3 calculation_time

```
double Optimize::calculation_time
```

Calculation time.

Definition at line 88 of file [optimize.h](#).

4.3.2.4 climbing

```
double* Optimize::climbing
```

Vector of hill climbing estimation.

Definition at line 68 of file [optimize.h](#).

4.3.2.5 error_best

```
double* Optimize::error_best
```

Array of the best minimum errors.

Definition at line 65 of file [optimize.h](#).

4.3.2.6 error_old

```
double* Optimize::error_old
```

Array of the best minimum errors on the previous step.

Definition at line 71 of file [optimize.h](#).

4.3.2.7 evaluator

```
char* Optimize::evaluator
```

Name of the program to evaluate the objective function.

Definition at line 58 of file [optimize.h](#).

4.3.2.8 experiment

```
char** Optimize::experiment
```

Array of experimental data file names.

Definition at line 48 of file [optimize.h](#).

4.3.2.9 file

```
GMappedFile** Optimize::file[MAX_NINPUTS]
```

Matrix of input template files.

Definition at line 47 of file [optimize.h](#).

4.3.2.10 file_result

```
FILE* Optimize::file_result
```

Result file.

Definition at line 53 of file [optimize.h](#).

4.3.2.11 file_variables

```
FILE* Optimize::file_variables
```

Variables file.

Definition at line 54 of file [optimize.h](#).

4.3.2.12 genetic_variable

```
GeneticVariable* Optimize::genetic_variable
```

Array of variables for the genetic algorithm.

Definition at line 51 of file [optimize.h](#).

4.3.2.13 label

```
char** Optimize::label
```

Array of variable names.

Definition at line 49 of file [optimize.h](#).

4.3.2.14 mpi_rank

```
int Optimize::mpi_rank
```

Number of MPI task.

Definition at line 113 of file [optimize.h](#).

4.3.2.15 mutation_ratio

```
double Optimize::mutation_ratio
```

Mutation probability.

Definition at line 84 of file [optimize.h](#).

4.3.2.16 nbest

```
unsigned int Optimize::nbest
```

Number of best simulations.

Definition at line 109 of file [optimize.h](#).

4.3.2.17 nbits

```
unsigned int* Optimize::nbits
```

Array of bits number of the genetic algorithm.

Definition at line 75 of file [optimize.h](#).

4.3.2.18 nend

```
unsigned int Optimize::nend
```

Ending simulation number of the task.

Definition at line 103 of file [optimize.h](#).

4.3.2.19 nend_climbing

```
unsigned int Optimize::nend_climbing
```

Ending simulation number of the task for the hill climbing method.

Definition at line 106 of file [optimize.h](#).

4.3.2.20 nestimates

```
unsigned int Optimize::nestimates
```

Number of simulations to estimate the climbing.

Definition at line 99 of file [optimize.h](#).

4.3.2.21 nexperiments

```
unsigned int Optimize::nexperiments
```

Experiments number.

Definition at line 94 of file [optimize.h](#).

4.3.2.22 ninputs

```
unsigned int Optimize::ninputs
```

Number of input files to the simulator.

Definition at line 95 of file [optimize.h](#).

4.3.2.23 niterations

```
unsigned int Optimize::niterations
```

Number of algorithm iterations.

Definition at line 108 of file [optimize.h](#).

4.3.2.24 nsaveds

```
unsigned int Optimize::nsaveds
```

Number of saved simulations.

Definition at line 110 of file [optimize.h](#).

4.3.2.25 nsimulations

```
unsigned int Optimize::nsimulations
```

Simulations number per experiment.

Definition at line 96 of file [optimize.h](#).

4.3.2.26 nstart

```
unsigned int Optimize::nstart
```

Beginning simulation number of the task.

Definition at line 102 of file [optimize.h](#).

4.3.2.27 nstart_climbing

```
unsigned int Optimize::nstart_climbing
```

Beginning simulation number of the task for the hill climbing method.

Definition at line 104 of file [optimize.h](#).

4.3.2.28 nsteps

```
unsigned int Optimize::nsteps
```

Number of steps for the hill climbing method.

Definition at line 97 of file [optimize.h](#).

4.3.2.29 nsweeps

```
unsigned int* Optimize::nsweeps
```

Array of sweeps of the sweep algorithm.

Definition at line 74 of file [optimize.h](#).

4.3.2.30 nvariables

```
unsigned int Optimize::nvariables
```

Variables number.

Definition at line 93 of file [optimize.h](#).

4.3.2.31 p

```
double Optimize::p
```

Exponent of the P error norm.

Definition at line 89 of file [optimize.h](#).

4.3.2.32 precision

```
unsigned int* Optimize::precision
```

Array of variable precisions.

Definition at line 73 of file [optimize.h](#).

4.3.2.33 rangemax

```
double* Optimize::rangemax
```

Array of maximum variable values.

Definition at line 62 of file [optimize.h](#).

4.3.2.34 rangemaxabs

```
double* Optimize::rangemaxabs
```

Array of absolute maximum variable values.

Definition at line 64 of file [optimize.h](#).

4.3.2.35 rangemin

```
double* Optimize::rangemin
```

Array of minimum variable values.

Definition at line 61 of file [optimize.h](#).

4.3.2.36 rangeminabs

```
double* Optimize::rangeminabs
```

Array of absolute minimum variable values.

Definition at line 63 of file [optimize.h](#).

4.3.2.37 relaxation

```
double Optimize::relaxation
```

Relaxation parameter.

Definition at line 87 of file [optimize.h](#).

4.3.2.38 reproduction_ratio

```
double Optimize::reproduction_ratio
```

Reproduction probability.

Definition at line 85 of file [optimize.h](#).

4.3.2.39 result

```
char* Optimize::result
```

Name of the result file.

Definition at line 55 of file [optimize.h](#).

4.3.2.40 rng

```
gsl_rng* Optimize::rng
```

GSL random number generator.

Definition at line 50 of file [optimize.h](#).

4.3.2.41 seed

```
unsigned long int Optimize::seed
```

Seed of the pseudo-random numbers generator.

Definition at line 91 of file [optimize.h](#).

4.3.2.42 simulation_best

```
unsigned int* Optimize::simulation_best
```

Array of best simulation numbers.

Definition at line 82 of file [optimize.h](#).

4.3.2.43 simulator

```
char* Optimize::simulator
```

Name of the simulator program.

Definition at line 57 of file [optimize.h](#).

4.3.2.44 step

```
double* Optimize::step
```

Array of hill climbing method step sizes.

Definition at line 67 of file [optimize.h](#).

4.3.2.45 stop

```
unsigned int Optimize::stop
```

To stop the simulations.

Definition at line 111 of file [optimize.h](#).

4.3.2.46 thread

```
unsigned int* Optimize::thread
```

Array of simulation numbers to calculate on the thread.

Definition at line 77 of file [optimize.h](#).

4.3.2.47 thread_climbing

```
unsigned int* Optimize::thread_climbing
```

Array of simulation numbers to calculate on the thread for the hill climbing method.

Definition at line 79 of file [optimize.h](#).

4.3.2.48 threshold

```
double Optimize::threshold
```

Threshold to finish the optimization.

Definition at line 90 of file [optimize.h](#).

4.3.2.49 tolerance

```
double Optimize::tolerance
```

Algorithm tolerance.

Definition at line 83 of file [optimize.h](#).

4.3.2.50 value

```
double* Optimize::value
```

Array of variable values.

Definition at line 60 of file [optimize.h](#).

4.3.2.51 value_old

```
double* Optimize::value_old
```

Array of the best variable values on the previous step.

Definition at line 69 of file [optimize.h](#).

4.3.2.52 variables

```
char* Optimize::variables
```

Name of the variables file.

Definition at line 56 of file [optimize.h](#).

4.3.2.53 weight

```
double* Optimize::weight
```

Array of the experiment weights.

Definition at line 66 of file [optimize.h](#).

The documentation for this struct was generated from the following file:

- [optimize.h](#)

4.4 Options Struct Reference

Struct to define the options dialog.

```
#include <interface.h>
```

Data Fields

- GtkDialog * [dialog](#)
Main GtkDialog.
- GtkGrid * [grid](#)
Main GtkGrid.
- GtkLabel * [label_seed](#)
Pseudo-random numbers generator seed GtkLabel.
- GtkSpinButton * [spin_seed](#)
Pseudo-random numbers generator seed GtkSpinButton.
- GtkLabel * [label_threads](#)
Threads number GtkLabel.
- GtkSpinButton * [spin_threads](#)
Threads number GtkSpinButton.
- GtkLabel * [label_climbing](#)
Climbing threads number GtkLabel.
- GtkSpinButton * [spin_climbing](#)
Climbing threads number GtkSpinButton.

4.4.1 Detailed Description

Struct to define the options dialog.

Definition at line 48 of file [interface.h](#).

4.4.2 Field Documentation

4.4.2.1 dialog

```
GtkDialog* Options::dialog
```

Main GtkDialog.

Definition at line 50 of file [interface.h](#).

4.4.2.2 grid

```
GtkGrid* Options::grid
```

Main GtkGrid.

Definition at line 51 of file [interface.h](#).

4.4.2.3 label_climbing

```
GtkLabel* Options::label_climbing
```

Climbing threads number GtkLabel.

Definition at line 58 of file [interface.h](#).

4.4.2.4 label_seed

```
GtkLabel* Options::label_seed
```

Pseudo-random numbers generator seed GtkLabel.

Definition at line 52 of file [interface.h](#).

4.4.2.5 label_threads

```
GtkLabel* Options::label_threads
```

Threads number GtkLabel.

Definition at line 56 of file [interface.h](#).

4.4.2.6 spin_climbing

```
GtkSpinButton* Options::spin_climbing
```

Climbing threads number GtkSpinButton.

Definition at line 59 of file [interface.h](#).

4.4.2.7 spin_seed

```
GtkSpinButton* Options::spin_seed
```

Pseudo-random numbers generator seed GtkSpinButton.

Definition at line 54 of file [interface.h](#).

4.4.2.8 spin_threads

```
GtkSpinButton* Options::spin_threads
```

Threads number GtkSpinButton.

Definition at line 57 of file [interface.h](#).

The documentation for this struct was generated from the following file:

- [interface.h](#)

4.5 ParallelData Struct Reference

Struct to pass to the GThreads parallelized function.

```
#include <optimize.h>
```

Data Fields

- unsigned int [thread](#)
Thread number.

4.5.1 Detailed Description

Struct to pass to the GThreads parallelized function.

Definition at line [121](#) of file [optimize.h](#).

4.5.2 Field Documentation

4.5.2.1 thread

```
unsigned int ParallelData::thread
```

Thread number.

Definition at line [123](#) of file [optimize.h](#).

The documentation for this struct was generated from the following file:

- [optimize.h](#)

4.6 Running Struct Reference

Struct to define the running dialog.

```
#include <interface.h>
```

Data Fields

- GtkWidget * [dialog](#)
Main GtkWidget.
- GtkWidget * [label](#)
Label GtkWidget.
- GtkWidget * [spinner](#)
Animation GtkWidget.
- GtkWidget * [grid](#)
Grid GtkWidget.

4.6.1 Detailed Description

Struct to define the running dialog.

Definition at line 66 of file [interface.h](#).

4.6.2 Field Documentation

4.6.2.1 dialog

```
GtkDialog* Running::dialog
```

Main GtkDialog.

Definition at line 68 of file [interface.h](#).

4.6.2.2 grid

```
GtkGrid* Running::grid
```

Grid GtkGrid.

Definition at line 71 of file [interface.h](#).

4.6.2.3 label

```
GtkLabel* Running::label
```

Label GtkLabel.

Definition at line 69 of file [interface.h](#).

4.6.2.4 spinner

```
GtkSpinner* Running::spinner
```

Animation GtkSpinner.

Definition at line 70 of file [interface.h](#).

The documentation for this struct was generated from the following file:

- [interface.h](#)

4.7 Variable Struct Reference

Struct to define the variable data.

```
#include <variable.h>
```

Data Fields

- char * [name](#)
Variable name.
- double [rangemin](#)
Minimum variable value.
- double [rangemax](#)
Maximum variable value.
- double [rangeminabs](#)
Absolute minimum variable value.
- double [rangemaxabs](#)
Absolute maximum variable value.
- double [step](#)
Hill climbing method step size.
- unsigned int [precision](#)
Variable precision.
- unsigned int [nsweeps](#)
Sweeps of the sweep algorithm.
- unsigned int [nbits](#)
Bits number of the genetic algorithm.

4.7.1 Detailed Description

Struct to define the variable data.

Definition at line [54](#) of file [variable.h](#).

4.7.2 Field Documentation

4.7.2.1 name

```
char* Variable::name
```

[Variable](#) name.

Definition at line [56](#) of file [variable.h](#).

4.7.2.2 nbits

```
unsigned int Variable::nbits
```

Bits number of the genetic algorithm.

Definition at line 64 of file [variable.h](#).

4.7.2.3 nsweeps

```
unsigned int Variable::nsweeps
```

Sweeps of the sweep algorithm.

Definition at line 63 of file [variable.h](#).

4.7.2.4 precision

```
unsigned int Variable::precision
```

[Variable](#) precision.

Definition at line 62 of file [variable.h](#).

4.7.2.5 rangemax

```
double Variable::rangemax
```

Maximum variable value.

Definition at line 58 of file [variable.h](#).

4.7.2.6 rangemaxabs

```
double Variable::rangemaxabs
```

Absolute maximum variable value.

Definition at line 60 of file [variable.h](#).

4.7.2.7 rangemin

```
double Variable::rangemin
```

Minimum variable value.

Definition at line 57 of file [variable.h](#).

4.7.2.8 rangeminabs

```
double Variable::rangeminabs
```

Absolute minimum variable value.

Definition at line 59 of file [variable.h](#).

4.7.2.9 step

```
double Variable::step
```

Hill climbing method step size.

Definition at line 61 of file [variable.h](#).

The documentation for this struct was generated from the following file:

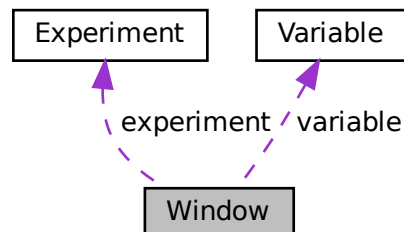
- [variable.h](#)

4.8 Window Struct Reference

Struct to define the main window.

```
#include <interface.h>
```

Collaboration diagram for Window:



Data Fields

- GtkWidget * [window](#)
Main GtkWidget.
- GtkWidget * [grid](#)
Main GtkWidget.
- GtkWidget * [box_buttons](#)
GtkBox to store the main buttons.
- GtkWidget * [button_open](#)
Open GtkWidget.
- GtkWidget * [button_save](#)
Save GtkWidget.
- GtkWidget * [button_run](#)
Run GtkWidget.
- GtkWidget * [button_options](#)
Options GtkWidget.
- GtkWidget * [button_help](#)
Help GtkWidget.
- GtkWidget * [button_about](#)
Help GtkWidget.
- GtkWidget * [button_exit](#)
Exit GtkWidget.
- GtkWidget * [grid_files](#)
Files GtkWidget.
- GtkWidget * [label_simulator](#)
Simulator program GtkWidget.
- GtkWidget * [button_simulator](#)
Simulator program GtkWidget.
- GtkWidget * [check_evaluator](#)
Evaluator program GtkWidget.
- GtkWidget * [button_evaluator](#)
Evaluator program GtkWidget.
- GtkWidget * [label_result](#)
Result file GtkWidget.
- GtkWidget * [entry_result](#)
Result file GtkWidget.
- GtkWidget * [label_variables](#)
Variables file GtkWidget.
- GtkWidget * [entry_variables](#)
Variables file GtkWidget.
- GtkWidget * [frame_norm](#)
GtkFrame to set the error norm.
- GtkWidget * [grid_norm](#)
GtkWidget to set the error norm.
- GtkWidget * [button_norm](#) [NNORMS]
Array of GtkWidgetButtons to set the error norm.
- GtkWidget * [label_p](#)
GtkWidget to set the p parameter.
- GtkWidget * [spin_p](#)
GtkSpinButton to set the p parameter.
- GtkWidget * [scrolled_p](#)

- GtkScrolledWindow to set the p parameter.*

 - GtkFrame * [frame_algorithm](#)

GtkFrame to set the algorithm.
 - GtkGrid * [grid_algorithm](#)

GtkGrid to set the algorithm.
 - GtkRadioButton * [button_algorithm](#) [NALGORITHMS]

Array of GtkRadioButtons to set the algorithm.
 - GtkLabel * [label_simulations](#)

GtkLabel to set the simulations number.
 - GtkSpinButton * [spin_simulations](#)

GtkSpinButton to set the simulations number.
 - GtkLabel * [label_iterations](#)

GtkLabel to set the iterations number.
 - GtkSpinButton * [spin_iterations](#)

GtkSpinButton to set the iterations number.
 - GtkLabel * [label_tolerance](#)

GtkLabel to set the tolerance.
 - GtkSpinButton * [spin_tolerance](#)

GtkSpinButton to set the tolerance.
 - GtkLabel * [label_best](#)

GtkLabel to set the best number.
 - GtkSpinButton * [spin_best](#)

GtkSpinButton to set the best number.
 - GtkLabel * [label_population](#)

GtkLabel to set the population number.
 - GtkSpinButton * [spin_population](#)

GtkSpinButton to set the population number.
 - GtkLabel * [label_generations](#)

GtkLabel to set the generations number.
 - GtkSpinButton * [spin_generations](#)

GtkSpinButton to set the generations number.
 - GtkLabel * [label_mutation](#)

GtkLabel to set the mutation ratio.
 - GtkSpinButton * [spin_mutation](#)

GtkSpinButton to set the mutation ratio.
 - GtkLabel * [label_reproduction](#)

GtkLabel to set the reproduction ratio.
 - GtkSpinButton * [spin_reproduction](#)

GtkSpinButton to set the reproduction ratio.
 - GtkLabel * [label_adaptation](#)

GtkLabel to set the adaptation ratio.
 - GtkSpinButton * [spin_adaptation](#)

GtkSpinButton to set the adaptation ratio.
 - GtkCheckButton * [check_climbing](#)

GtkCheckButton to check running the hill climbing method.
 - GtkGrid * [grid_climbing](#)

GtkGrid to pack the hill climbing method widgets.
 - GtkRadioButton * [button_climbing](#) [NCLIMBINGS]

Array of GtkRadioButtons array to set the hill climbing method.
 - GtkLabel * [label_steps](#)

GtkLabel to set the steps number.

- GtkSpinButton * [spin_steps](#)
GtkSpinButton to set the steps number.
- GtkLabel * [label_estimates](#)
GtkLabel to set the estimates number.
- GtkSpinButton * [spin_estimates](#)
GtkSpinButton to set the estimates number.
- GtkLabel * [label_relaxation](#)
GtkLabel to set the relaxation parameter.
- GtkSpinButton * [spin_relaxation](#)
GtkSpinButton to set the relaxation parameter.
- GtkLabel * [label_threshold](#)
GtkLabel to set the threshold.
- GtkSpinButton * [spin_threshold](#)
GtkSpinButton to set the threshold.
- GtkScrolledWindow * [scrolled_threshold](#)
GtkScrolledWindow to set the threshold.
- GtkFrame * [frame_variable](#)
Variable GtkFrame.
- GtkGrid * [grid_variable](#)
Variable GtkGrid.
- GtkComboBoxText * [combo_variable](#)
GtkComboBoxEntry to select a variable.
- GtkButton * [button_add_variable](#)
GtkButton to add a variable.
- GtkButton * [button_remove_variable](#)
GtkButton to remove a variable.
- GtkLabel * [label_variable](#)
Variable GtkLabel.
- GtkEntry * [entry_variable](#)
GtkEntry to set the variable name.
- GtkLabel * [label_min](#)
Minimum GtkLabel.
- GtkSpinButton * [spin_min](#)
Minimum GtkSpinButton.
- GtkScrolledWindow * [scrolled_min](#)
Minimum GtkScrolledWindow.
- GtkLabel * [label_max](#)
Maximum GtkLabel.
- GtkSpinButton * [spin_max](#)
Maximum GtkSpinButton.
- GtkScrolledWindow * [scrolled_max](#)
Maximum GtkScrolledWindow.
- GtkCheckButton * [check_minabs](#)
Absolute minimum GtkCheckButton.
- GtkSpinButton * [spin_minabs](#)
Absolute minimum GtkSpinButton.
- GtkScrolledWindow * [scrolled_minabs](#)
Absolute minimum GtkScrolledWindow.
- GtkCheckButton * [check_maxabs](#)
Absolute maximum GtkCheckButton.
- GtkSpinButton * [spin_maxabs](#)

- Absolute maximum GtkSpinButton.*
- GtkScrolledWindow * [scrolled_maxabs](#)
 - Absolute maximum GtkScrolledWindow.*
- GtkLabel * [label_precision](#)
 - Precision GtkLabel.*
- GtkSpinButton * [spin_precision](#)
 - Precision digits GtkSpinButton.*
- GtkLabel * [label_sweeps](#)
 - Sweeps number GtkLabel.*
- GtkSpinButton * [spin_sweeps](#)
 - Sweeps number GtkSpinButton.*
- GtkLabel * [label_bits](#)
 - Bits number GtkLabel.*
- GtkSpinButton * [spin_bits](#)
 - Bits number GtkSpinButton.*
- GtkLabel * [label_step](#)
 - GtkLabel to set the step.*
- GtkSpinButton * [spin_step](#)
 - GtkSpinButton to set the step.*
- GtkScrolledWindow * [scrolled_step](#)
 - step GtkScrolledWindow.*
- GtkFrame * [frame_experiment](#)
 - Experiment GtkFrame.*
- GtkGrid * [grid_experiment](#)
 - Experiment GtkGrid.*
- GtkComboBoxText * [combo_experiment](#)
 - Experiment GtkComboBoxEntry.*
- GtkButton * [button_add_experiment](#)
 - GtkButton to add a experiment.*
- GtkButton * [button_remove_experiment](#)
 - GtkButton to remove a experiment.*
- GtkLabel * [label_experiment](#)
 - Experiment GtkLabel.*
- GtkButton * [button_experiment](#)
 - GtkButton to set the experimental data file.*
- GtkLabel * [label_weight](#)
 - Weight GtkLabel.*
- GtkSpinButton * [spin_weight](#)
 - Weight GtkSpinButton.*
- GtkCheckButton * [check_template](#) [MAX_NINPUTS]
 - Array of GtkCheckButtons to set the input templates.*
- GtkButton * [button_template](#) [MAX_NINPUTS]
 - Array of GtkButtons to set the input templates.*
- GdkPixbuf * [logo](#)
 - Logo GdkPixbuf.*
- [Experiment](#) * [experiment](#)
 - Array of experiments data.*
- [Variable](#) * [variable](#)
 - Array of variables data.*
- char * [application_directory](#)
 - Application directory.*

- gulong [id_experiment](#)
Identifier of the combo_experiment signal.
- gulong [id_experiment_name](#)
Identifier of the button_experiment signal.
- gulong [id_variable](#)
Identifier of the combo_variable signal.
- gulong [id_variable_label](#)
Identifier of the entry_variable signal.
- gulong [id_template](#) [MAX_NINPUTS]
Array of identifiers of the check_template signal.
- gulong [id_input](#) [MAX_NINPUTS]
Array of identifiers of the button_template signal.
- unsigned int [nexperiments](#)
Number of experiments.
- unsigned int [nvariables](#)
Number of variables.

4.8.1 Detailed Description

Struct to define the main window.

Definition at line 78 of file [interface.h](#).

4.8.2 Field Documentation

4.8.2.1 application_directory

```
char* Window::application_directory
```

Application directory.

Definition at line 215 of file [interface.h](#).

4.8.2.2 box_buttons

```
GtkBox* Window::box_buttons
```

GtkBox to store the main buttons.

Definition at line 82 of file [interface.h](#).

4.8.2.3 button_about

GtkButton* Window::button_about

Help GtkButton.

Definition at line 88 of file [interface.h](#).

4.8.2.4 button_add_experiment

GtkButton* Window::button_add_experiment

GtkButton to add a experiment.

Definition at line 201 of file [interface.h](#).

4.8.2.5 button_add_variable

GtkButton* Window::button_add_variable

GtkButton to add a variable.

Definition at line 173 of file [interface.h](#).

4.8.2.6 button_algorithm

GtkRadioButton* Window::button_algorithm[[NALGORITHMS](#)]

Array of GtkRadioButtons to set the algorithm.

Definition at line 115 of file [interface.h](#).

4.8.2.7 button_climbing

GtkRadioButton* Window::button_climbing[[NCLIMBINGS](#)]

Array of GtkRadioButtons array to set the hill climbing method.

Definition at line 150 of file [interface.h](#).

4.8.2.8 button_evaluator

GtkButton* Window::button_evaluator

Evaluator program GtkButton.

Definition at line 94 of file [interface.h](#).

4.8.2.9 button_exit

GtkButton* Window::button_exit

Exit GtkButton.

Definition at line 89 of file [interface.h](#).

4.8.2.10 button_experiment

GtkButton* Window::button_experiment

GtkButton to set the experimental data file.

Definition at line 204 of file [interface.h](#).

4.8.2.11 button_help

GtkButton* Window::button_help

Help GtkButton.

Definition at line 87 of file [interface.h](#).

4.8.2.12 button_norm

GtkRadioButton* Window::button_norm[NNORMS]

Array of GtkRadioButtons to set the error norm.

Definition at line 102 of file [interface.h](#).

4.8.2.13 button_open

GtkButton* Window::button_open

Open GtkButton.

Definition at line 83 of file [interface.h](#).

4.8.2.14 button_options

GtkButton* Window::button_options

[Options](#) GtkButton.

Definition at line 86 of file [interface.h](#).

4.8.2.15 button_remove_experiment

GtkButton* Window::button_remove_experiment

GtkButton to remove a experiment.

Definition at line 202 of file [interface.h](#).

4.8.2.16 button_remove_variable

GtkButton* Window::button_remove_variable

GtkButton to remove a variable.

Definition at line 174 of file [interface.h](#).

4.8.2.17 button_run

GtkButton* Window::button_run

Run GtkButton.

Definition at line 85 of file [interface.h](#).

4.8.2.18 button_save

```
GtkButton* Window::button_save
```

Save GtkButton.

Definition at line 84 of file [interface.h](#).

4.8.2.19 button_simulator

```
GtkButton* Window::button_simulator
```

Simulator program GtkButton.

Definition at line 92 of file [interface.h](#).

4.8.2.20 button_template

```
GtkButton* Window::button_template[MAX_NINPUTS]
```

Array of GtkButtons to set the input templates.

Definition at line 210 of file [interface.h](#).

4.8.2.21 check_climbing

```
GtkCheckButton* Window::check_climbing
```

GtkCheckButton to check running the hill climbing method.

Definition at line 145 of file [interface.h](#).

4.8.2.22 check_evaluator

```
GtkCheckButton* Window::check_evaluator
```

Evaluator program GtkCheckButton.

Definition at line 93 of file [interface.h](#).

4.8.2.23 check_maxabs

```
GtkCheckButton* Window::check_maxabs
```

Absolute maximum GtkCheckButton.

Definition at line 186 of file [interface.h](#).

4.8.2.24 check_minabs

```
GtkCheckButton* Window::check_minabs
```

Absolute minimum GtkCheckButton.

Definition at line 183 of file [interface.h](#).

4.8.2.25 check_template

```
GtkCheckButton* Window::check_template[MAX_NINPUTS]
```

Array of GtkCheckButtons to set the input templates.

Definition at line 208 of file [interface.h](#).

4.8.2.26 combo_experiment

```
GtkComboBoxText* Window::combo_experiment
```

[Experiment](#) GtkComboBoxEntry.

Definition at line 200 of file [interface.h](#).

4.8.2.27 combo_variable

```
GtkComboBoxText* Window::combo_variable
```

GtkComboBoxEntry to select a variable.

Definition at line 171 of file [interface.h](#).

4.8.2.28 entry_result

GtkEntry* Window::entry_result

Result file GtkEntry.

Definition at line 96 of file [interface.h](#).

4.8.2.29 entry_variable

GtkEntry* Window::entry_variable

GtkEntry to set the variable name.

Definition at line 176 of file [interface.h](#).

4.8.2.30 entry_variables

GtkEntry* Window::entry_variables

Variables file GtkEntry.

Definition at line 98 of file [interface.h](#).

4.8.2.31 experiment

[Experiment](#)* Window::experiment

Array of experiments data.

Definition at line 213 of file [interface.h](#).

4.8.2.32 frame_algorithm

GtkFrame* Window::frame_algorithm

GtkFrame to set the algorithm.

Definition at line 112 of file [interface.h](#).

4.8.2.33 frame_experiment

GtkFrame* Window::frame_experiment

[Experiment](#) GtkFrame.

Definition at line 198 of file [interface.h](#).

4.8.2.34 frame_norm

GtkFrame* Window::frame_norm

GtkFrame to set the error norm.

Definition at line 99 of file [interface.h](#).

4.8.2.35 frame_variable

GtkFrame* Window::frame_variable

[Variable](#) GtkFrame.

Definition at line 169 of file [interface.h](#).

4.8.2.36 grid

GtkGrid* Window::grid

Main GtkGrid.

Definition at line 81 of file [interface.h](#).

4.8.2.37 grid_algorithm

GtkGrid* Window::grid_algorithm

GtkGrid to set the algorithm.

Definition at line 113 of file [interface.h](#).

4.8.2.38 grid_climbing

```
GtkGrid* Window::grid_climbing
```

GtkGrid to pack the hill climbing method widgets.

Definition at line 147 of file [interface.h](#).

4.8.2.39 grid_experiment

```
GtkGrid* Window::grid_experiment
```

[Experiment](#) GtkGrid.

Definition at line 199 of file [interface.h](#).

4.8.2.40 grid_files

```
GtkGrid* Window::grid_files
```

Files GtkGrid.

Definition at line 90 of file [interface.h](#).

4.8.2.41 grid_norm

```
GtkGrid* Window::grid_norm
```

GtkGrid to set the error norm.

Definition at line 100 of file [interface.h](#).

4.8.2.42 grid_variable

```
GtkGrid* Window::grid_variable
```

[Variable](#) GtkGrid.

Definition at line 170 of file [interface.h](#).

4.8.2.43 id_experiment

```
gulong Window::id_experiment
```

Identifier of the combo_experiment signal.

Definition at line 216 of file [interface.h](#).

4.8.2.44 id_experiment_name

```
gulong Window::id_experiment_name
```

Identifier of the button_experiment signal.

Definition at line 217 of file [interface.h](#).

4.8.2.45 id_input

```
gulong Window::id_input[MAX_NINPUTS]
```

Array of identifiers of the button_template signal.

Definition at line 222 of file [interface.h](#).

4.8.2.46 id_template

```
gulong Window::id_template[MAX_NINPUTS]
```

Array of identifiers of the check_template signal.

Definition at line 220 of file [interface.h](#).

4.8.2.47 id_variable

```
gulong Window::id_variable
```

Identifier of the combo_variable signal.

Definition at line 218 of file [interface.h](#).

4.8.2.48 id_variable_label

```
gulong Window::id_variable_label
```

Identifier of the entry_variable signal.

Definition at line 219 of file [interface.h](#).

4.8.2.49 label_adaptation

```
GtkLabel* Window::label_adaptation
```

GtkLabel to set the adaptation ratio.

Definition at line 142 of file [interface.h](#).

4.8.2.50 label_best

```
GtkLabel* Window::label_best
```

GtkLabel to set the best number.

Definition at line 129 of file [interface.h](#).

4.8.2.51 label_bits

```
GtkLabel* Window::label_bits
```

Bits number GtkLabel.

Definition at line 193 of file [interface.h](#).

4.8.2.52 label_estimates

```
GtkLabel* Window::label_estimates
```

GtkLabel to set the estimates number.

Definition at line 158 of file [interface.h](#).

4.8.2.53 label_experiment

```
GtkLabel* Window::label_experiment
```

[Experiment](#) GtkLabel.

Definition at line 203 of file [interface.h](#).

4.8.2.54 label_generations

```
GtkLabel* Window::label_generations
```

GtkLabel to set the generations number.

Definition at line 134 of file [interface.h](#).

4.8.2.55 label_iterations

```
GtkLabel* Window::label_iterations
```

GtkLabel to set the iterations number.

Definition at line 124 of file [interface.h](#).

4.8.2.56 label_max

```
GtkLabel* Window::label_max
```

Maximum GtkLabel.

Definition at line 180 of file [interface.h](#).

4.8.2.57 label_min

```
GtkLabel* Window::label_min
```

Minimum GtkLabel.

Definition at line 177 of file [interface.h](#).

4.8.2.58 label_mutation

```
GtkLabel* Window::label_mutation
```

GtkLabel to set the mutation ratio.

Definition at line 137 of file [interface.h](#).

4.8.2.59 label_p

```
GtkLabel* Window::label_p
```

GtkLabel to set the p parameter.

Definition at line 108 of file [interface.h](#).

4.8.2.60 label_population

```
GtkLabel* Window::label_population
```

GtkLabel to set the population number.

Definition at line 131 of file [interface.h](#).

4.8.2.61 label_precision

```
GtkLabel* Window::label_precision
```

Precision GtkLabel.

Definition at line 189 of file [interface.h](#).

4.8.2.62 label_relaxation

```
GtkLabel* Window::label_relaxation
```

GtkLabel to set the relaxation parameter.

Definition at line 161 of file [interface.h](#).

4.8.2.63 label_reproduction

```
GtkLabel* Window::label_reproduction
```

GtkLabel to set the reproduction ratio.

Definition at line 139 of file [interface.h](#).

4.8.2.64 label_result

```
GtkLabel* Window::label_result
```

Result file GtkLabel.

Definition at line 95 of file [interface.h](#).

4.8.2.65 label_simulations

```
GtkLabel* Window::label_simulations
```

GtkLabel to set the simulations number.

Definition at line 121 of file [interface.h](#).

4.8.2.66 label_simulator

```
GtkLabel* Window::label_simulator
```

Simulator program GtkLabel.

Definition at line 91 of file [interface.h](#).

4.8.2.67 label_step

```
GtkLabel* Window::label_step
```

GtkLabel to set the step.

Definition at line 195 of file [interface.h](#).

4.8.2.68 label_steps

```
GtkLabel* Window::label_steps
```

GtkLabel to set the steps number.

Definition at line 156 of file [interface.h](#).

4.8.2.69 label_sweeps

```
GtkLabel* Window::label_sweeps
```

Sweeps number GtkLabel.

Definition at line 191 of file [interface.h](#).

4.8.2.70 label_threshold

```
GtkLabel* Window::label_threshold
```

GtkLabel to set the threshold.

Definition at line 165 of file [interface.h](#).

4.8.2.71 label_tolerance

```
GtkLabel* Window::label_tolerance
```

GtkLabel to set the tolerance.

Definition at line 127 of file [interface.h](#).

4.8.2.72 label_variable

```
GtkLabel* Window::label_variable
```

[Variable](#) GtkLabel.

Definition at line 175 of file [interface.h](#).

4.8.2.73 label_variables

```
GtkLabel* Window::label_variables
```

Variables file GtkLabel.

Definition at line 97 of file [interface.h](#).

4.8.2.74 label_weight

```
GtkLabel* Window::label_weight
```

Weight GtkLabel.

Definition at line 206 of file [interface.h](#).

4.8.2.75 logo

```
GdkPixbuf* Window::logo
```

Logo GdkPixbuf.

Definition at line 212 of file [interface.h](#).

4.8.2.76 nexperiments

```
unsigned int Window::nexperiments
```

Number of experiments.

Definition at line 224 of file [interface.h](#).

4.8.2.77 nvariables

```
unsigned int Window::nvariables
```

Number of variables.

Definition at line 225 of file [interface.h](#).

4.8.2.78 scrolled_max

```
GtkScrolledWindow* Window::scrolled_max
```

Maximum GtkScrolledWindow.

Definition at line 182 of file [interface.h](#).

4.8.2.79 scrolled_maxabs

```
GtkScrolledWindow* Window::scrolled_maxabs
```

Absolute maximum GtkScrolledWindow.

Definition at line 188 of file [interface.h](#).

4.8.2.80 scrolled_min

```
GtkScrolledWindow* Window::scrolled_min
```

Minimum GtkScrolledWindow.

Definition at line 179 of file [interface.h](#).

4.8.2.81 scrolled_minabs

```
GtkScrolledWindow* Window::scrolled_minabs
```

Absolute minimum GtkScrolledWindow.

Definition at line 185 of file [interface.h](#).

4.8.2.82 scrolled_p

```
GtkScrolledWindow* Window::scrolled_p
```

GtkScrolledWindow to set the p parameter.

Definition at line 110 of file [interface.h](#).

4.8.2.83 scrolled_step

```
GtkScrolledWindow* Window::scrolled_step
```

step GtkScrolledWindow.

Definition at line 197 of file [interface.h](#).

4.8.2.84 scrolled_threshold

```
GtkScrolledWindow* Window::scrolled_threshold
```

GtkScrolledWindow to set the threshold.

Definition at line 167 of file [interface.h](#).

4.8.2.85 spin_adaptation

```
GtkSpinButton* Window::spin_adaptation
```

GtkSpinButton to set the adaptation ratio.

Definition at line 143 of file [interface.h](#).

4.8.2.86 spin_bests

```
GtkSpinButton* Window::spin_bests
```

GtkSpinButton to set the best number.

Definition at line 130 of file [interface.h](#).

4.8.2.87 spin_bits

```
GtkSpinButton* Window::spin_bits
```

Bits number GtkSpinButton.

Definition at line 194 of file [interface.h](#).

4.8.2.88 spin_estimates

GtkSpinButton* Window::spin_estimates

GtkSpinButton to set the estimates number.

Definition at line 159 of file [interface.h](#).

4.8.2.89 spin_generations

GtkSpinButton* Window::spin_generations

GtkSpinButton to set the generations number.

Definition at line 135 of file [interface.h](#).

4.8.2.90 spin_iterations

GtkSpinButton* Window::spin_iterations

GtkSpinButton to set the iterations number.

Definition at line 125 of file [interface.h](#).

4.8.2.91 spin_max

GtkSpinButton* Window::spin_max

Maximum GtkSpinButton.

Definition at line 181 of file [interface.h](#).

4.8.2.92 spin_maxabs

GtkSpinButton* Window::spin_maxabs

Absolute maximum GtkSpinButton.

Definition at line 187 of file [interface.h](#).

4.8.2.93 spin_min

GtkSpinButton* Window::spin_min

Minimum GtkSpinButton.

Definition at line 178 of file [interface.h](#).

4.8.2.94 spin_minabs

GtkSpinButton* Window::spin_minabs

Absolute minimum GtkSpinButton.

Definition at line 184 of file [interface.h](#).

4.8.2.95 spin_mutation

GtkSpinButton* Window::spin_mutation

GtkSpinButton to set the mutation ratio.

Definition at line 138 of file [interface.h](#).

4.8.2.96 spin_p

GtkSpinButton* Window::spin_p

GtkSpinButton to set the p parameter.

Definition at line 109 of file [interface.h](#).

4.8.2.97 spin_population

GtkSpinButton* Window::spin_population

GtkSpinButton to set the population number.

Definition at line 132 of file [interface.h](#).

4.8.2.98 spin_precision

GtkSpinButton* Window::spin_precision

Precision digits GtkSpinButton.

Definition at line 190 of file [interface.h](#).

4.8.2.99 spin_relaxation

GtkSpinButton* Window::spin_relaxation

GtkSpinButton to set the relaxation parameter.

Definition at line 163 of file [interface.h](#).

4.8.2.100 spin_reproduction

GtkSpinButton* Window::spin_reproduction

GtkSpinButton to set the reproduction ratio.

Definition at line 140 of file [interface.h](#).

4.8.2.101 spin_simulations

GtkSpinButton* Window::spin_simulations

GtkSpinButton to set the simulations number.

Definition at line 122 of file [interface.h](#).

4.8.2.102 spin_step

GtkSpinButton* Window::spin_step

GtkSpinButton to set the step.

Definition at line 196 of file [interface.h](#).

4.8.2.103 spin_steps

GtkSpinButton* Window::spin_steps

GtkSpinButton to set the steps number.

Definition at line 157 of file [interface.h](#).

4.8.2.104 spin_sweeps

GtkSpinButton* Window::spin_sweeps

Sweeps number GtkSpinButton.

Definition at line 192 of file [interface.h](#).

4.8.2.105 spin_threshold

GtkSpinButton* Window::spin_threshold

GtkSpinButton to set the threshold.

Definition at line 166 of file [interface.h](#).

4.8.2.106 spin_tolerance

GtkSpinButton* Window::spin_tolerance

GtkSpinButton to set the tolerance.

Definition at line 128 of file [interface.h](#).

4.8.2.107 spin_weight

GtkSpinButton* Window::spin_weight

Weight GtkSpinButton.

Definition at line 207 of file [interface.h](#).

4.8.2.108 variable

`Variable*` Window::variable

Array of variables data.

Definition at line 214 of file [interface.h](#).

4.8.2.109 window

`GtkWindow*` Window::window

Main GtkWindow.

Definition at line 80 of file [interface.h](#).

The documentation for this struct was generated from the following file:

- [interface.h](#)

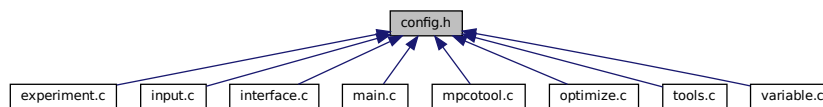
Chapter 5

File Documentation

5.1 config.h File Reference

Configuration header file.

This graph shows which files directly or indirectly include this file:



Macros

- `#define HAVE_MPI 1`
- `#define MAX_NINPUTS 8`
Maximum number of input files in the simulator program.
- `#define NALGORITHMS 4`
Number of stochastic algorithms.
- `#define NCLIMBINGS 2`
Number of hill climbing estimate methods.
- `#define NNORMS 4`
Number of error norms.
- `#define NPRECISIONS 15`
Number of precisions.
- `#define DEFAULT_PRECISION (NPRECISIONS - 1)`
Default precision digits.
- `#define DEFAULT_RANDOM_SEED 7007`
Default pseudo-random numbers seed.
- `#define DEFAULT_RELAXATION 1.`
Default relaxation parameter.
- `#define LOCALE_DIR "locales"`
Locales directory.

- `#define PROGRAM_INTERFACE "mpcotool"`
Name of the interface program.
- `#define LABEL_ABSOLUTE_MINIMUM "absolute_minimum"`
absolute minimum label.
- `#define LABEL_ABSOLUTE_MAXIMUM "absolute_maximum"`
absolute maximum label.
- `#define LABEL_ADAPTATION "adaption"`
adaption label.
- `#define LABEL_ALGORITHM "algorithm"`
algoritm label.
- `#define LABEL_CLIMBING "climbing"`
climbing label.
- `#define LABEL_COORDINATES "coordinates"`
coordinates label.
- `#define LABEL_EUCLIDIAN "euclidian"`
euclidian label.
- `#define LABEL_EVALUATOR "evaluator"`
evaluator label.
- `#define LABEL_EXPERIMENT "experiment"`
experiment label.
- `#define LABEL_EXPERIMENTS "experiments"`
experiment label.
- `#define LABEL_GENETIC "genetic"`
genetic label.
- `#define LABEL_MINIMUM "minimum"`
minimum label.
- `#define LABEL_MAXIMUM "maximum"`
maximum label.
- `#define LABEL_MONTE_CARLO "Monte-Carlo"`
Monte-Carlo label.
- `#define LABEL_MUTATION "mutation"`
mutation label.
- `#define LABEL_NAME "name"`
name label.
- `#define LABEL_NBEST "nbest"`
nbest label.
- `#define LABEL_NBITS "nbits"`
nbits label.
- `#define LABEL_NESTIMATES "nestimates"`
nestimates label.
- `#define LABEL_NGENERATIONS "ngenerations"`
ngenerations label.
- `#define LABEL_NITERATIONS "niterations"`
niterations label.
- `#define LABEL_NORM "norm"`
norm label.
- `#define LABEL_NPOPULATION "npopulation"`
npopulation label.
- `#define LABEL_NSIMULATIONS "nsimulations"`
nsimulations label.
- `#define LABEL_NSTEPS "nsteps"`

- nsteps label.*
- #define LABEL_NSWEEPS "nsweeps"
nsweeps label.
- #define LABEL_OPTIMIZE "optimize"
optimize label.
- #define LABEL_ORTHOGONAL "orthogonal"
orthogonal label.
- #define LABEL_P "p"
p label.
- #define LABEL_PRECISION "precision"
precision label.
- #define LABEL_RANDOM "random"
random label.
- #define LABEL_RELAXATION "relaxation"
relaxation label.
- #define LABEL_REPRODUCTION "reproduction"
reproduction label.
- #define LABEL_RESULT_FILE "result_file"
result_file label.
- #define LABEL_SIMULATOR "simulator"
simulator label.
- #define LABEL_SEED "seed"
seed label.
- #define LABEL_STEP "step"
step label.
- #define LABEL_SWEEP "sweep"
sweep label.
- #define LABEL_TAXICAB "taxicab"
taxicab label.
- #define LABEL_TEMPLATE1 "template1"
template1 label.
- #define LABEL_TEMPLATE2 "template2"
template2 label.
- #define LABEL_TEMPLATE3 "template3"
template3 label.
- #define LABEL_TEMPLATE4 "template4"
template4 label.
- #define LABEL_TEMPLATE5 "template5"
template5 label.
- #define LABEL_TEMPLATE6 "template6"
template6 label.
- #define LABEL_TEMPLATE7 "template7"
template7 label.
- #define LABEL_TEMPLATE8 "template8"
template8 label.
- #define LABEL_THRESHOLD "threshold"
threshold label.
- #define LABEL_TOLERANCE "tolerance"
tolerance label.
- #define LABEL_VARIABLE "variable"
variable label.

- `#define LABEL_VARIABLES "variables"`
variables label.
- `#define LABEL_VARIABLES_FILE "variables_file"`
variables label.
- `#define LABEL_WEIGHT "weight"`
weight label.

Enumerations

- `enum INPUT_TYPE { INPUT_TYPE_XML = 0 , INPUT_TYPE_JSON = 1 }`
Enum to define the input file types.

5.1.1 Detailed Description

Configuration header file.

Authors

Javier Burguete and Borja Latorre.

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Definition in file [config.h](#).

5.1.2 Macro Definition Documentation

5.1.2.1 DEFAULT_PRECISION

```
#define DEFAULT_PRECISION (NPRECISIONS - 1)
```

Default precision digits.

Definition at line 55 of file [config.h](#).

5.1.2.2 DEFAULT_RANDOM_SEED

```
#define DEFAULT_RANDOM_SEED 7007
```

Default pseudo-random numbers seed.

Definition at line 56 of file [config.h](#).

5.1.2.3 DEFAULT_RELAXATION

```
#define DEFAULT_RELAXATION 1.
```

Default relaxation parameter.

Definition at line 57 of file [config.h](#).

5.1.2.4 HAVE_MPI

```
#define HAVE_MPI 1
```

Definition at line 42 of file [config.h](#).

5.1.2.5 LABEL_ABSOLUTE_MAXIMUM

```
#define LABEL_ABSOLUTE_MAXIMUM "absolute_maximum"
```

absolute maximum label.

Definition at line 69 of file [config.h](#).

5.1.2.6 LABEL_ABSOLUTE_MINIMUM

```
#define LABEL_ABSOLUTE_MINIMUM "absolute_minimum"
```

absolute minimum label.

Definition at line 67 of file [config.h](#).

5.1.2.7 LABEL_ADAPTATION

```
#define LABEL_ADAPTATION "adaptation"
```

adaption label.

Definition at line 70 of file [config.h](#).

5.1.2.8 LABEL_ALGORITHM

```
#define LABEL_ALGORITHM "algorithm"
```

algorithm label.

Definition at line 71 of file [config.h](#).

5.1.2.9 LABEL_CLIMBING

```
#define LABEL_CLIMBING "climbing"
```

climbing label.

Definition at line 72 of file [config.h](#).

5.1.2.10 LABEL_COORDINATES

```
#define LABEL_COORDINATES "coordinates"
```

coordinates label.

Definition at line 73 of file [config.h](#).

5.1.2.11 LABEL_EUCLIDIAN

```
#define LABEL_EUCLIDIAN "euclidian"
```

euclidian label.

Definition at line 74 of file [config.h](#).

5.1.2.12 LABEL_EVALUATOR

```
#define LABEL_EVALUATOR "evaluator"
```

evaluator label.

Definition at line 75 of file [config.h](#).

5.1.2.13 LABEL_EXPERIMENT

```
#define LABEL_EXPERIMENT "experiment"
```

experiment label.

Definition at line 76 of file [config.h](#).

5.1.2.14 LABEL_EXPERIMENTS

```
#define LABEL_EXPERIMENTS "experiments"
```

experiment label.

Definition at line 77 of file [config.h](#).

5.1.2.15 LABEL_GENETIC

```
#define LABEL_GENETIC "genetic"
```

genetic label.

Definition at line 78 of file [config.h](#).

5.1.2.16 LABEL_MAXIMUM

```
#define LABEL_MAXIMUM "maximum"
```

maximum label.

Definition at line 80 of file [config.h](#).

5.1.2.17 LABEL_MINIMUM

```
#define LABEL_MINIMUM "minimum"
```

minimum label.

Definition at line 79 of file [config.h](#).

5.1.2.18 LABEL_MONTE_CARLO

```
#define LABEL_MONTE_CARLO "Monte-Carlo"
```

Monte-Carlo label.

Definition at line 81 of file [config.h](#).

5.1.2.19 LABEL_MUTATION

```
#define LABEL_MUTATION "mutation"
```

mutation label.

Definition at line 82 of file [config.h](#).

5.1.2.20 LABEL_NAME

```
#define LABEL_NAME "name"
```

name label.

Definition at line 83 of file [config.h](#).

5.1.2.21 LABEL_NBEST

```
#define LABEL_NBEST "nbest"
```

nbest label.

Definition at line 84 of file [config.h](#).

5.1.2.22 LABEL_NBITS

```
#define LABEL_NBITS "nbits"
```

nbits label.

Definition at line 85 of file [config.h](#).

5.1.2.23 LABEL_NESTIMATES

```
#define LABEL_NESTIMATES "nestimates"
```

nestimates label.

Definition at line 86 of file [config.h](#).

5.1.2.24 LABEL_NGENERATIONS

```
#define LABEL_NGENERATIONS "ngenerations"
```

ngenerations label.

Definition at line 87 of file [config.h](#).

5.1.2.25 LABEL_NITERATIONS

```
#define LABEL_NITERATIONS "niterations"
```

niterations label.

Definition at line 88 of file [config.h](#).

5.1.2.26 LABEL_NORM

```
#define LABEL_NORM "norm"
```

norm label.

Definition at line 89 of file [config.h](#).

5.1.2.27 LABEL_NPOPULATION

```
#define LABEL_NPOPULATION "npopulation"
```

npopulation label.

Definition at line 90 of file [config.h](#).

5.1.2.28 LABEL_NSIMULATIONS

```
#define LABEL_NSIMULATIONS "nsimulations"
```

nsimulations label.

Definition at line 91 of file [config.h](#).

5.1.2.29 LABEL_NSTEPS

```
#define LABEL_NSTEPS "nsteps"
```

nsteps label.

Definition at line 92 of file [config.h](#).

5.1.2.30 LABEL_NSWEEPS

```
#define LABEL_NSWEEPS "nsweeps"
```

nsweeps label.

Definition at line 93 of file [config.h](#).

5.1.2.31 LABEL_OPTIMIZE

```
#define LABEL_OPTIMIZE "optimize"
```

optimize label.

Definition at line 94 of file [config.h](#).

5.1.2.32 LABEL_ORTHOGONAL

```
#define LABEL_ORTHOGONAL "orthogonal"
```

orthogonal label.

Definition at line 95 of file [config.h](#).

5.1.2.33 LABEL_P

```
#define LABEL_P "p"
```

p label.

Definition at line 96 of file [config.h](#).

5.1.2.34 LABEL_PRECISION

```
#define LABEL_PRECISION "precision"
```

precision label.

Definition at line 97 of file [config.h](#).

5.1.2.35 LABEL_RANDOM

```
#define LABEL_RANDOM "random"
```

random label.

Definition at line 98 of file [config.h](#).

5.1.2.36 LABEL_RELAXATION

```
#define LABEL_RELAXATION "relaxation"
```

relaxation label.

Definition at line 99 of file [config.h](#).

5.1.2.37 LABEL_REPRODUCTION

```
#define LABEL_REPRODUCTION "reproduction"
```

reproduction label.

Definition at line 100 of file [config.h](#).

5.1.2.38 LABEL_RESULT_FILE

```
#define LABEL_RESULT_FILE "result_file"
```

result_file label.

Definition at line 101 of file [config.h](#).

5.1.2.39 LABEL_SEED

```
#define LABEL_SEED "seed"
```

seed label.

Definition at line 103 of file [config.h](#).

5.1.2.40 LABEL_SIMULATOR

```
#define LABEL_SIMULATOR "simulator"
```

simulator label.

Definition at line 102 of file [config.h](#).

5.1.2.41 LABEL_STEP

```
#define LABEL_STEP "step"
```

step label.

Definition at line 104 of file [config.h](#).

5.1.2.42 LABEL_SWEEP

```
#define LABEL_SWEEP "sweep"
```

sweep label.

Definition at line 105 of file [config.h](#).

5.1.2.43 LABEL_TAXICAB

```
#define LABEL_TAXICAB "taxicab"
```

taxicab label.

Definition at line 106 of file [config.h](#).

5.1.2.44 LABEL_TEMPLATE1

```
#define LABEL_TEMPLATE1 "template1"
```

template1 label.

Definition at line 107 of file [config.h](#).

5.1.2.45 LABEL_TEMPLATE2

```
#define LABEL_TEMPLATE2 "template2"
```

template2 label.

Definition at line 108 of file [config.h](#).

5.1.2.46 LABEL_TEMPLATE3

```
#define LABEL_TEMPLATE3 "template3"
```

template3 label.

Definition at line 109 of file [config.h](#).

5.1.2.47 LABEL_TEMPLATE4

```
#define LABEL_TEMPLATE4 "template4"
```

template4 label.

Definition at line 110 of file [config.h](#).

5.1.2.48 LABEL_TEMPLATE5

```
#define LABEL_TEMPLATE5 "template5"
```

template5 label.

Definition at line 111 of file [config.h](#).

5.1.2.49 LABEL_TEMPLATE6

```
#define LABEL_TEMPLATE6 "template6"
```

template6 label.

Definition at line 112 of file [config.h](#).

5.1.2.50 LABEL_TEMPLATE7

```
#define LABEL_TEMPLATE7 "template7"
```

template7 label.

Definition at line 113 of file [config.h](#).

5.1.2.51 LABEL_TEMPLATE8

```
#define LABEL_TEMPLATE8 "template8"
```

template8 label.

Definition at line 114 of file [config.h](#).

5.1.2.52 LABEL_THRESHOLD

```
#define LABEL_THRESHOLD "threshold"
```

threshold label.

Definition at line 115 of file [config.h](#).

5.1.2.53 LABEL_TOLERANCE

```
#define LABEL_TOLERANCE "tolerance"
```

tolerance label.

Definition at line 116 of file [config.h](#).

5.1.2.54 LABEL_VARIABLE

```
#define LABEL_VARIABLE "variable"
```

variable label.

Definition at line 117 of file [config.h](#).

5.1.2.55 LABEL_VARIABLES

```
#define LABEL_VARIABLES "variables"
```

variables label.

Definition at line 118 of file [config.h](#).

5.1.2.56 LABEL_VARIABLES_FILE

```
#define LABEL_VARIABLES_FILE "variables_file"
```

variables label.

Definition at line 119 of file [config.h](#).

5.1.2.57 LABEL_WEIGHT

```
#define LABEL_WEIGHT "weight"
```

weight label.

Definition at line 120 of file [config.h](#).

5.1.2.58 LOCALE_DIR

```
#define LOCALE_DIR "locales"
```

Locales directory.

Definition at line 61 of file [config.h](#).

5.1.2.59 MAX_NINPUTS

```
#define MAX_NINPUTS 8
```

Maximum number of input files in the simulator program.

Definition at line 47 of file [config.h](#).

5.1.2.60 NALGORITHMS

```
#define NALGORITHMS 4
```

Number of stochastic algorithms.

Definition at line 48 of file [config.h](#).

5.1.2.61 NCLIMBINGS

```
#define NCLIMBINGS 2
```

Number of hill climbing estimate methods.

Definition at line 49 of file [config.h](#).

5.1.2.62 NNORMS

```
#define NNORMS 4
```

Number of error norms.

Definition at line 50 of file [config.h](#).

5.1.2.63 NPRECISIONS

```
#define NPRECISIONS 15
```

Number of precisions.

Definition at line 51 of file [config.h](#).

5.1.2.64 PROGRAM_INTERFACE

```
#define PROGRAM_INTERFACE "mpcotool"
```

Name of the interface program.

Definition at line 62 of file [config.h](#).

5.1.3 Enumeration Type Documentation

5.1.3.1 INPUT_TYPE

```
enum INPUT_TYPE
```

Enum to define the input file types.

Enumerator

INPUT_TYPE_XML	XML input file.
INPUT_TYPE_JSON	JSON input file.

Definition at line 125 of file [config.h](#).

```
00126 {  
00127     INPUT_TYPE_XML = 0,  
00128     INPUT_TYPE_JSON = 1  
00129 };
```

5.2 config.h

[Go to the documentation of this file.](#)

```
00001 /* config.h.      Generated from config.h.in by configure.    */  
00002 /*  
00003 MPCOTool:  
00004 The Multi-Purposes Calibration and Optimization Tool.  A software to perform  
00005 calibrations or optimizations of empirical parameters.  
00006  
00007 AUTHORS: Javier Burguete and Borja Latorre.
```

```

00008
00009 Copyright 2012-2018, AUTHORS.
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00026 PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
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00028 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00029 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00030 OF SUCH DAMAGE.
00031 */
00032
00033 #ifndef CONFIG__H
00034 #define CONFIG__H 1
00035
00036 #define HAVE_MPI 1
00037
00038 // Array sizes
00039
00040 #define MAX_NINPUTS 8
00041 #define NALGORITHMS 4
00042 #define NCLIMBINGS 2
00043 #define NNORMS 4
00044 #define NPRECISIONS 15
00045
00046 // Default choices
00047
00048 #define DEFAULT_PRECISION (NPRECISIONS - 1)
00049 #define DEFAULT_RANDOM_SEED 7007
00050 #define DEFAULT_RELAXATION 1.
00051
00052 // Interface labels
00053
00054 #define LOCALE_DIR "locales"
00055 #define PROGRAM_INTERFACE "mpcotool"
00056
00057 // Labels
00058
00059 #define LABEL_ABSOLUTE_MINIMUM "absolute_minimum"
00060 #define LABEL_ABSOLUTE_MAXIMUM "absolute_maximum"
00061 #define LABEL_ADAPTATION "adaptation"
00062 #define LABEL_ALGORITHM "algorithm"
00063 #define LABEL_CLIMBING "climbing"
00064 #define LABEL_COORDINATES "coordinates"
00065 #define LABEL_EUCLIDIAN "euclidian"
00066 #define LABEL_EVALUATOR "evaluator"
00067 #define LABEL_EXPERIMENT "experiment"
00068 #define LABEL_EXPERIMENTS "experiments"
00069 #define LABEL_GENETIC "genetic"
00070 #define LABEL_MINIMUM "minimum"
00071 #define LABEL_MAXIMUM "maximum"
00072 #define LABEL_MONTE_CARLO "Monte-Carlo"
00073 #define LABEL_MUTATION "mutation"
00074 #define LABEL_NAME "name"
00075 #define LABEL_NBEST "nbest"
00076 #define LABEL_NBITS "nbits"
00077 #define LABEL_NESTIMATES "nestimates"
00078 #define LABEL_NGENERATIONS "ngenerations"
00079 #define LABEL_NITERATIONS "niterations"
00080 #define LABEL_NORM "norm"
00081 #define LABEL_NPOPULATION "npopulation"
00082 #define LABEL_NSIMULATIONS "nsimulations"
00083 #define LABEL_NSTEPS "nsteps"
00084 #define LABEL_NSWEEPS "nsweeps"
00085 #define LABEL_OPTIMIZE "optimize"
00086 #define LABEL_ORTHOGONAL "orthogonal"
00087 #define LABEL_P "p"
00088 #define LABEL_PRECISION "precision"
00089 #define LABEL_RANDOM "random"
00090 #define LABEL_RELAXATION "relaxation"
00091 #define LABEL_REPRODUCTION "reproduction"
00092 #define LABEL_RESULT_FILE "result_file"
00093 #define LABEL_SIMULATOR "simulator"
00094 #define LABEL_SEED "seed"

```

```

00104 #define LABEL_STEP "step"
00105 #define LABEL_SWEEP "sweep"
00106 #define LABEL_TAXICAB "taxicab"
00107 #define LABEL_TEMPLATE1 "template1"
00108 #define LABEL_TEMPLATE2 "template2"
00109 #define LABEL_TEMPLATE3 "template3"
00110 #define LABEL_TEMPLATE4 "template4"
00111 #define LABEL_TEMPLATE5 "template5"
00112 #define LABEL_TEMPLATE6 "template6"
00113 #define LABEL_TEMPLATE7 "template7"
00114 #define LABEL_TEMPLATE8 "template8"
00115 #define LABEL_THRESHOLD "threshold"
00116 #define LABEL_TOLERANCE "tolerance"
00117 #define LABEL_VARIABLE "variable"
00118 #define LABEL_VARIABLES "variables"
00119 #define LABEL_VARIABLES_FILE "variables_file"
00120 #define LABEL_WEIGHT "weight"
00121
00122 // Enumerations
00123
00125 enum INPUT_TYPE
00126 {
00127     INPUT_TYPE_XML = 0,
00128     INPUT_TYPE_JSON = 1
00129 };
00130
00131 #endif

```

5.3 experiment.c File Reference

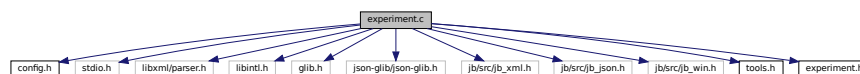
Source file to define the experiment data.

```

#include "config.h"
#include <stdio.h>
#include <libxml/parser.h>
#include <libintl.h>
#include <glib.h>
#include <json-glib/json-glib.h>
#include "jb/src/jb_xml.h"
#include "jb/src/jb_json.h"
#include "jb/src/jb_win.h"
#include "tools.h"
#include "experiment.h"

```

Include dependency graph for experiment.c:



Macros

- `#define DEBUG_EXPERIMENT 0`
Macro to debug experiment functions.

Functions

- static void `experiment_new` (`Experiment *experiment`)
- void `experiment_free` (`Experiment *experiment`, unsigned int type)
- void `experiment_error` (`Experiment *experiment`, char *message)
- int `experiment_open_xml` (`Experiment *experiment`, xmlNode *node, unsigned int ninputs)
- int `experiment_open_json` (`Experiment *experiment`, JsonNode *node, unsigned int ninputs)

Variables

- `const char * stencil [MAX_NINPUTS]`
Array of xmlChar strings with stencil labels.

5.3.1 Detailed Description

Source file to define the experiment data.

Authors

Javier Burguete and Borja Latorre.

Copyright

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Definition in file [experiment.c](#).

5.3.2 Macro Definition Documentation

5.3.2.1 DEBUG_EXPERIMENT

```
#define DEBUG_EXPERIMENT 0
```

Macro to debug experiment functions.

Definition at line 51 of file [experiment.c](#).

5.3.3 Function Documentation

5.3.3.1 experiment_error()

```
void experiment_error (  
    Experiment * experiment,  
    char * message )
```

Function to print a message error opening an [Experiment](#) struct.

Parameters

<i>experiment</i>	Experiment struct.
<i>message</i>	Error message.

Definition at line 112 of file [experiment.c](#).

```
00114 {
00115     char buffer[64];
00116     if (!experiment->name)
00117         snprintf (buffer, 64, "%s: %s", _("Experiment"), message);
00118     else
00119         snprintf (buffer, 64, "%s %s: %s", _("Experiment"),
00120                 experiment->name, message);
00121     error_message = g_strdup (buffer);
00122 }
```

5.3.3.2 experiment_free()

```
void experiment_free (
    Experiment * experiment,
    unsigned int type )
```

Function to free the memory of an [Experiment](#) struct.

Parameters

<i>experiment</i>	Experiment struct.
<i>type</i>	Type of input file.

Definition at line 83 of file [experiment.c](#).

```
00085 {
00086     unsigned int i;
00087     #if DEBUG_EXPERIMENT
00088     fprintf (stderr, "experiment_free: start\n");
00089     #endif
00090     if (type == INPUT_TYPE_XML)
00091     {
00092         for (i = 0; i < experiment->ninputs; ++i)
00093             xmlFree (experiment->stencil[i]);
00094         xmlFree (experiment->name);
00095     }
00096     else
00097     {
00098         for (i = 0; i < experiment->ninputs; ++i)
00099             g_free (experiment->stencil[i]);
00100         g_free (experiment->name);
00101     }
00102     experiment->ninputs = 0;
00103     #if DEBUG_EXPERIMENT
00104     fprintf (stderr, "experiment_free: end\n");
00105     #endif
00106 }
```

5.3.3.3 experiment_new()

```
static void experiment_new (
    Experiment * experiment ) [static]
```

Function to create a new [Experiment](#) struct.

Parameters

<i>experiment</i>	Experiment struct.
-------------------	------------------------------------

Definition at line 64 of file [experiment.c](#).

```
00065 {
00066     unsigned int i;
00067     #if DEBUG_EXPERIMENT
00068         fprintf (stderr, "experiment_new: start\n");
00069     #endif
00070     experiment->name = NULL;
00071     experiment->ninputs = 0;
00072     for (i = 0; i < MAX_NINPUTS; ++i)
00073         experiment->stencil[i] = NULL;
00074     #if DEBUG_EXPERIMENT
00075         fprintf (stderr, "input_new: end\n");
00076     #endif
00077 }
```

5.3.3.4 experiment_open_json()

```
int experiment_open_json (
    Experiment * experiment,
    JsonNode * node,
    unsigned int ninputs )
```

Function to open the [Experiment](#) struct on a XML node.

Returns

1 on success, 0 on error.

Parameters

<i>experiment</i>	Experiment struct.
<i>node</i>	JSON node.
<i>ninputs</i>	Number of the simulator input files.

Definition at line 233 of file [experiment.c](#).

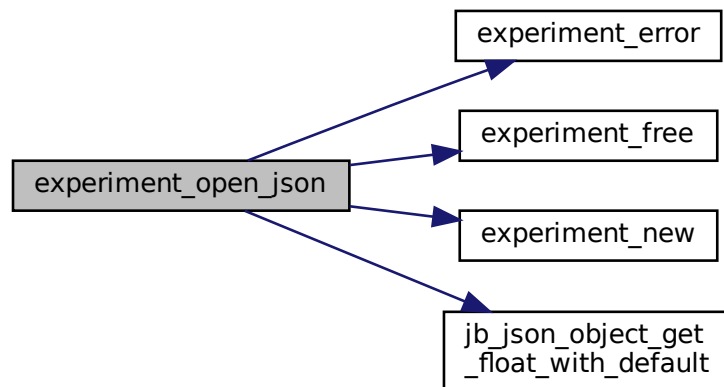
```
00237 {
00238     char buffer[64];
00239     JsonObject *object;
00240     const char *name;
00241     int error_code;
00242     unsigned int i;
00243
00244     #if DEBUG_EXPERIMENT
00245         fprintf (stderr, "experiment_open_json: start\n");
00246     #endif
00247
00248     // Resetting experiment data
00249     experiment_new (experiment);
00250
00251     // Getting JSON object
00252     object = json_node_get_object (node);
00253
00254     // Reading the experimental data
00255     name = json_object_get_string_member (object, LABEL_NAME);
00256     if (!name)
00257     {
00258         experiment_error (experiment, _("no data file name"));
00259         goto exit_on_error;
00260     }
00261     experiment->name = g_strdup (name);
00262     #if DEBUG_EXPERIMENT
00263         fprintf (stderr, "experiment_open_json: name=%s\n", experiment->name);
00264     #endif
00265     experiment->weight
00266         = jb_json_object_get_float_with_default (object, LABEL_WEIGHT, &error_code,
00267                                                 1.);
00268     if (!error_code)
```

```

00269     {
00270         experiment_error (experiment, _("bad weight"));
00271         goto exit_on_error;
00272     }
00273 #if DEBUG_EXPERIMENT
00274     fprintf (stderr, "experiment_open_json: weight=%lg\n", experiment->weight);
00275 #endif
00276     name = json_object_get_string_member (object, stencil[0]);
00277     if (name)
00278     {
00279         #if DEBUG_EXPERIMENT
00280             fprintf (stderr, "experiment_open_json: experiment=%s template1=%s\n",
00281                     name, stencil[0]);
00282         #endif
00283         ++experiment->ninputs;
00284     }
00285     else
00286     {
00287         experiment_error (experiment, _("no template"));
00288         goto exit_on_error;
00289     }
00290     experiment->stencil[0] = g_strdup (name);
00291     for (i = 1; i < MAX_NINPUTS; ++i)
00292     {
00293         #if DEBUG_EXPERIMENT
00294             fprintf (stderr, "experiment_open_json: stencil%u\n", i + 1);
00295         #endif
00296         if (json_object_get_member (object, stencil[i]))
00297         {
00298             if (ninputs && ninputs <= i)
00299             {
00300                 experiment_error (experiment, _("bad templates number"));
00301                 goto exit_on_error;
00302             }
00303             name = json_object_get_string_member (object, stencil[i]);
00304             #if DEBUG_EXPERIMENT
00305                 fprintf (stderr,
00306                         "experiment_open_json: experiment=%s stencil%u=%s\n",
00307                         experiment->nexperiments, name, stencil[i]);
00308             #endif
00309             experiment->stencil[i] = g_strdup (name);
00310             ++experiment->ninputs;
00311         }
00312         else if (ninputs && ninputs > i)
00313         {
00314             snprintf (buffer, 64, "%s%u", _("no template"), i + 1);
00315             experiment_error (experiment, buffer);
00316             goto exit_on_error;
00317         }
00318         else
00319             break;
00320     }
00321
00322     #if DEBUG_EXPERIMENT
00323     fprintf (stderr, "experiment_open_json: end\n");
00324     #endif
00325     return 1;
00326
00327 exit_on_error:
00328     experiment_free (experiment, INPUT_TYPE_JSON);
00329     #if DEBUG_EXPERIMENT
00330     fprintf (stderr, "experiment_open_json: end\n");
00331     #endif
00332     return 0;
00333 }

```

Here is the call graph for this function:



5.3.3.5 experiment_open_xml()

```

int experiment_open_xml (
    Experiment * experiment,
    xmlNode * node,
    unsigned int ninputs )
  
```

Function to open the [Experiment](#) struct on a XML node.

Returns

1 on success, 0 on error.

Parameters

<i>experiment</i>	Experiment struct.
<i>node</i>	XML node.
<i>ninputs</i>	Number of the simulator input files.

Definition at line 130 of file [experiment.c](#).

```

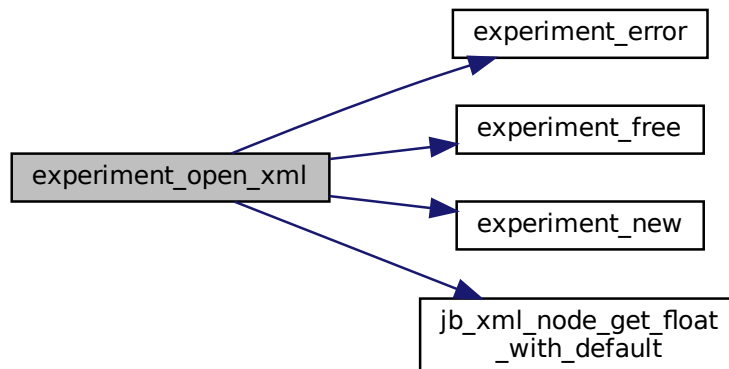
00134 {
00135     char buffer[64];
00136     int error_code;
00137     unsigned int i;
00138
00139     #if DEBUG_EXPERIMENT
00140         fprintf (stderr, "experiment_open_xml:  start\n");
00141     #endif
00142
00143     // Resetting experiment data
00144     experiment_new (experiment);
00145
  
```

```

00146 // Reading the experimental data
00147 experiment->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00148 if (!experiment->name)
00149 {
00150     experiment_error (experiment, _("no data file name"));
00151     goto exit_on_error;
00152 }
00153 #if DEBUG_EXPERIMENT
00154 fprintf (stderr, "experiment_open_xml: name=%s\n", experiment->name);
00155 #endif
00156 experiment->weight
00157 = jb_xml_node_get_float_with_default (node, (const xmlChar *) LABEL_WEIGHT,
00158                                     &error_code, 1.);
00159 if (!error_code)
00160 {
00161     experiment_error (experiment, _("bad weight"));
00162     goto exit_on_error;
00163 }
00164 #if DEBUG_EXPERIMENT
00165 fprintf (stderr, "experiment_open_xml: weight=%lg\n", experiment->weight);
00166 #endif
00167 experiment->stencil[0]
00168 = (char *) xmlGetProp (node, (const xmlChar *) stencil[0]);
00169 if (experiment->stencil[0])
00170 {
00171     #if DEBUG_EXPERIMENT
00172     fprintf (stderr, "experiment_open_xml: experiment=%s stencil1=%s\n",
00173             experiment->name, stencil[0]);
00174     #endif
00175     ++experiment->ninputs;
00176 }
00177 else
00178 {
00179     experiment_error (experiment, _("no template"));
00180     goto exit_on_error;
00181 }
00182 for (i = 1; i < MAX_NINPUTS; ++i)
00183 {
00184     #if DEBUG_EXPERIMENT
00185     fprintf (stderr, "experiment_open_xml: stencil%u\n", i + 1);
00186     #endif
00187     if (xmlHasProp (node, (const xmlChar *) stencil[i]))
00188     {
00189         if (ninputs && ninputs <= i)
00190         {
00191             experiment_error (experiment, _("bad templates number"));
00192             goto exit_on_error;
00193         }
00194         experiment->stencil[i]
00195         = (char *) xmlGetProp (node, (const xmlChar *) stencil[i]);
00196         #if DEBUG_EXPERIMENT
00197         fprintf (stderr,
00198                 "experiment_open_xml: experiment=%s stencil%u=%s\n",
00199                 experiment->nexperiments, experiment->name,
00200                 experiment->stencil[i]);
00201         #endif
00202         ++experiment->ninputs;
00203     }
00204     else if (ninputs && ninputs > i)
00205     {
00206         snprintf (buffer, 64, "%s%u", _("no template"), i + 1);
00207         experiment_error (experiment, buffer);
00208         goto exit_on_error;
00209     }
00210     else
00211         break;
00212 }
00213
00214 #if DEBUG_EXPERIMENT
00215 fprintf (stderr, "experiment_open_xml: end\n");
00216 #endif
00217 return 1;
00218
00219 exit_on_error:
00220     experiment_free (experiment, INPUT_TYPE_XML);
00221     #if DEBUG_EXPERIMENT
00222     fprintf (stderr, "experiment_open_xml: end\n");
00223     #endif
00224     return 0;
00225 }

```

Here is the call graph for this function:



5.3.4 Variable Documentation

5.3.4.1 stencil

```
const char* stencil[MAX_NINPUTS]
```

Initial value:

```
= {
    LABEL_TEMPLATE1, LABEL_TEMPLATE2, LABEL_TEMPLATE3, LABEL_TEMPLATE4,
    LABEL_TEMPLATE5, LABEL_TEMPLATE6, LABEL_TEMPLATE7, LABEL_TEMPLATE8
}
```

Array of xmlChar strings with stencil labels.

Definition at line 53 of file [experiment.c](#).

5.4 experiment.c

[Go to the documentation of this file.](#)

```

00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burquete and Borja Latorre.
00007
00008 Copyright 2012-2023, AUTHORS.
00009
00010 Redistribution and use in source and binary forms, with or without modification,
00011 are permitted provided that the following conditions are met:
00012
00013 1. Redistributions of source code must retain the above copyright notice,
00014 this list of conditions and the following disclaimer.
00015
00016 2. Redistributions in binary form must reproduce the above copyright notice,
```

```

00017 this list of conditions and the following disclaimer in the
00018 documentation and/or other materials provided with the distribution.
00019
00020 THIS SOFTWARE IS PROVIDED BY AUTHORS "AS IS" AND ANY EXPRESS OR IMPLIED
00021 WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
00022 MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
00023 SHALL AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
00024 SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
00025 PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
00026 BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #define _GNU_SOURCE
00033 #include "config.h"
00034 #include <stdio.h>
00035 #include <libxml/parser.h>
00036 #include <libintl.h>
00037 #include <glib.h>
00038 #include <json-glib/json-glib.h>
00039 #include "jb/src/jb_xml.h"
00040 #include "jb/src/jb_json.h"
00041 #include "jb/src/jb_win.h"
00042 #include "tools.h"
00043 #include "experiment.h"
00044
00045 #define DEBUG_EXPERIMENT 0
00046
00047 const char *stencil[MAX_NINPUTS] = {
00048     LABEL_TEMPLATE1, LABEL_TEMPLATE2, LABEL_TEMPLATE3, LABEL_TEMPLATE4,
00049     LABEL_TEMPLATE5, LABEL_TEMPLATE6, LABEL_TEMPLATE7, LABEL_TEMPLATE8
00050 };
00051
00052 static void
00053 experiment_new (Experiment * experiment)
00054 {
00055     unsigned int i;
00056     #if DEBUG_EXPERIMENT
00057         fprintf (stderr, "experiment_new: start\n");
00058     #endif
00059     experiment->name = NULL;
00060     experiment->ninputs = 0;
00061     for (i = 0; i < MAX_NINPUTS; ++i)
00062         experiment->stencil[i] = NULL;
00063     #if DEBUG_EXPERIMENT
00064         fprintf (stderr, "input_new: end\n");
00065     #endif
00066 }
00067
00068 void
00069 experiment_free (Experiment * experiment,
00070                 unsigned int type)
00071 {
00072     unsigned int i;
00073     #if DEBUG_EXPERIMENT
00074         fprintf (stderr, "experiment_free: start\n");
00075     #endif
00076     if (type == INPUT_TYPE_XML)
00077     {
00078         for (i = 0; i < experiment->ninputs; ++i)
00079             xmlFree (experiment->stencil[i]);
00080         xmlFree (experiment->name);
00081     }
00082     else
00083     {
00084         for (i = 0; i < experiment->ninputs; ++i)
00085             g_free (experiment->stencil[i]);
00086         g_free (experiment->name);
00087     }
00088     experiment->ninputs = 0;
00089     #if DEBUG_EXPERIMENT
00090         fprintf (stderr, "experiment_free: end\n");
00091     #endif
00092 }
00093
00094 void
00095 experiment_error (Experiment * experiment,
00096                  char *message)
00097 {
00098     char buffer[64];
00099     if (!experiment->name)
00100         snprintf (buffer, 64, "%s: %s", _("Experiment"), message);
00101     else
00102         snprintf (buffer, 64, "%s %s: %s", _("Experiment"),

```

```

00120         experiment->name, message);
00121     error_message = g_strdup (buffer);
00122 }
00123
00129 int
00130 experiment_open_xml (Experiment * experiment,
00131                     xmlNode * node,
00132                     unsigned int ninputs)
00133 {
00134     char buffer[64];
00135     int error_code;
00136     unsigned int i;
00137
00138     #if DEBUG_EXPERIMENT
00139     fprintf (stderr, "experiment_open_xml: start\n");
00140     #endif
00141
00142     // Resetting experiment data
00143     experiment_new (experiment);
00144
00145     // Reading the experimental data
00146     experiment->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00147     if (!experiment->name)
00148     {
00149         experiment_error (experiment, _("no data file name"));
00150         goto exit_on_error;
00151     }
00152
00153     #if DEBUG_EXPERIMENT
00154     fprintf (stderr, "experiment_open_xml: name=%s\n", experiment->name);
00155     #endif
00156     experiment->weight
00157         = jb_xml_node_get_float_with_default (node, (const xmlChar *) LABEL_WEIGHT,
00158                                             &error_code, 1.);
00159     if (!error_code)
00160     {
00161         experiment_error (experiment, _("bad weight"));
00162         goto exit_on_error;
00163     }
00164
00165     #if DEBUG_EXPERIMENT
00166     fprintf (stderr, "experiment_open_xml: weight=%lg\n", experiment->weight);
00167     #endif
00168     experiment->stencil[0]
00169         = (char *) xmlGetProp (node, (const xmlChar *) stencil[0]);
00170     if (experiment->stencil[0])
00171     {
00172         #if DEBUG_EXPERIMENT
00173         fprintf (stderr, "experiment_open_xml: experiment=%s stencil=%s\n",
00174                 experiment->name, stencil[0]);
00175         #endif
00176         ++experiment->ninputs;
00177     }
00178     else
00179     {
00180         experiment_error (experiment, _("no template"));
00181         goto exit_on_error;
00182     }
00183     for (i = 1; i < MAX_NINPUTS; ++i)
00184     {
00185         #if DEBUG_EXPERIMENT
00186         fprintf (stderr, "experiment_open_xml: stencil%u\n", i + 1);
00187         #endif
00188         if (xmlHasProp (node, (const xmlChar *) stencil[i]))
00189         {
00190             if (ninputs && ninputs <= i)
00191             {
00192                 experiment_error (experiment, _("bad templates number"));
00193                 goto exit_on_error;
00194             }
00195             experiment->stencil[i]
00196                 = (char *) xmlGetProp (node, (const xmlChar *) stencil[i]);
00197             #if DEBUG_EXPERIMENT
00198             fprintf (stderr,
00199                     "experiment_open_xml: experiment=%s stencil%u=%s\n",
00200                     experiment->name,
00201                     experiment->stencil[i]);
00202             #endif
00203             ++experiment->ninputs;
00204         }
00205         else if (ninputs && ninputs > i)
00206         {
00207             snprintf (buffer, 64, "%s%u", _("no template"), i + 1);
00208             experiment_error (experiment, buffer);
00209             goto exit_on_error;
00210         }
00211         else
00212             break;
00213     }

```



```

00213
00214 #if DEBUG_EXPERIMENT
00215     fprintf (stderr, "experiment_open_xml:  end\n");
00216 #endif
00217     return 1;
00218
00219 exit_on_error:
00220     experiment_free (experiment, INPUT_TYPE_XML);
00221 #if DEBUG_EXPERIMENT
00222     fprintf (stderr, "experiment_open_xml:  end\n");
00223 #endif
00224     return 0;
00225 }
00226
00232 int
00233 experiment_open_json (Experiment * experiment,
00234                      JsonNode * node,
00235                      unsigned int ninputs)
00237 {
00238     char buffer[64];
00239     JsonObject *object;
00240     const char *name;
00241     int error_code;
00242     unsigned int i;
00243
00244 #if DEBUG_EXPERIMENT
00245     fprintf (stderr, "experiment_open_json:  start\n");
00246 #endif
00247
00248     // Resetting experiment data
00249     experiment_new (experiment);
00250
00251     // Getting JSON object
00252     object = json_node_get_object (node);
00253
00254     // Reading the experimental data
00255     name = json_object_get_string_member (object, LABEL_NAME);
00256     if (!name)
00257     {
00258         experiment_error (experiment, _("no data file name"));
00259         goto exit_on_error;
00260     }
00261     experiment->name = g_strdup (name);
00262 #if DEBUG_EXPERIMENT
00263     fprintf (stderr, "experiment_open_json:  name=%s\n", experiment->name);
00264 #endif
00265     experiment->weight
00266         = jb_json_object_get_float_with_default (object, LABEL_WEIGHT, &error_code,
00267                                                  1.);
00268     if (!error_code)
00269     {
00270         experiment_error (experiment, _("bad weight"));
00271         goto exit_on_error;
00272     }
00273 #if DEBUG_EXPERIMENT
00274     fprintf (stderr, "experiment_open_json:  weight=%lg\n", experiment->weight);
00275 #endif
00276     name = json_object_get_string_member (object, stencil[0]);
00277     if (name)
00278     {
00279 #if DEBUG_EXPERIMENT
00280         fprintf (stderr, "experiment_open_json:  experiment=%s template1=%s\n",
00281                 name, stencil[0]);
00282 #endif
00283         ++experiment->ninputs;
00284     }
00285     else
00286     {
00287         experiment_error (experiment, _("no template"));
00288         goto exit_on_error;
00289     }
00290     experiment->stencil[0] = g_strdup (name);
00291     for (i = 1; i < MAX_NINPUTS; ++i)
00292     {
00293 #if DEBUG_EXPERIMENT
00294         fprintf (stderr, "experiment_open_json:  stencil%u\n", i + 1);
00295 #endif
00296         if (json_object_get_member (object, stencil[i]))
00297         {
00298             if (ninputs && ninputs <= i)
00299             {
00300                 experiment_error (experiment, _("bad templates number"));
00301                 goto exit_on_error;
00302             }
00303             name = json_object_get_string_member (object, stencil[i]);
00304 #if DEBUG_EXPERIMENT
00305             fprintf (stderr,

```

```

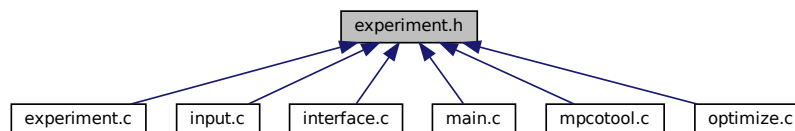
00306             "experiment_open_json: experiment=%s stencil%u=%s\n",
00307             experiment->nexperiments, name, stencil[i]);
00308 #endif
00309     experiment->stencil[i] = g_strdup (name);
00310     ++experiment->ninputs;
00311 }
00312 else if (ninputs && ninputs > i)
00313 {
00314     snprintf (buffer, 64, "%s%u", _("no template"), i + 1);
00315     experiment_error (experiment, buffer);
00316     goto exit_on_error;
00317 }
00318 else
00319     break;
00320 }
00321
00322 #if DEBUG_EXPERIMENT
00323 fprintf (stderr, "experiment_open_json: end\n");
00324 #endif
00325 return 1;
00326
00327 exit_on_error:
00328     experiment_free (experiment, INPUT_TYPE_JSON);
00329 #if DEBUG_EXPERIMENT
00330 fprintf (stderr, "experiment_open_json: end\n");
00331 #endif
00332 return 0;
00333 }

```

5.5 experiment.h File Reference

Header file to define the experiment data.

This graph shows which files directly or indirectly include this file:



Data Structures

- struct [Experiment](#)
Struct to define the experiment data.

Functions

- void [experiment_free](#) ([Experiment](#) *experiment, unsigned int type)
- void [experiment_error](#) ([Experiment](#) *experiment, char *message)
- int [experiment_open_xml](#) ([Experiment](#) *experiment, xmlNode *node, unsigned int ninputs)
- int [experiment_open_json](#) ([Experiment](#) *experiment, JsonNode *node, unsigned int ninputs)

Variables

- const char * [stencil](#) [[MAX_NINPUTS](#)]
Array of xmlChar strings with stencil labels.

5.5.1 Detailed Description

Header file to define the experiment data.

Authors

Javier Burguete.

Copyright

Copyright 2012-2023, all rights reserved.

Definition in file [experiment.h](#).

5.5.2 Function Documentation

5.5.2.1 `experiment_error()`

```
void experiment_error (
    Experiment * experiment,
    char * message )
```

Function to print a message error opening an [Experiment](#) struct.

Parameters

<i>experiment</i>	Experiment struct.
<i>message</i>	Error message.

Definition at line 112 of file [experiment.c](#).

```
00114 {
00115     char buffer[64];
00116     if (!experiment->name)
00117         snprintf (buffer, 64, "%s: %s", _("Experiment"), message);
00118     else
00119         snprintf (buffer, 64, "%s %s: %s", _("Experiment"),
00120                 experiment->name, message);
00121     error_message = g_strdup (buffer);
00122 }
```

5.5.2.2 `experiment_free()`

```
void experiment_free (
    Experiment * experiment,
    unsigned int type )
```

Function to free the memory of an [Experiment](#) struct.

Parameters

<i>experiment</i>	Experiment struct.
<i>type</i>	Type of input file.

Definition at line 83 of file [experiment.c](#).

```

00085 {
00086     unsigned int i;
00087     #if DEBUG_EXPERIMENT
00088         fprintf (stderr, "experiment_free:  start\n");
00089     #endif
00090     if (type == INPUT_TYPE_XML)
00091     {
00092         for (i = 0; i < experiment->ninputs; ++i)
00093             xmlFree (experiment->stencil[i]);
00094         xmlFree (experiment->name);
00095     }
00096     else
00097     {
00098         for (i = 0; i < experiment->ninputs; ++i)
00099             g_free (experiment->stencil[i]);
00100         g_free (experiment->name);
00101     }
00102     experiment->ninputs = 0;
00103     #if DEBUG_EXPERIMENT
00104         fprintf (stderr, "experiment_free:  end\n");
00105     #endif
00106 }
```

5.5.2.3 experiment_open_json()

```

int experiment_open_json (
    Experiment * experiment,
    JsonNode * node,
    unsigned int ninputs )
```

Function to open the [Experiment](#) struct on a XML node.

Returns

1 on success, 0 on error.

Parameters

<i>experiment</i>	Experiment struct.
<i>node</i>	JSON node.
<i>ninputs</i>	Number of the simulator input files.

Definition at line 233 of file [experiment.c](#).

```

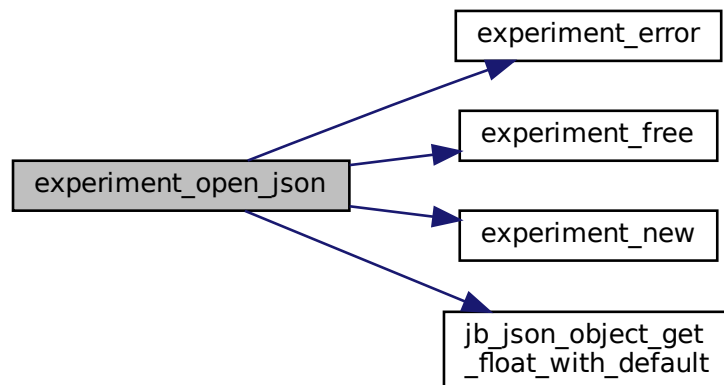
00237 {
00238     char buffer[64];
00239     JsonObject *object;
00240     const char *name;
00241     int error_code;
00242     unsigned int i;
00243
00244     #if DEBUG_EXPERIMENT
00245         fprintf (stderr, "experiment_open_json:  start\n");
00246     #endif
00247
00248     // Resetting experiment data
00249     experiment\_new (experiment);
```

```

00250
00251 // Getting JSON object
00252 object = json_node_get_object (node);
00253
00254 // Reading the experimental data
00255 name = json_object_get_string_member (object, LABEL_NAME);
00256 if (!name)
00257 {
00258     experiment_error (experiment, _("no data file name"));
00259     goto exit_on_error;
00260 }
00261 experiment->name = g_strdup (name);
00262 #if DEBUG_EXPERIMENT
00263 fprintf (stderr, "experiment_open_json: name=%s\n", experiment->name);
00264 #endif
00265 experiment->weight
00266     = jb_json_object_get_float_with_default (object, LABEL_WEIGHT, &error_code,
00267                                             1.);
00268 if (!error_code)
00269 {
00270     experiment_error (experiment, _("bad weight"));
00271     goto exit_on_error;
00272 }
00273 #if DEBUG_EXPERIMENT
00274 fprintf (stderr, "experiment_open_json: weight=%lg\n", experiment->weight);
00275 #endif
00276 name = json_object_get_string_member (object, stencil[0]);
00277 if (name)
00278 {
00279     #if DEBUG_EXPERIMENT
00280         fprintf (stderr, "experiment_open_json: experiment=%s template1=%s\n",
00281                 name, stencil[0]);
00282     #endif
00283     ++experiment->ninputs;
00284 }
00285 else
00286 {
00287     experiment_error (experiment, _("no template"));
00288     goto exit_on_error;
00289 }
00290 experiment->stencil[0] = g_strdup (name);
00291 for (i = 1; i < MAX_NINPUTS; ++i)
00292 {
00293     #if DEBUG_EXPERIMENT
00294         fprintf (stderr, "experiment_open_json: stencil%u\n", i + 1);
00295     #endif
00296     if (json_object_get_member (object, stencil[i]))
00297     {
00298         if (ninputs && ninputs <= i)
00299         {
00300             experiment_error (experiment, _("bad templates number"));
00301             goto exit_on_error;
00302         }
00303         name = json_object_get_string_member (object, stencil[i]);
00304         #if DEBUG_EXPERIMENT
00305             fprintf (stderr,
00306                     "experiment_open_json: experiment=%s stencil%u=%s\n",
00307                     experiment->nexperiments, name, stencil[i]);
00308         #endif
00309         experiment->stencil[i] = g_strdup (name);
00310         ++experiment->ninputs;
00311     }
00312     else if (ninputs && ninputs > i)
00313     {
00314         snprintf (buffer, 64, "%s%u", _("no template"), i + 1);
00315         experiment_error (experiment, buffer);
00316         goto exit_on_error;
00317     }
00318     else
00319         break;
00320 }
00321
00322 #if DEBUG_EXPERIMENT
00323 fprintf (stderr, "experiment_open_json: end\n");
00324 #endif
00325 return 1;
00326
00327 exit_on_error:
00328     experiment_free (experiment, INPUT_TYPE_JSON);
00329 #if DEBUG_EXPERIMENT
00330     fprintf (stderr, "experiment_open_json: end\n");
00331 #endif
00332     return 0;
00333 }

```

Here is the call graph for this function:



5.5.2.4 experiment_open_xml()

```

int experiment_open_xml (
    Experiment * experiment,
    xmlNode * node,
    unsigned int ninputs )
  
```

Function to open the `Experiment` struct on a XML node.

Returns

1 on success, 0 on error.

Parameters

<i>experiment</i>	<code>Experiment</code> struct.
<i>node</i>	XML node.
<i>ninputs</i>	Number of the simulator input files.

Definition at line 130 of file `experiment.c`.

```

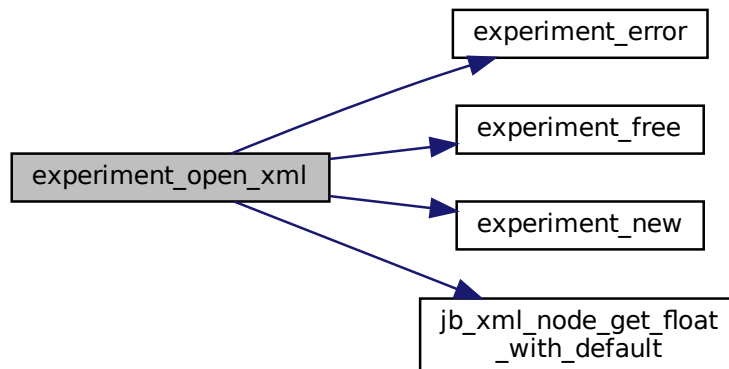
00134 {
00135     char buffer[64];
00136     int error_code;
00137     unsigned int i;
00138
00139     #if DEBUG_EXPERIMENT
00140         fprintf (stderr, "experiment_open_xml:  start\n");
00141     #endif
00142
00143     // Resetting experiment data
00144     experiment_new (experiment);
00145
  
```

```

00146 // Reading the experimental data
00147 experiment->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00148 if (!experiment->name)
00149 {
00150     experiment_error (experiment, _("no data file name"));
00151     goto exit_on_error;
00152 }
00153 #if DEBUG_EXPERIMENT
00154 fprintf (stderr, "experiment_open_xml: name=%s\n", experiment->name);
00155 #endif
00156 experiment->weight
00157 = jb_xml_node_get_float_with_default (node, (const xmlChar *) LABEL_WEIGHT,
00158                                     &error_code, 1.);
00159 if (!error_code)
00160 {
00161     experiment_error (experiment, _("bad weight"));
00162     goto exit_on_error;
00163 }
00164 #if DEBUG_EXPERIMENT
00165 fprintf (stderr, "experiment_open_xml: weight=%lg\n", experiment->weight);
00166 #endif
00167 experiment->stencil[0]
00168 = (char *) xmlGetProp (node, (const xmlChar *) stencil[0]);
00169 if (experiment->stencil[0])
00170 {
00171     #if DEBUG_EXPERIMENT
00172     fprintf (stderr, "experiment_open_xml: experiment=%s stencil1=%s\n",
00173             experiment->name, stencil[0]);
00174     #endif
00175     ++experiment->ninputs;
00176 }
00177 else
00178 {
00179     experiment_error (experiment, _("no template"));
00180     goto exit_on_error;
00181 }
00182 for (i = 1; i < MAX_NINPUTS; ++i)
00183 {
00184     #if DEBUG_EXPERIMENT
00185     fprintf (stderr, "experiment_open_xml: stencil%u\n", i + 1);
00186     #endif
00187     if (xmlHasProp (node, (const xmlChar *) stencil[i]))
00188     {
00189         if (ninputs && ninputs <= i)
00190         {
00191             experiment_error (experiment, _("bad templates number"));
00192             goto exit_on_error;
00193         }
00194         experiment->stencil[i]
00195         = (char *) xmlGetProp (node, (const xmlChar *) stencil[i]);
00196         #if DEBUG_EXPERIMENT
00197         fprintf (stderr,
00198                 "experiment_open_xml: experiment=%s stencil%u=%s\n",
00199                 experiment->nexperiments, experiment->name,
00200                 experiment->stencil[i]);
00201         #endif
00202         ++experiment->ninputs;
00203     }
00204     else if (ninputs && ninputs > i)
00205     {
00206         snprintf (buffer, 64, "%s%u", _("no template"), i + 1);
00207         experiment_error (experiment, buffer);
00208         goto exit_on_error;
00209     }
00210     else
00211         break;
00212 }
00213
00214 #if DEBUG_EXPERIMENT
00215 fprintf (stderr, "experiment_open_xml: end\n");
00216 #endif
00217 return 1;
00218
00219 exit_on_error:
00220     experiment_free (experiment, INPUT_TYPE_XML);
00221     #if DEBUG_EXPERIMENT
00222     fprintf (stderr, "experiment_open_xml: end\n");
00223     #endif
00224     return 0;
00225 }

```

Here is the call graph for this function:



5.5.3 Variable Documentation

5.5.3.1 stencil

```
const char* stencil[MAX_NINPUTS] [extern]
```

Array of xmlChar strings with stencil labels.

Definition at line 53 of file [experiment.c](#).

5.6 experiment.h

[Go to the documentation of this file.](#)

```

00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burquete and Borja Latorre.
00007
00008 Copyright 2012-2023, AUTHORS.
00009
00010 Redistribution and use in source and binary forms, with or without modification,
00011 are permitted provided that the following conditions are met:
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00013 1. Redistributions of source code must retain the above copyright notice,
00014 this list of conditions and the following disclaimer.
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00016 2. Redistributions in binary form must reproduce the above copyright notice,
00017 this list of conditions and the following disclaimer in the
00018 documentation and/or other materials provided with the distribution.
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00020 THIS SOFTWARE IS PROVIDED BY AUTHORS "AS IS" AND ANY EXPRESS OR IMPLIED
00021 WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
00022 MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
00023 SHALL AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,

```



```

00024 SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
00025 PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
00026 BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #ifndef EXPERIMENT__H
00033 #define EXPERIMENT__H 1
00034
00035 typedef struct
00036 {
00037     char *name;
00038     char *stencil[MAX_NINPITS];
00039     double weight;
00040     unsigned int ninputs;
00041 } Experiment;
00042
00043 extern const char *stencil[MAX_NINPITS];
00044
00045 // Public functions
00046 void experiment_free (Experiment * experiment, unsigned int type);
00047 void experiment_error (Experiment * experiment, char *message);
00048 int experiment_open_xml (Experiment * experiment, xmlNode * node,
00049                          unsigned int ninputs);
00050 int experiment_open_json (Experiment * experiment, JsonNode * node,
00051                           unsigned int ninputs);
00052
00053 #endif

```

5.7 input.c File Reference

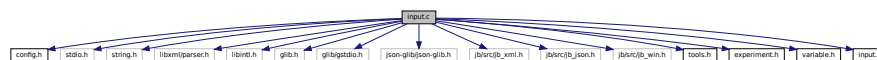
Source file to define the input functions.

```

#include "config.h"
#include <stdio.h>
#include <string.h>
#include <libxml/parser.h>
#include <libintl.h>
#include <glib.h>
#include <glib/gstdio.h>
#include <json-glib/json-glib.h>
#include "jb/src/jb_xml.h"
#include "jb/src/jb_json.h"
#include "jb/src/jb_win.h"
#include "tools.h"
#include "experiment.h"
#include "variable.h"
#include "input.h"

```

Include dependency graph for input.c:



Macros

- `#define DEBUG_INPUT 0`
Macro to debug input functions.

Functions

- void [input_new](#) ()
- void [input_free](#) ()
- static void [input_error](#) (char *message)
- static int [input_open_xml](#) (xmlDoc *doc)
- static int [input_open_json](#) (JsonParser *parser)
- int [input_open](#) (char *filename)

Variables

- [Input](#) [input](#) [1]
Global [Input](#) struct to set the input data.
- const char * [result_name](#) = "result"
Name of the result file.
- const char * [variables_name](#) = "variables"
Name of the variables file.

5.7.1 Detailed Description

Source file to define the input functions.

Authors

Javier Burguete and Borja Latorre.

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Definition in file [input.c](#).

5.7.2 Macro Definition Documentation

5.7.2.1 DEBUG_INPUT

```
#define DEBUG_INPUT 0
```

Macro to debug input functions.

Definition at line 55 of file [input.c](#).

5.7.3 Function Documentation

5.7.3.1 input_error()

```
static void input_error (  
    char * message ) [static]
```

Function to print an error message opening an [Input](#) struct.

Parameters

<i>message</i>	Error message.
----------------	----------------

Definition at line 122 of file [input.c](#).

```
00123 {
00124     char buffer[64];
00125     snprintf (buffer, 64, "%s: %s\n", _("Input"), message);
00126     error_message = g_strdup (buffer);
00127 }
```

5.7.3.2 input_free()

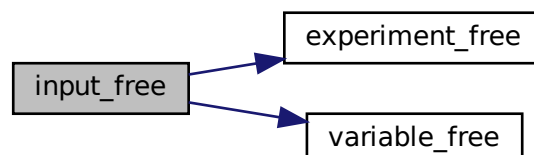
```
void input_free ( )
```

Function to free the memory of the input file data.

Definition at line 84 of file [input.c](#).

```
00085 {
00086     unsigned int i;
00087     #if DEBUG_INPUT
00088         fprintf (stderr, "input_free: start\n");
00089     #endif
00090     g_free (input->name);
00091     g_free (input->directory);
00092     for (i = 0; i < input->nexperiments; ++i)
00093         experiment_free (input->experiment + i, input->type);
00094     for (i = 0; i < input->nvariables; ++i)
00095         variable_free (input->variable + i, input->type);
00096     g_free (input->experiment);
00097     g_free (input->variable);
00098     if (input->type == INPUT_TYPE_XML)
00099     {
00100         xmlFree (input->evaluator);
00101         xmlFree (input->simulator);
00102         xmlFree (input->result);
00103         xmlFree (input->variables);
00104     }
00105     else
00106     {
00107         g_free (input->evaluator);
00108         g_free (input->simulator);
00109         g_free (input->result);
00110         g_free (input->variables);
00111     }
00112     input->nexperiments = input->nvariables = input->nsteps = 0;
00113     #if DEBUG_INPUT
00114         fprintf (stderr, "input_free: end\n");
00115     #endif
00116 }
```

Here is the call graph for this function:



5.7.3.3 input_new()

```
void input_new ( )
```

Function to create a new [Input](#) struct.

Definition at line 66 of file [input.c](#).

```
00067 {
00068     #if DEBUG_INPUT
00069     fprintf (stderr, "input_new:  start\n");
00070     #endif
00071     input->nvariables = input->nexperiments = input->nsteps = 0;
00072     input->simulator = input->evaluator = input->directory = input->name = NULL;
00073     input->experiment = NULL;
00074     input->variable = NULL;
00075     #if DEBUG_INPUT
00076     fprintf (stderr, "input_new:  end\n");
00077     #endif
00078 }
```

5.7.3.4 input_open()

```
int input_open (
    char * filename )
```

Function to open the input file.

Returns

1_on_success, 0_on_error.

Parameters

<i>filename</i>	Input data file name.
-----------------	---------------------------------------

Definition at line 963 of file [input.c](#).

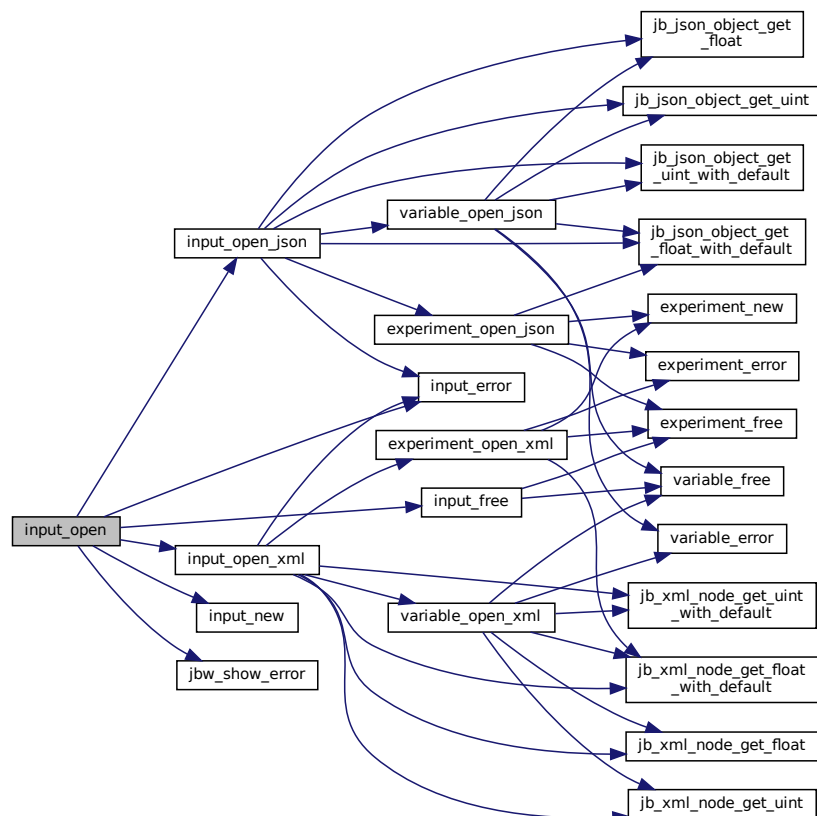
```
00964 {
00965     xmlDoc *doc;
00966     JsonParser *parser;
00967
00968     #if DEBUG_INPUT
00969     fprintf (stderr, "input_open:  start\n");
00970     #endif
00971
00972     // Resetting input data
00973     input_new ();
00974
00975     // Opening input file
00976     #if DEBUG_INPUT
00977     fprintf (stderr, "input_open:  opening the input file %s\n", filename);
00978     fprintf (stderr, "input_open:  trying XML format\n");
00979     #endif
00980     doc = xmlParseFile (filename);
00981     if (!doc)
00982     {
00983         #if DEBUG_INPUT
00984         fprintf (stderr, "input_open:  trying JSON format\n");
00985         #endif
00986         parser = json_parser_new ();
00987         if (!json_parser_load_from_file (parser, filename, NULL))
00988         {
00989             input_error (_("Unable to parse the input file"));
00990             goto exit_on_error;
00991         }
00992         if (!input_open_json (parser))
```

```

00993     goto exit_on_error;
00994 }
00995 else if (!input_open_xml (doc))
00996     goto exit_on_error;
00997
00998 // Getting the working directory
00999 input->directory = g_path_get_dirname (filename);
01000 input->name = g_path_get_basename (filename);
01001
01002 #if DEBUG_INPUT
01003 fprintf (stderr, "input_open: end\n");
01004 #endif
01005 return 1;
01006
01007 exit_on_error:
01008 jbw_show_error (error_message);
01009 g_free (error_message);
01010 input_free ();
01011 #if DEBUG_INPUT
01012 fprintf (stderr, "input_open: end\n");
01013 #endif
01014 return 0;
01015 }

```

Here is the call graph for this function:



5.7.3.5 input_open_json()

```

static int input_open_json (
    JsonParser * parser ) [inline], [static]

```

Function to open the input file in JSON format.

Returns

1_on_success, 0_on_error.

Parameters

<i>parser</i>	JsonParser struct.
---------------	--------------------

Definition at line 572 of file [input.c](#).

```

00573 {
00574     JsonNode *node, *child;
00575     JsonObject *object;
00576     JsonArray *array;
00577     const char *buffer;
00578     int error_code;
00579     unsigned int i, n;
00580
00581     #if DEBUG_INPUT
00582     fprintf (stderr, "input_open_json: start\n");
00583     #endif
00584
00585     // Resetting input data
00586     input->type = INPUT_TYPE_JSON;
00587
00588     // Getting the root node
00589     #if DEBUG_INPUT
00590     fprintf (stderr, "input_open_json: getting the root node\n");
00591     #endif
00592     node = json_parser_get_root (parser);
00593     object = json_node_get_object (node);
00594
00595     // Getting result and variables file names
00596     if (!input->result)
00597     {
00598         buffer = json_object_get_string_member (object, LABEL_RESULT_FILE);
00599         if (!buffer)
00600             buffer = result_name;
00601         input->result = g_strdup (buffer);
00602     }
00603     else
00604         input->result = g_strdup (result_name);
00605     if (!input->variables)
00606     {
00607         buffer = json_object_get_string_member (object, LABEL_VARIABLES_FILE);
00608         if (!buffer)
00609             buffer = variables_name;
00610         input->variables = g_strdup (buffer);
00611     }
00612     else
00613         input->variables = g_strdup (variables_name);
00614
00615     // Opening simulator program name
00616     buffer = json_object_get_string_member (object, LABEL_SIMULATOR);
00617     if (!buffer)
00618     {
00619         input_error (_("Bad simulator program"));
00620         goto exit_on_error;
00621     }
00622     input->simulator = g_strdup (buffer);
00623
00624     // Opening evaluator program name
00625     buffer = json_object_get_string_member (object, LABEL_EVALUATOR);
00626     if (buffer)
00627         input->evaluator = g_strdup (buffer);
00628
00629     // Obtaining pseudo-random numbers generator seed
00630     input->seed
00631     = jb_json_object_get_uint_with_default (object, LABEL_SEED,
00632                                           &error_code, DEFAULT_RANDOM_SEED);
00633     if (!error_code)
00634     {
00635         input_error (_("Bad pseudo-random numbers generator seed"));
00636         goto exit_on_error;
00637     }
00638
00639     // Opening algorithm
00640     buffer = json_object_get_string_member (object, LABEL_ALGORITHM);
00641     if (!strcmp (buffer, LABEL_MONTE_CARLO))
00642     {
00643         input->algorithm = ALGORITHM_MONTE_CARLO;
00644

```

```
00645     // Obtaining simulations number
00646     input->nsimulations
00647     = jb_json_object_get_uint (object, LABEL_NSIMULATIONS, &error_code);
00648     if (!error_code)
00649     {
00650         input_error (_("Bad simulations number"));
00651         goto exit_on_error;
00652     }
00653 }
00654 else if (!strcmp (buffer, LABEL_SWEEP))
00655     input->algorithm = ALGORITHM_SWEEP;
00656 else if (!strcmp (buffer, LABEL_ORTHOGONAL))
00657     input->algorithm = ALGORITHM_ORTHOGONAL;
00658 else if (!strcmp (buffer, LABEL_GENETIC))
00659 {
00660     input->algorithm = ALGORITHM_GENETIC;
00661
00662     // Obtaining population
00663     if (json_object_get_member (object, LABEL_NPOPULATION))
00664     {
00665         input->nsimulations
00666         = jb_json_object_get_uint (object, LABEL_NPOPULATION, &error_code);
00667         if (!error_code || input->nsimulations < 3)
00668         {
00669             input_error (_("Invalid population number"));
00670             goto exit_on_error;
00671         }
00672     }
00673     else
00674     {
00675         input_error (_("No population number"));
00676         goto exit_on_error;
00677     }
00678
00679     // Obtaining generations
00680     if (json_object_get_member (object, LABEL_NGENERATIONS))
00681     {
00682         input->niterations
00683         = jb_json_object_get_uint_with_default (object, LABEL_NGENERATIONS,
00684                                                 &error_code, 1);
00685         if (!error_code || !input->niterations)
00686         {
00687             input_error (_("Invalid generations number"));
00688             goto exit_on_error;
00689         }
00690     }
00691     else
00692     {
00693         input_error (_("No generations number"));
00694         goto exit_on_error;
00695     }
00696
00697     // Obtaining mutation probability
00698     if (json_object_get_member (object, LABEL_MUTATION))
00699     {
00700         input->mutation_ratio
00701         = jb_json_object_get_float (object, LABEL_MUTATION, &error_code);
00702         if (!error_code || input->mutation_ratio < 0.
00703             || input->mutation_ratio >= 1.)
00704         {
00705             input_error (_("Invalid mutation probability"));
00706             goto exit_on_error;
00707         }
00708     }
00709     else
00710     {
00711         input_error (_("No mutation probability"));
00712         goto exit_on_error;
00713     }
00714
00715     // Obtaining reproduction probability
00716     if (json_object_get_member (object, LABEL_REPRODUCTION))
00717     {
00718         input->reproduction_ratio
00719         = jb_json_object_get_float (object, LABEL_REPRODUCTION,
00720                                     &error_code);
00721         if (!error_code || input->reproduction_ratio < 0.
00722             || input->reproduction_ratio >= 1.0)
00723         {
00724             input_error (_("Invalid reproduction probability"));
00725             goto exit_on_error;
00726         }
00727     }
00728     else
00729     {
00730         input_error (_("No reproduction probability"));
00731         goto exit_on_error;
```

```

00732     }
00733
00734     // Obtaining adaptation probability
00735     if (json_object_get_member (object, LABEL_ADAPTATION))
00736     {
00737         input->adaptation_ratio
00738         = jb_json_object_get_float (object, LABEL_ADAPTATION, &error_code);
00739         if (!error_code || input->adaptation_ratio < 0.
00740             || input->adaptation_ratio >= 1.)
00741         {
00742             input_error (_("Invalid adaptation probability"));
00743             goto exit_on_error;
00744         }
00745     }
00746     else
00747     {
00748         input_error (_("No adaptation probability"));
00749         goto exit_on_error;
00750     }
00751
00752     // Checking survivals
00753     i = input->mutation_ratio * input->nsimulations;
00754     i += input->reproduction_ratio * input->nsimulations;
00755     i += input->adaptation_ratio * input->nsimulations;
00756     if (i > input->nsimulations - 2)
00757     {
00758         input_error
00759         (_("No enough survival entities to reproduce the population"));
00760         goto exit_on_error;
00761     }
00762 }
00763 else
00764 {
00765     input_error (_("Unknown algorithm"));
00766     goto exit_on_error;
00767 }
00768
00769 if (input->algorithm == ALGORITHM_MONTE_CARLO
00770     || input->algorithm == ALGORITHM_SWEEP
00771     || input->algorithm == ALGORITHM_ORTHOGONAL)
00772 {
00773
00774     // Obtaining iterations number
00775     input->niterations
00776     = jb_json_object_get_uint (object, LABEL_NITERATIONS, &error_code);
00777     if (!error_code || !input->niterations)
00778     {
00779         input_error (_("Bad iterations number"));
00780         goto exit_on_error;
00781     }
00782
00783     // Obtaining best number
00784     input->nbest
00785     = jb_json_object_get_uint_with_default (object, LABEL_NBEST,
00786                                             &error_code, 1);
00787     if (!error_code || !input->nbest)
00788     {
00789         input_error (_("Invalid best number"));
00790         goto exit_on_error;
00791     }
00792
00793     // Obtaining tolerance
00794     input->tolerance
00795     = jb_json_object_get_float_with_default (object, LABEL_TOLERANCE,
00796                                             &error_code, 0.);
00797     if (!error_code || input->tolerance < 0.)
00798     {
00799         input_error (_("Invalid tolerance"));
00800         goto exit_on_error;
00801     }
00802
00803     // Getting hill climbing method parameters
00804     if (json_object_get_member (object, LABEL_NSTEPS))
00805     {
00806         input->nsteps
00807         = jb_json_object_get_uint (object, LABEL_NSTEPS, &error_code);
00808         if (!error_code)
00809         {
00810             input_error (_("Invalid steps number"));
00811             goto exit_on_error;
00812         }
00813         buffer = json_object_get_string_member (object, LABEL_CLIMBING);
00814         if (!strcmp (buffer, LABEL_COORDINATES))
00815             input->climbing = CLIMBING_METHOD_COORDINATES;
00816         else if (!strcmp (buffer, LABEL_RANDOM))
00817         {
00818             input->climbing = CLIMBING_METHOD_RANDOM;

```



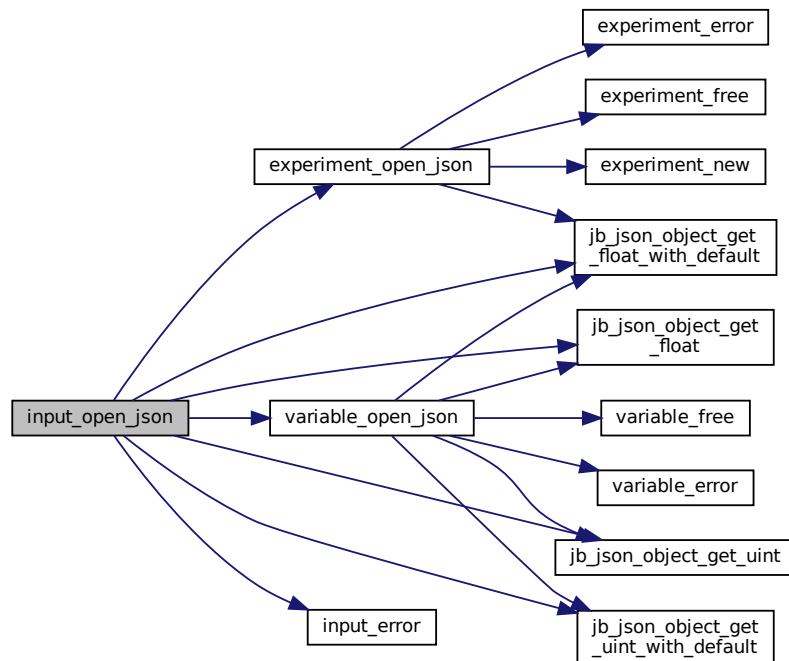
```

00819         input->nestimates
00820         = jb_json_object_get_uint (object, LABEL_NESTIMATES,
00821                                   &error_code);
00822         if (!error_code || !input->nestimates)
00823         {
00824             input_error (_("Invalid estimates number"));
00825             goto exit_on_error;
00826         }
00827     }
00828     else
00829     {
00830         input_error (_("Unknown method to estimate the hill climbing"));
00831         goto exit_on_error;
00832     }
00833     input->relaxation
00834     = jb_json_object_get_float_with_default (object, LABEL_RELAXATION,
00835                                              &error_code,
00836                                              DEFAULT_RELAXATION);
00837     if (!error_code || input->relaxation < 0. || input->relaxation > 2.)
00838     {
00839         input_error (_("Invalid relaxation parameter"));
00840         goto exit_on_error;
00841     }
00842 }
00843 else
00844     input->nsteps = 0;
00845 }
00846 // Obtaining the threshold
00847 input->threshold
00848 = jb_json_object_get_float_with_default (object, LABEL_THRESHOLD,
00849                                          &error_code, 0.);
00850
00851 if (!error_code)
00852 {
00853     input_error (_("Invalid threshold"));
00854     goto exit_on_error;
00855 }
00856
00857 // Reading the experimental data
00858 array = json_object_get_array_member (object, LABEL_EXPERIMENTS);
00859 n = json_array_get_length (array);
00860 input->experiment = (Experiment *) g_malloc (n * sizeof (Experiment));
00861 for (i = 0; i < n; ++i)
00862 {
00863     #if DEBUG_INPUT
00864         fprintf (stderr, "input_open_json: nexperiments=%u\n",
00865                 input->nexperiments);
00866     #endif
00867     child = json_array_get_element (array, i);
00868     if (!input->nexperiments)
00869     {
00870         if (!experiment_open_json (input->experiment, child, 0))
00871             goto exit_on_error;
00872     }
00873     else
00874     {
00875         if (!experiment_open_json (input->experiment + input->nexperiments,
00876                                   child, input->experiment->ninputs))
00877             goto exit_on_error;
00878     }
00879     ++input->nexperiments;
00880     #if DEBUG_INPUT
00881         fprintf (stderr, "input_open_json: nexperiments=%u\n",
00882                 input->nexperiments);
00883     #endif
00884 }
00885 if (!input->nexperiments)
00886 {
00887     input_error (_("No optimization experiments"));
00888     goto exit_on_error;
00889 }
00890
00891 // Reading the variables data
00892 array = json_object_get_array_member (object, LABEL_VARIABLES);
00893 n = json_array_get_length (array);
00894 input->variable = (Variable *) g_malloc (n * sizeof (Variable));
00895 for (i = 0; i < n; ++i)
00896 {
00897     #if DEBUG_INPUT
00898         fprintf (stderr, "input_open_json: nvariables=%u\n", input->nvariables);
00899     #endif
00900     child = json_array_get_element (array, i);
00901     if (!variable_open_json (input->variable + input->nvariables, child,
00902                             input->algorithm, input->nsteps))
00903         goto exit_on_error;
00904     ++input->nvariables;
00905 }

```

```
00906     if (!input->nvariables)
00907     {
00908         input_error (_("No optimization variables"));
00909         goto exit_on_error;
00910     }
00911
00912     // Obtaining the error norm
00913     if (json_object_get_member (object, LABEL_NORM))
00914     {
00915         buffer = json_object_get_string_member (object, LABEL_NORM);
00916         if (!strcmp (buffer, LABEL_EUCLIDIAN))
00917             input->norm = ERROR_NORM_EUCLIDIAN;
00918         else if (!strcmp (buffer, LABEL_MAXIMUM))
00919             input->norm = ERROR_NORM_MAXIMUM;
00920         else if (!strcmp (buffer, LABEL_P))
00921         {
00922             input->norm = ERROR_NORM_P;
00923             input->p = jb_json_object_get_float (object, LABEL_P, &error_code);
00924             if (!error_code)
00925             {
00926                 input_error (_("Bad P parameter"));
00927                 goto exit_on_error;
00928             }
00929         }
00930         else if (!strcmp (buffer, LABEL_TAXICAB))
00931             input->norm = ERROR_NORM_TAXICAB;
00932         else
00933         {
00934             input_error (_("Unknown error norm"));
00935             goto exit_on_error;
00936         }
00937     }
00938     else
00939         input->norm = ERROR_NORM_EUCLIDIAN;
00940
00941     // Closing the JSON document
00942     g_object_unref (parser);
00943
00944     #if DEBUG_INPUT
00945     fprintf (stderr, "input_open_json: end\n");
00946     #endif
00947     return 1;
00948
00949 exit_on_error:
00950     g_object_unref (parser);
00951     #if DEBUG_INPUT
00952     fprintf (stderr, "input_open_json: end\n");
00953     #endif
00954     return 0;
00955 }
```

Here is the call graph for this function:



5.7.3.6 input_open_xml()

```
static int input_open_xml (
    xmlDoc * doc ) [inline], [static]
```

Function to open the input file in XML format.

Returns

1_on_success, 0_on_error.

Parameters

<i>doc</i>	xmlDoc struct.
------------	----------------

Definition at line 135 of file [input.c](#).

```
00136 {
00137     char buffer2[64];
00138     xmlNode *node, *child;
00139     xmlChar *buffer;
00140     int error_code;
00141     unsigned int i;
00142
00143     #if DEBUG_INPUT
00144     fprintf (stderr, "input_open_xml: start\n");
```

```

00145 #endif
00146
00147 // Resetting input data
00148 buffer = NULL;
00149 input->type = INPUT_TYPE_XML;
00150
00151 // Getting the root node
00152 #if DEBUG_INPUT
00153 fprintf (stderr, "input_open_xml: getting the root node\n");
00154 #endif
00155 node = xmlDocGetRootElement (doc);
00156 if (xmlStrcmp (node->name, (const xmlChar *) LABEL_OPTIMIZE))
00157 {
00158     input_error (_("Bad root XML node"));
00159     goto exit_on_error;
00160 }
00161
00162 // Getting result and variables file names
00163 if (!input->result)
00164 {
00165     input->result =
00166         (char *) xmlGetProp (node, (const xmlChar *) LABEL_RESULT_FILE);
00167     if (!input->result)
00168         input->result = (char *) xmlStrdup ((const xmlChar *) result_name);
00169 }
00170 #if DEBUG_INPUT
00171 fprintf (stderr, "input_open_xml: result file=%s\n", input->result);
00172 #endif
00173 if (!input->variables)
00174 {
00175     input->variables =
00176         (char *) xmlGetProp (node, (const xmlChar *) LABEL_VARIABLES_FILE);
00177     if (!input->variables)
00178         input->variables =
00179             (char *) xmlStrdup ((const xmlChar *) variables_name);
00180 }
00181 #if DEBUG_INPUT
00182 fprintf (stderr, "input_open_xml: variables file=%s\n", input->variables);
00183 #endif
00184
00185 // Opening simulator program name
00186 input->simulator =
00187     (char *) xmlGetProp (node, (const xmlChar *) LABEL_SIMULATOR);
00188 if (!input->simulator)
00189 {
00190     input_error (_("Bad simulator program"));
00191     goto exit_on_error;
00192 }
00193
00194 // Opening evaluator program name
00195 input->evaluator =
00196     (char *) xmlGetProp (node, (const xmlChar *) LABEL_EVALUATOR);
00197
00198 // Obtaining pseudo-random numbers generator seed
00199 input->seed
00200     = jb_xml_node_get_uint_with_default (node, (const xmlChar *) LABEL_SEED,
00201                                         &error_code, DEFAULT_RANDOM_SEED);
00202 if (!error_code)
00203 {
00204     input_error (_("Bad pseudo-random numbers generator seed"));
00205     goto exit_on_error;
00206 }
00207
00208 // Opening algorithm
00209 buffer = xmlGetProp (node, (const xmlChar *) LABEL_ALGORITHM);
00210 if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_MONTE_CARLO))
00211 {
00212     input->algorithm = ALGORITHM_MONTE_CARLO;
00213 }
00214 // Obtaining simulations number
00215 input->nsimulations
00216     = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NSIMULATIONS,
00217                             &error_code);
00218 if (!error_code)
00219 {
00220     input_error (_("Bad simulations number"));
00221     goto exit_on_error;
00222 }
00223 }
00224 else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_SWEEP))
00225     input->algorithm = ALGORITHM_SWEEP;
00226 else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_ORTHOGONAL))
00227     input->algorithm = ALGORITHM_ORTHOGONAL;
00228 else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_GENETIC))
00229 {
00230     input->algorithm = ALGORITHM_GENETIC;
00231 }

```

```

00232     // Obtaining population
00233     if (xmlHasProp (node, (const xmlChar *) LABEL_NPOPULATION))
00234     {
00235         input->nsimulations
00236         = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NPOPULATION,
00237                                &error_code);
00238         if (!error_code || input->nsimulations < 3)
00239         {
00240             input_error (_("Invalid population number"));
00241             goto exit_on_error;
00242         }
00243     }
00244     else
00245     {
00246         input_error (_("No population number"));
00247         goto exit_on_error;
00248     }
00249
00250     // Obtaining generations
00251     if (xmlHasProp (node, (const xmlChar *) LABEL_NGENERATIONS))
00252     {
00253         input->niterations
00254         = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NGENERATIONS,
00255                                &error_code);
00256         if (!error_code || !input->niterations)
00257         {
00258             input_error (_("Invalid generations number"));
00259             goto exit_on_error;
00260         }
00261     }
00262     else
00263     {
00264         input_error (_("No generations number"));
00265         goto exit_on_error;
00266     }
00267
00268     // Obtaining mutation probability
00269     if (xmlHasProp (node, (const xmlChar *) LABEL_MUTATION))
00270     {
00271         input->mutation_ratio
00272         = jb_xml_node_get_float (node, (const xmlChar *) LABEL_MUTATION,
00273                                &error_code);
00274         if (!error_code || input->mutation_ratio < 0.
00275             || input->mutation_ratio >= 1.)
00276         {
00277             input_error (_("Invalid mutation probability"));
00278             goto exit_on_error;
00279         }
00280     }
00281     else
00282     {
00283         input_error (_("No mutation probability"));
00284         goto exit_on_error;
00285     }
00286
00287     // Obtaining reproduction probability
00288     if (xmlHasProp (node, (const xmlChar *) LABEL_REPRODUCTION))
00289     {
00290         input->reproduction_ratio
00291         = jb_xml_node_get_float (node, (const xmlChar *) LABEL_REPRODUCTION,
00292                                &error_code);
00293         if (!error_code || input->reproduction_ratio < 0.
00294             || input->reproduction_ratio >= 1.0)
00295         {
00296             input_error (_("Invalid reproduction probability"));
00297             goto exit_on_error;
00298         }
00299     }
00300     else
00301     {
00302         input_error (_("No reproduction probability"));
00303         goto exit_on_error;
00304     }
00305
00306     // Obtaining adaptation probability
00307     if (xmlHasProp (node, (const xmlChar *) LABEL_ADAPTATION))
00308     {
00309         input->adaptation_ratio
00310         = jb_xml_node_get_float (node, (const xmlChar *) LABEL_ADAPTATION,
00311                                &error_code);
00312         if (!error_code || input->adaptation_ratio < 0.
00313             || input->adaptation_ratio >= 1.)
00314         {
00315             input_error (_("Invalid adaptation probability"));
00316             goto exit_on_error;
00317         }
00318     }

```

```

00319     else
00320     {
00321         input_error (_("No adaptation probability"));
00322         goto exit_on_error;
00323     }
00324
00325     // Checking survivals
00326     i = input->mutation_ratio * input->nsimulations;
00327     i += input->reproduction_ratio * input->nsimulations;
00328     i += input->adaptation_ratio * input->nsimulations;
00329     if (i > input->nsimulations - 2)
00330     {
00331         input_error
00332         (_("No enough survival entities to reproduce the population"));
00333         goto exit_on_error;
00334     }
00335 }
00336 else
00337 {
00338     input_error (_("Unknown algorithm"));
00339     goto exit_on_error;
00340 }
00341 xmlFree (buffer);
00342 buffer = NULL;
00343
00344 if (input->algorithm == ALGORITHM_MONTE_CARLO
00345     || input->algorithm == ALGORITHM_SWEEP
00346     || input->algorithm == ALGORITHM_ORTHOGONAL)
00347 {
00348
00349     // Obtaining iterations number
00350     input->niterations = jb_xml_node_get_uint_with_default
00351     (node, (const xmlChar *) LABEL_NITERATIONS, &error_code, 1);
00352     if (!error_code || !input->niterations)
00353     {
00354         input_error (_("Bad iterations number"));
00355         goto exit_on_error;
00356     }
00357
00358     // Obtaining best number
00359     input->nbest
00360     = jb_xml_node_get_uint_with_default (node,
00361                                         (const xmlChar *) LABEL_NBEST,
00362                                         &error_code, 1);
00363     if (!error_code || !input->nbest)
00364     {
00365         input_error (_("Invalid best number"));
00366         goto exit_on_error;
00367     }
00368
00369     // Obtaining tolerance
00370     input->tolerance
00371     = jb_xml_node_get_float_with_default (node,
00372                                         (const xmlChar *) LABEL_TOLERANCE,
00373                                         &error_code, 0.);
00374     if (!error_code || input->tolerance < 0.)
00375     {
00376         input_error (_("Invalid tolerance"));
00377         goto exit_on_error;
00378     }
00379
00380     // Getting hill climbing method parameters
00381     if (xmlHasProp (node, (const xmlChar *) LABEL_NSTEPS))
00382     {
00383         input->nsteps =
00384         jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NSTEPS,
00385                             &error_code);
00386         if (!error_code)
00387         {
00388             input_error (_("Invalid steps number"));
00389             goto exit_on_error;
00390         }
00391     }
00392     #if DEBUG_INPUT
00392     fprintf (stderr, "input_open_xml: nsteps=%u\n", input->nsteps);
00393     #endif
00394     buffer = xmlGetProp (node, (const xmlChar *) LABEL_CLIMBING);
00395     if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_COORDINATES))
00396         input->climbing = CLIMBING_METHOD_COORDINATES;
00397     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_RANDOM))
00398     {
00399         input->climbing = CLIMBING_METHOD_RANDOM;
00400         input->nestimates
00401         = jb_xml_node_get_uint (node,
00402                               (const xmlChar *) LABEL_NESTIMATES,
00403                               &error_code);
00404         if (!error_code || !input->nestimates)
00405         {

```

```

00406         input_error (_("Invalid estimates number"));
00407         goto exit_on_error;
00408     }
00409 }
00410 else
00411 {
00412     input_error (_("Unknown method to estimate the hill climbing"));
00413     goto exit_on_error;
00414 }
00415 xmlFree (buffer);
00416 buffer = NULL;
00417 input->relaxation
00418     = jb_xml_node_get_float_with_default (node,
00419     (const xmlChar *)
00420     LABEL_RELAXATION,
00421     &error_code,
00422     DEFAULT_RELAXATION);
00423 if (!error_code || input->relaxation < 0. || input->relaxation > 2.)
00424 {
00425     input_error (_("Invalid relaxation parameter"));
00426     goto exit_on_error;
00427 }
00428 }
00429 else
00430     input->nsteps = 0;
00431 }
00432 // Obtaining the threshold
00433 input->threshold =
00434     jb_xml_node_get_float_with_default (node, (const xmlChar *) LABEL_THRESHOLD,
00435     &error_code, 0.);
00436 if (!error_code)
00437 {
00438     input_error (_("Invalid threshold"));
00439     goto exit_on_error;
00440 }
00441
00442 // Reading the experimental data
00443 for (child = node->children; child; child = child->next)
00444 {
00445     if (xmlStrcmp (child->name, (const xmlChar *) LABEL_EXPERIMENT))
00446         break;
00447 #if DEBUG_INPUT
00448     fprintf (stderr, "input_open_xml: nexperiments=%u\n",
00449         input->nexperiments);
00450 #endif
00451     input->experiment = (Experiment *)
00452         g_realloc (input->experiment,
00453         (1 + input->nexperiments) * sizeof (Experiment));
00454     if (!input->nexperiments)
00455     {
00456         if (!experiment_open_xml (input->experiment, child, 0))
00457             goto exit_on_error;
00458     }
00459     else
00460     {
00461         if (!experiment_open_xml (input->experiment + input->nexperiments,
00462             child, input->experiment->ninputs))
00463             goto exit_on_error;
00464     }
00465     ++input->nexperiments;
00466 #if DEBUG_INPUT
00467     fprintf (stderr, "input_open_xml: nexperiments=%u\n",
00468         input->nexperiments);
00469 #endif
00470 }
00471 if (!input->nexperiments)
00472 {
00473     input_error (_("No optimization experiments"));
00474     goto exit_on_error;
00475 }
00476 buffer = NULL;
00477
00478 // Reading the variables data
00479 if (input->algorithm == ALGORITHM_SWEEP
00480     || input->algorithm == ALGORITHM_ORTHOGONAL)
00481     input->nsimulations = 1;
00482 for (; child; child = child->next)
00483 {
00484     #if DEBUG_INPUT
00485         fprintf (stderr, "input_open_xml: nvariables=%u\n", input->nvariables);
00486     #endif
00487     if (xmlStrcmp (child->name, (const xmlChar *) LABEL_VARIABLE))
00488     {
00489         snprintf (buffer2, 64, "%s %u: %s",
00490             _("Variable"), input->nvariables + 1, _("bad XML node"));
00491         input_error (buffer2);
00492         goto exit_on_error;

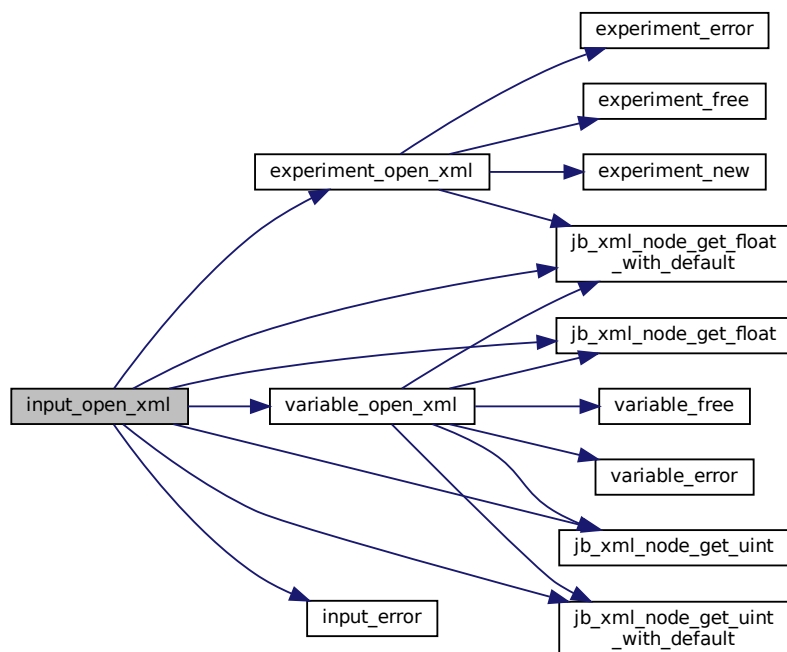
```

```

00493     }
00494     input->variable = (Variable *)
00495     g_realloc (input->variable,
00496     (1 + input->nvariables) * sizeof (Variable));
00497     if (!variable_open_xml (input->variable + input->nvariables, child,
00498     input->algorithm, input->nsteps))
00499         goto exit_on_error;
00500     if (input->algorithm == ALGORITHM_SWEEP
00501     || input->algorithm == ALGORITHM_ORTHOGONAL)
00502         input->nsimulations *= input->variable[input->nvariables].nsweeps;
00503     ++input->nvariables;
00504 }
00505 if (!input->nvariables)
00506 {
00507     input_error (_("No optimization variables"));
00508     goto exit_on_error;
00509 }
00510 if (input->nbest > input->nsimulations)
00511 {
00512     input_error (_("Best number higher than simulations number"));
00513     goto exit_on_error;
00514 }
00515 buffer = NULL;
00516
00517 // Obtaining the error norm
00518 if (xmlHasProp (node, (const xmlChar *) LABEL_NORM))
00519 {
00520     buffer = xmlGetProp (node, (const xmlChar *) LABEL_NORM);
00521     if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_EUCLIDIAN))
00522         input->norm = ERROR_NORM_EUCLIDIAN;
00523     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_MAXIMUM))
00524         input->norm = ERROR_NORM_MAXIMUM;
00525     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_P))
00526     {
00527         input->norm = ERROR_NORM_P;
00528         input->p
00529         = jb_xml_node_get_float (node, (const xmlChar *) LABEL_P,
00530         &error_code);
00531         if (!error_code)
00532         {
00533             input_error (_("Bad P parameter"));
00534             goto exit_on_error;
00535         }
00536     }
00537     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_TAXICAB))
00538         input->norm = ERROR_NORM_TAXICAB;
00539     else
00540     {
00541         input_error (_("Unknown error norm"));
00542         goto exit_on_error;
00543     }
00544     xmlFree (buffer);
00545 }
00546 else
00547     input->norm = ERROR_NORM_EUCLIDIAN;
00548
00549 // Closing the XML document
00550 xmlFreeDoc (doc);
00551
00552 #if DEBUG_INPUT
00553     fprintf (stderr, "input_open_xml: end\n");
00554 #endif
00555     return 1;
00556
00557 exit_on_error:
00558     xmlFree (buffer);
00559     xmlFreeDoc (doc);
00560 #if DEBUG_INPUT
00561     fprintf (stderr, "input_open_xml: end\n");
00562 #endif
00563     return 0;
00564 }

```


Here is the call graph for this function:



5.7.4 Variable Documentation

5.7.4.1 input

`Input` `input[1]`

Global `Input` struct to set the input data.

Definition at line 57 of file `input.c`.

5.7.4.2 result_name

```
const char* result_name = "result"
```

Name of the result file.

Definition at line 59 of file `input.c`.

5.7.4.3 variables_name

```
const char* variables_name = "variables"
```

Name of the variables file.

Definition at line 60 of file [input.c](#).

5.8 input.c

[Go to the documentation of this file.](#)

```
00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burquete and Borja Latorre.
00007
00008 Copyright 2012-2023, AUTHORS.
00009
00010 Redistribution and use in source and binary forms, with or without modification,
00011 are permitted provided that the following conditions are met:
00012
00013 1. Redistributions of source code must retain the above copyright notice,
00014 this list of conditions and the following disclaimer.
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00017 this list of conditions and the following disclaimer in the
00018 documentation and/or other materials provided with the distribution.
00019
00020 THIS SOFTWARE IS PROVIDED BY AUTHORS "AS IS" AND ANY EXPRESS OR IMPLIED
00021 WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
00022 MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
00023 SHALL AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
00024 SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
00025 PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
00026 BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #define _GNU_SOURCE
00033 #include "config.h"
00034 #include <stdio.h>
00035 #include <string.h>
00036 #include <libxml/parser.h>
00037 #include <libintl.h>
00038 #include <glib.h>
00039 #include <glib/gstdio.h>
00040 #include <json-glib/json-glib.h>
00041 #include "jb/src/jb_xml.h"
00042 #include "jb/src/jb_json.h"
00043 #include "jb/src/jb_win.h"
00044 #include "tools.h"
00045 #include "experiment.h"
00046 #include "variable.h"
00047 #include "input.h"
00048
00049 #define DEBUG_INPUT 0
00050
00051 Input input[1];
00052
00053 const char *result_name = "result";
00054 const char *variables_name = "variables";
00055
00056 void
00057 input_new ()
00058 {
00059 #if DEBUG_INPUT
00060     fprintf (stderr, "input_new: start\n");
00061 #endif
00062     input->nvariables = input->nexperiments = input->nsteps = 0;
00063     input->simulator = input->evaluator = input->directory = input->name = NULL;
00064     input->experiment = NULL;
00065     input->variable = NULL;
00066 #if DEBUG_INPUT
```

```

00076     fprintf (stderr, "input_new:  end\n");
00077 #endif
00078 }
00079
00083 void
00084 input_free ()
00085 {
00086     unsigned int i;
00087     #if DEBUG_INPUT
00088         fprintf (stderr, "input_free:  start\n");
00089     #endif
00090     g_free (input->name);
00091     g_free (input->directory);
00092     for (i = 0; i < input->nexperiments; ++i)
00093         experiment_free (input->experiment + i, input->type);
00094     for (i = 0; i < input->nvariables; ++i)
00095         variable_free (input->variable + i, input->type);
00096     g_free (input->experiment);
00097     g_free (input->variable);
00098     if (input->type == INPUT_TYPE_XML)
00099     {
00100         xmlFree (input->evaluator);
00101         xmlFree (input->simulator);
00102         xmlFree (input->result);
00103         xmlFree (input->variables);
00104     }
00105     else
00106     {
00107         g_free (input->evaluator);
00108         g_free (input->simulator);
00109         g_free (input->result);
00110         g_free (input->variables);
00111     }
00112     input->nexperiments = input->nvariables = input->nsteps = 0;
00113     #if DEBUG_INPUT
00114         fprintf (stderr, "input_free:  end\n");
00115     #endif
00116 }
00117
00121 static void
00122 input_error (char *message)
00123 {
00124     char buffer[64];
00125     snprintf (buffer, 64, "%s:  %s\n", _("Input"), message);
00126     error_message = g_strdup (buffer);
00127 }
00128
00134 static inline int
00135 input_open_xml (xmlDoc * doc)
00136 {
00137     char buffer2[64];
00138     xmlNode *node, *child;
00139     xmlChar *buffer;
00140     int error_code;
00141     unsigned int i;
00142
00143     #if DEBUG_INPUT
00144         fprintf (stderr, "input_open_xml:  start\n");
00145     #endif
00146
00147     // Resetting input data
00148     buffer = NULL;
00149     input->type = INPUT_TYPE_XML;
00150
00151     // Getting the root node
00152     #if DEBUG_INPUT
00153         fprintf (stderr, "input_open_xml:  getting the root node\n");
00154     #endif
00155     node = xmlDocGetRootElement (doc);
00156     if (xmlStrcmp (node->name, (const xmlChar *) LABEL_OPTIMIZE))
00157     {
00158         input_error (_("Bad root XML node"));
00159         goto exit_on_error;
00160     }
00161
00162     // Getting result and variables file names
00163     if (!input->result)
00164     {
00165         input->result =
00166             (char *) xmlGetProp (node, (const xmlChar *) LABEL_RESULT_FILE);
00167         if (!input->result)
00168             input->result = (char *) xmlStrdup ((const xmlChar *) result_name);
00169     }
00170     #if DEBUG_INPUT
00171         fprintf (stderr, "input_open_xml:  result file=%s\n", input->result);
00172     #endif
00173     if (!input->variables)

```

```

00174     {
00175         input->variables =
00176             (char *) xmlGetProp (node, (const xmlChar *) LABEL_VARIABLES_FILE);
00177         if (!input->variables)
00178             input->variables =
00179                 (char *) xmlStrdup ((const xmlChar *) variables_name);
00180     }
00181 #if DEBUG_INPUT
00182     fprintf (stderr, "input_open_xml: variables file=%s\n", input->variables);
00183 #endif
00184
00185     // Opening simulator program name
00186     input->simulator =
00187         (char *) xmlGetProp (node, (const xmlChar *) LABEL_SIMULATOR);
00188     if (!input->simulator)
00189     {
00190         input_error (_("Bad simulator program"));
00191         goto exit_on_error;
00192     }
00193
00194     // Opening evaluator program name
00195     input->evaluator =
00196         (char *) xmlGetProp (node, (const xmlChar *) LABEL_EVALUATOR);
00197
00198     // Obtaining pseudo-random numbers generator seed
00199     input->seed
00200         = jb_xml_node_get_uint_with_default (node, (const xmlChar *) LABEL_SEED,
00201                                             &error_code, DEFAULT_RANDOM_SEED);
00202     if (!error_code)
00203     {
00204         input_error (_("Bad pseudo-random numbers generator seed"));
00205         goto exit_on_error;
00206     }
00207
00208     // Opening algorithm
00209     buffer = xmlGetProp (node, (const xmlChar *) LABEL_ALGORITHM);
00210     if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_MONTE_CARLO))
00211     {
00212         input->algorithm = ALGORITHM_MONTE_CARLO;
00213
00214         // Obtaining simulations number
00215         input->nsimulations
00216             = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NSIMULATIONS,
00217                                   &error_code);
00218         if (!error_code)
00219         {
00220             input_error (_("Bad simulations number"));
00221             goto exit_on_error;
00222         }
00223     }
00224     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_SWEEP))
00225         input->algorithm = ALGORITHM_SWEEP;
00226     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_ORTHOGONAL))
00227         input->algorithm = ALGORITHM_ORTHOGONAL;
00228     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_GENETIC))
00229     {
00230         input->algorithm = ALGORITHM_GENETIC;
00231
00232         // Obtaining population
00233         if (xmlHasProp (node, (const xmlChar *) LABEL_NPOPULATION))
00234         {
00235             input->nsimulations
00236                 = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NPOPULATION,
00237                                       &error_code);
00238             if (!error_code || input->nsimulations < 3)
00239             {
00240                 input_error (_("Invalid population number"));
00241                 goto exit_on_error;
00242             }
00243         }
00244         else
00245         {
00246             input_error (_("No population number"));
00247             goto exit_on_error;
00248         }
00249
00250         // Obtaining generations
00251         if (xmlHasProp (node, (const xmlChar *) LABEL_NGENERATIONS))
00252         {
00253             input->niterations
00254                 = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NGENERATIONS,
00255                                       &error_code);
00256             if (!error_code || !input->niterations)
00257             {
00258                 input_error (_("Invalid generations number"));
00259                 goto exit_on_error;
00260             }

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```

00261     }
00262     else
00263     {
00264         input_error (_("No generations number"));
00265         goto exit_on_error;
00266     }
00267
00268     // Obtaining mutation probability
00269     if (xmlHasProp (node, (const xmlChar *) LABEL_MUTATION))
00270     {
00271         input->mutation_ratio
00272         = jb_xml_node_get_float (node, (const xmlChar *) LABEL_MUTATION,
00273                                 &error_code);
00274         if (!error_code || input->mutation_ratio < 0.
00275             || input->mutation_ratio >= 1.)
00276         {
00277             input_error (_("Invalid mutation probability"));
00278             goto exit_on_error;
00279         }
00280     }
00281     else
00282     {
00283         input_error (_("No mutation probability"));
00284         goto exit_on_error;
00285     }
00286
00287     // Obtaining reproduction probability
00288     if (xmlHasProp (node, (const xmlChar *) LABEL_REPRODUCTION))
00289     {
00290         input->reproduction_ratio
00291         = jb_xml_node_get_float (node, (const xmlChar *) LABEL_REPRODUCTION,
00292                                 &error_code);
00293         if (!error_code || input->reproduction_ratio < 0.
00294             || input->reproduction_ratio >= 1.0)
00295         {
00296             input_error (_("Invalid reproduction probability"));
00297             goto exit_on_error;
00298         }
00299     }
00300     else
00301     {
00302         input_error (_("No reproduction probability"));
00303         goto exit_on_error;
00304     }
00305
00306     // Obtaining adaptation probability
00307     if (xmlHasProp (node, (const xmlChar *) LABEL_ADAPTATION))
00308     {
00309         input->adaptation_ratio
00310         = jb_xml_node_get_float (node, (const xmlChar *) LABEL_ADAPTATION,
00311                                 &error_code);
00312         if (!error_code || input->adaptation_ratio < 0.
00313             || input->adaptation_ratio >= 1.)
00314         {
00315             input_error (_("Invalid adaptation probability"));
00316             goto exit_on_error;
00317         }
00318     }
00319     else
00320     {
00321         input_error (_("No adaptation probability"));
00322         goto exit_on_error;
00323     }
00324
00325     // Checking survivals
00326     i = input->mutation_ratio * input->nsimulations;
00327     i += input->reproduction_ratio * input->nsimulations;
00328     i += input->adaptation_ratio * input->nsimulations;
00329     if (i > input->nsimulations - 2)
00330     {
00331         input_error
00332         (_("No enough survival entities to reproduce the population"));
00333         goto exit_on_error;
00334     }
00335 }
00336 else
00337 {
00338     input_error (_("Unknown algorithm"));
00339     goto exit_on_error;
00340 }
00341 xmlFree (buffer);
00342 buffer = NULL;
00343
00344 if (input->algorithm == ALGORITHM_MONTE_CARLO
00345     || input->algorithm == ALGORITHM_SWEEP
00346     || input->algorithm == ALGORITHM_ORTHOGONAL)
00347 {

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00348
00349 // Obtaining iterations number
00350 input->niterations = jb_xml_node_get_uint_with_default
00351 (node, (const xmlChar *) LABEL_NITERATIONS, &error_code, 1);
00352 if (!error_code || !input->niterations)
00353 {
00354     input_error (_("Bad iterations number"));
00355     goto exit_on_error;
00356 }
00357
00358 // Obtaining best number
00359 input->nbest
00360 = jb_xml_node_get_uint_with_default (node,
00361                                     (const xmlChar *) LABEL_NBEST,
00362                                     &error_code, 1);
00363 if (!error_code || !input->nbest)
00364 {
00365     input_error (_("Invalid best number"));
00366     goto exit_on_error;
00367 }
00368
00369 // Obtaining tolerance
00370 input->tolerance
00371 = jb_xml_node_get_float_with_default (node,
00372                                     (const xmlChar *) LABEL_TOLERANCE,
00373                                     &error_code, 0.);
00374 if (!error_code || input->tolerance < 0.)
00375 {
00376     input_error (_("Invalid tolerance"));
00377     goto exit_on_error;
00378 }
00379
00380 // Getting hill climbing method parameters
00381 if (xmlHasProp (node, (const xmlChar *) LABEL_NSTEPS))
00382 {
00383     input->nsteps =
00384         jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NSTEPS,
00385                             &error_code);
00386     if (!error_code)
00387     {
00388         input_error (_("Invalid steps number"));
00389         goto exit_on_error;
00390     }
00391 #if DEBUG_INPUT
00392     fprintf (stderr, "input_open_xml: nsteps=%u\n", input->nsteps);
00393 #endif
00394     buffer = xmlGetProp (node, (const xmlChar *) LABEL_CLIMBING);
00395     if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_COORDINATES))
00396         input->climbing = CLIMBING_METHOD_COORDINATES;
00397     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_RANDOM))
00398     {
00399         input->climbing = CLIMBING_METHOD_RANDOM;
00400         input->nestimates
00401         = jb_xml_node_get_uint (node,
00402                             (const xmlChar *) LABEL_NESTIMATES,
00403                             &error_code);
00404         if (!error_code || !input->nestimates)
00405         {
00406             input_error (_("Invalid estimates number"));
00407             goto exit_on_error;
00408         }
00409     }
00410     else
00411     {
00412         input_error (_("Unknown method to estimate the hill climbing"));
00413         goto exit_on_error;
00414     }
00415     xmlFree (buffer);
00416     buffer = NULL;
00417     input->relaxation
00418     = jb_xml_node_get_float_with_default (node,
00419                                         (const xmlChar *)
00420                                         LABEL_RELAXATION,
00421                                         &error_code,
00422                                         DEFAULT_RELAXATION);
00423     if (!error_code || input->relaxation < 0. || input->relaxation > 2.)
00424     {
00425         input_error (_("Invalid relaxation parameter"));
00426         goto exit_on_error;
00427     }
00428 }
00429 else
00430     input->nsteps = 0;
00431 }
00432 // Obtaining the threshold
00433 input->threshold =
00434     jb_xml_node_get_float_with_default (node, (const xmlChar *) LABEL_THRESHOLD,

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00435                                     &error_code, 0.);
00436     if (!error_code)
00437     {
00438         input_error (_("Invalid threshold"));
00439         goto exit_on_error;
00440     }
00441
00442     // Reading the experimental data
00443     for (child = node->children; child; child = child->next)
00444     {
00445         if (xmlStrcmp (child->name, (const xmlChar *) LABEL_EXPERIMENT))
00446             break;
00447 #if DEBUG_INPUT
00448         fprintf (stderr, "input_open_xml: nexperiments=%u\n",
00449                 input->nexperiments);
00450 #endif
00451         input->experiment = (Experiment *)
00452             g_realloc (input->experiment,
00453                       (1 + input->nexperiments) * sizeof (Experiment));
00454         if (!input->nexperiments)
00455         {
00456             if (!experiment_open_xml (input->experiment, child, 0))
00457                 goto exit_on_error;
00458         }
00459         else
00460         {
00461             if (!experiment_open_xml (input->experiment + input->nexperiments,
00462                                       child, input->experiment->ninputs))
00463                 goto exit_on_error;
00464         }
00465         ++input->nexperiments;
00466 #if DEBUG_INPUT
00467         fprintf (stderr, "input_open_xml: nexperiments=%u\n",
00468                 input->nexperiments);
00469 #endif
00470     }
00471     if (!input->nexperiments)
00472     {
00473         input_error (_("No optimization experiments"));
00474         goto exit_on_error;
00475     }
00476     buffer = NULL;
00477
00478     // Reading the variables data
00479     if (input->algorithm == ALGORITHM_SWEEP
00480         || input->algorithm == ALGORITHM_ORTHOGONAL)
00481         input->nsimulations = 1;
00482     for (; child; child = child->next)
00483     {
00484 #if DEBUG_INPUT
00485         fprintf (stderr, "input_open_xml: nvariables=%u\n", input->nvariables);
00486 #endif
00487         if (xmlStrcmp (child->name, (const xmlChar *) LABEL_VARIABLE))
00488         {
00489             snprintf (buffer2, 64, "%s %u: %s",
00490                      _("Variable"), input->nvariables + 1, _("bad XML node"));
00491             input_error (buffer2);
00492             goto exit_on_error;
00493         }
00494         input->variable = (Variable *)
00495             g_realloc (input->variable,
00496                       (1 + input->nvariables) * sizeof (Variable));
00497         if (!variable_open_xml (input->variable + input->nvariables, child,
00498                               input->algorithm, input->nsteps))
00499             goto exit_on_error;
00500         if (input->algorithm == ALGORITHM_SWEEP
00501             || input->algorithm == ALGORITHM_ORTHOGONAL)
00502             input->nsimulations *= input->variable[input->nvariables].nsweeps;
00503         ++input->nvariables;
00504     }
00505     if (!input->nvariables)
00506     {
00507         input_error (_("No optimization variables"));
00508         goto exit_on_error;
00509     }
00510     if (input->nbest > input->nsimulations)
00511     {
00512         input_error (_("Best number higher than simulations number"));
00513         goto exit_on_error;
00514     }
00515     buffer = NULL;
00516
00517     // Obtaining the error norm
00518     if (xmlHasProp (node, (const xmlChar *) LABEL_NORM))
00519     {
00520         buffer = xmlGetProp (node, (const xmlChar *) LABEL_NORM);
00521         if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_EUCLIDIAN))

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00522     input->norm = ERROR_NORM_EUCLIDIAN;
00523 else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_MAXIMUM))
00524     input->norm = ERROR_NORM_MAXIMUM;
00525 else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_P))
00526     {
00527         input->norm = ERROR_NORM_P;
00528         input->p
00529             = jb_xml_node_get_float (node, (const xmlChar *) LABEL_P,
00530                                     &error_code);
00531         if (!error_code)
00532             {
00533                 input_error (_("Bad P parameter"));
00534                 goto exit_on_error;
00535             }
00536     }
00537 else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_TOXICAB))
00538     input->norm = ERROR_NORM_TOXICAB;
00539 else
00540     {
00541         input_error (_("Unknown error norm"));
00542         goto exit_on_error;
00543     }
00544     xmlFree (buffer);
00545 }
00546 else
00547     input->norm = ERROR_NORM_EUCLIDIAN;
00548
00549 // Closing the XML document
00550 xmlFreeDoc (doc);
00551
00552 #if DEBUG_INPUT
00553     fprintf (stderr, "input_open_xml: end\n");
00554 #endif
00555     return 1;
00556
00557 exit_on_error:
00558     xmlFree (buffer);
00559     xmlFreeDoc (doc);
00560 #if DEBUG_INPUT
00561     fprintf (stderr, "input_open_xml: end\n");
00562 #endif
00563     return 0;
00564 }
00565
00571 static inline int
00572 input_open_json (JsonParser * parser)
00573 {
00574     JsonNode *node, *child;
00575     JsonObject *object;
00576     JsonArray *array;
00577     const char *buffer;
00578     int error_code;
00579     unsigned int i, n;
00580
00581 #if DEBUG_INPUT
00582     fprintf (stderr, "input_open_json: start\n");
00583 #endif
00584
00585     // Resetting input data
00586     input->type = INPUT_TYPE_JSON;
00587
00588     // Getting the root node
00589 #if DEBUG_INPUT
00590     fprintf (stderr, "input_open_json: getting the root node\n");
00591 #endif
00592     node = json_parser_get_root (parser);
00593     object = json_node_get_object (node);
00594
00595     // Getting result and variables file names
00596     if (!input->result)
00597     {
00598         buffer = json_object_get_string_member (object, LABEL_RESULT_FILE);
00599         if (!buffer)
00600             buffer = result_name;
00601         input->result = g_strdup (buffer);
00602     }
00603     else
00604         input->result = g_strdup (result_name);
00605     if (!input->variables)
00606     {
00607         buffer = json_object_get_string_member (object, LABEL_VARIABLES_FILE);
00608         if (!buffer)
00609             buffer = variables_name;
00610         input->variables = g_strdup (buffer);
00611     }
00612     else
00613         input->variables = g_strdup (variables_name);

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00614
00615 // Opening simulator program name
00616 buffer = json_object_get_string_member (object, LABEL_SIMULATOR);
00617 if (!buffer)
00618 {
00619     input_error (_("Bad simulator program"));
00620     goto exit_on_error;
00621 }
00622 input->simulator = g_strdup (buffer);
00623
00624 // Opening evaluator program name
00625 buffer = json_object_get_string_member (object, LABEL_EVALUATOR);
00626 if (buffer)
00627     input->evaluator = g_strdup (buffer);
00628
00629 // Obtaining pseudo-random numbers generator seed
00630 input->seed
00631 = jb_json_object_get_uint_with_default (object, LABEL_SEED,
00632                                         &error_code, DEFAULT_RANDOM_SEED);
00633 if (!error_code)
00634 {
00635     input_error (_("Bad pseudo-random numbers generator seed"));
00636     goto exit_on_error;
00637 }
00638
00639 // Opening algorithm
00640 buffer = json_object_get_string_member (object, LABEL_ALGORITHM);
00641 if (!strcmp (buffer, LABEL_MONTE_CARLO))
00642 {
00643     input->algorithm = ALGORITHM_MONTE_CARLO;
00644
00645     // Obtaining simulations number
00646     input->nsimulations
00647     = jb_json_object_get_uint (object, LABEL_NSIMULATIONS, &error_code);
00648     if (!error_code)
00649     {
00650         input_error (_("Bad simulations number"));
00651         goto exit_on_error;
00652     }
00653 }
00654 else if (!strcmp (buffer, LABEL_SWEEP))
00655     input->algorithm = ALGORITHM_SWEEP;
00656 else if (!strcmp (buffer, LABEL_ORTHOGONAL))
00657     input->algorithm = ALGORITHM_ORTHOGONAL;
00658 else if (!strcmp (buffer, LABEL_GENETIC))
00659 {
00660     input->algorithm = ALGORITHM_GENETIC;
00661
00662     // Obtaining population
00663     if (json_object_get_member (object, LABEL_NPOPULATION))
00664     {
00665         input->nsimulations
00666         = jb_json_object_get_uint (object, LABEL_NPOPULATION, &error_code);
00667         if (!error_code || input->nsimulations < 3)
00668         {
00669             input_error (_("Invalid population number"));
00670             goto exit_on_error;
00671         }
00672     }
00673     else
00674     {
00675         input_error (_("No population number"));
00676         goto exit_on_error;
00677     }
00678
00679     // Obtaining generations
00680     if (json_object_get_member (object, LABEL_NGENERATIONS))
00681     {
00682         input->niterations
00683         = jb_json_object_get_uint_with_default (object, LABEL_NGENERATIONS,
00684                                                 &error_code, 1);
00685         if (!error_code || !input->niterations)
00686         {
00687             input_error (_("Invalid generations number"));
00688             goto exit_on_error;
00689         }
00690     }
00691     else
00692     {
00693         input_error (_("No generations number"));
00694         goto exit_on_error;
00695     }
00696
00697     // Obtaining mutation probability
00698     if (json_object_get_member (object, LABEL_MUTATION))
00699     {
00700         input->mutation_ratio

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00701         = jb_json_object_get_float (object, LABEL_MUTATION, &error_code);
00702     if (!error_code || input->mutation_ratio < 0.
00703         || input->mutation_ratio >= 1.)
00704     {
00705         input_error (_("Invalid mutation probability"));
00706         goto exit_on_error;
00707     }
00708 }
00709 else
00710 {
00711     input_error (_("No mutation probability"));
00712     goto exit_on_error;
00713 }
00714
00715 // Obtaining reproduction probability
00716 if (json_object_get_member (object, LABEL_REPRODUCTION))
00717 {
00718     input->reproduction_ratio
00719     = jb_json_object_get_float (object, LABEL_REPRODUCTION,
00720                                &error_code);
00721     if (!error_code || input->reproduction_ratio < 0.
00722         || input->reproduction_ratio >= 1.0)
00723     {
00724         input_error (_("Invalid reproduction probability"));
00725         goto exit_on_error;
00726     }
00727 }
00728 else
00729 {
00730     input_error (_("No reproduction probability"));
00731     goto exit_on_error;
00732 }
00733
00734 // Obtaining adaptation probability
00735 if (json_object_get_member (object, LABEL_ADAPTATION))
00736 {
00737     input->adaptation_ratio
00738     = jb_json_object_get_float (object, LABEL_ADAPTATION, &error_code);
00739     if (!error_code || input->adaptation_ratio < 0.
00740         || input->adaptation_ratio >= 1.)
00741     {
00742         input_error (_("Invalid adaptation probability"));
00743         goto exit_on_error;
00744     }
00745 }
00746 else
00747 {
00748     input_error (_("No adaptation probability"));
00749     goto exit_on_error;
00750 }
00751
00752 // Checking survivals
00753 i = input->mutation_ratio * input->nsimulations;
00754 i += input->reproduction_ratio * input->nsimulations;
00755 i += input->adaptation_ratio * input->nsimulations;
00756 if (i > input->nsimulations - 2)
00757 {
00758     input_error
00759     (_("No enough survival entities to reproduce the population"));
00760     goto exit_on_error;
00761 }
00762 }
00763 else
00764 {
00765     input_error (_("Unknown algorithm"));
00766     goto exit_on_error;
00767 }
00768
00769 if (input->algorithm == ALGORITHM_MONTE_CARLO
00770     || input->algorithm == ALGORITHM_SWEEP
00771     || input->algorithm == ALGORITHM_ORTHOGONAL)
00772 {
00773
00774     // Obtaining iterations number
00775     input->niterations
00776     = jb_json_object_get_uint (object, LABEL_NITERATIONS, &error_code);
00777     if (!error_code || !input->niterations)
00778     {
00779         input_error (_("Bad iterations number"));
00780         goto exit_on_error;
00781     }
00782
00783     // Obtaining best number
00784     input->nbest
00785     = jb_json_object_get_uint_with_default (object, LABEL_NBEST,
00786                                             &error_code, 1);
00787     if (!error_code || !input->nbest)

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00788     {
00789         input_error (_("Invalid best number"));
00790         goto exit_on_error;
00791     }
00792
00793     // Obtaining tolerance
00794     input->tolerance
00795     = jb_json_object_get_float_with_default (object, LABEL_TOLERANCE,
00796                                             &error_code, 0.);
00797     if (!error_code || input->tolerance < 0.)
00798     {
00799         input_error (_("Invalid tolerance"));
00800         goto exit_on_error;
00801     }
00802
00803     // Getting hill climbing method parameters
00804     if (json_object_get_member (object, LABEL_NSTEPS))
00805     {
00806         input->nsteps
00807         = jb_json_object_get_uint (object, LABEL_NSTEPS, &error_code);
00808         if (!error_code)
00809         {
00810             input_error (_("Invalid steps number"));
00811             goto exit_on_error;
00812         }
00813         buffer = json_object_get_string_member (object, LABEL_CLIMBING);
00814         if (!strcmp (buffer, LABEL_COORDINATES))
00815             input->climbing = CLIMBING_METHOD_COORDINATES;
00816         else if (!strcmp (buffer, LABEL_RANDOM))
00817         {
00818             input->climbing = CLIMBING_METHOD_RANDOM;
00819             input->nestimates
00820             = jb_json_object_get_uint (object, LABEL_NESTIMATES,
00821                                       &error_code);
00822             if (!error_code || !input->nestimates)
00823             {
00824                 input_error (_("Invalid estimates number"));
00825                 goto exit_on_error;
00826             }
00827         }
00828         else
00829         {
00830             input_error (_("Unknown method to estimate the hill climbing"));
00831             goto exit_on_error;
00832         }
00833         input->relaxation
00834         = jb_json_object_get_float_with_default (object, LABEL_RELAXATION,
00835                                                 &error_code,
00836                                                 DEFAULT_RELAXATION);
00837         if (!error_code || input->relaxation < 0. || input->relaxation > 2.)
00838         {
00839             input_error (_("Invalid relaxation parameter"));
00840             goto exit_on_error;
00841         }
00842     }
00843     else
00844         input->nsteps = 0;
00845 }
00846 // Obtaining the threshold
00847 input->threshold
00848 = jb_json_object_get_float_with_default (object, LABEL_THRESHOLD,
00849                                         &error_code, 0.);
00850
00851 if (!error_code)
00852 {
00853     input_error (_("Invalid threshold"));
00854     goto exit_on_error;
00855 }
00856
00857 // Reading the experimental data
00858 array = json_object_get_array_member (object, LABEL_EXPERIMENTS);
00859 n = json_array_get_length (array);
00860 input->experiment = (Experiment *) g_malloc (n * sizeof (Experiment));
00861 for (i = 0; i < n; ++i)
00862 {
00863     #if DEBUG_INPUT
00864         fprintf (stderr, "input_open_json: nexperiments=%u\n",
00865                 input->nexperiments);
00866     #endif
00867     child = json_array_get_element (array, i);
00868     if (!input->nexperiments)
00869     {
00870         if (!experiment_open_json (input->experiment, child, 0))
00871             goto exit_on_error;
00872     }
00873     else
00874     {

```

```

00875         if (!experiment_open_json (input->experiment + input->nexperiments,
00876                                     child, input->experiment->ninputs))
00877             goto exit_on_error;
00878     }
00879     ++input->nexperiments;
00880 #if DEBUG_INPUT
00881     fprintf (stderr, "input_open_json:  nexperiments=%u\n",
00882             input->nexperiments);
00883 #endif
00884 }
00885 if (!input->nexperiments)
00886 {
00887     input_error (_("No optimization experiments"));
00888     goto exit_on_error;
00889 }
00890
00891 // Reading the variables data
00892 array = json_object_get_array_member (object, LABEL_VARIABLES);
00893 n = json_array_get_length (array);
00894 input->variable = (Variable *) g_malloc (n * sizeof (Variable));
00895 for (i = 0; i < n; ++i)
00896 {
00897 #if DEBUG_INPUT
00898     fprintf (stderr, "input_open_json:  nvariables=%u\n", input->nvariables);
00899 #endif
00900     child = json_array_get_element (array, i);
00901     if (!variable_open_json (input->variable + input->nvariables, child,
00902                             input->algorithm, input->nsteps))
00903         goto exit_on_error;
00904     ++input->nvariables;
00905 }
00906 if (!input->nvariables)
00907 {
00908     input_error (_("No optimization variables"));
00909     goto exit_on_error;
00910 }
00911
00912 // Obtaining the error norm
00913 if (json_object_get_member (object, LABEL_NORM))
00914 {
00915     buffer = json_object_get_string_member (object, LABEL_NORM);
00916     if (!strcmp (buffer, LABEL_EUCLIDIAN))
00917         input->norm = ERROR_NORM_EUCLIDIAN;
00918     else if (!strcmp (buffer, LABEL_MAXIMUM))
00919         input->norm = ERROR_NORM_MAXIMUM;
00920     else if (!strcmp (buffer, LABEL_P))
00921     {
00922         input->norm = ERROR_NORM_P;
00923         input->p = jb_json_object_get_float (object, LABEL_P, &error_code);
00924         if (!error_code)
00925         {
00926             input_error (_("Bad P parameter"));
00927             goto exit_on_error;
00928         }
00929     }
00930     else if (!strcmp (buffer, LABEL_TAXICAB))
00931         input->norm = ERROR_NORM_TAXICAB;
00932     else
00933     {
00934         input_error (_("Unknown error norm"));
00935         goto exit_on_error;
00936     }
00937 }
00938 else
00939     input->norm = ERROR_NORM_EUCLIDIAN;
00940
00941 // Closing the JSON document
00942 g_object_unref (parser);
00943
00944 #if DEBUG_INPUT
00945     fprintf (stderr, "input_open_json:  end\n");
00946 #endif
00947     return 1;
00948
00949 exit_on_error:
00950     g_object_unref (parser);
00951 #if DEBUG_INPUT
00952     fprintf (stderr, "input_open_json:  end\n");
00953 #endif
00954     return 0;
00955 }
00956
00962 int
00963 input_open (char *filename)
00964 {
00965     xmlDoc *doc;
00966     JsonParser *parser;

```

```

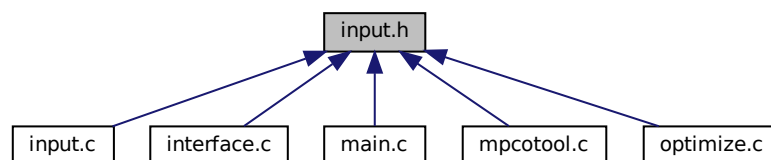
00967
00968 #if DEBUG_INPUT
00969     fprintf (stderr, "input_open:  start\n");
00970 #endif
00971
00972     // Resetting input data
00973     input_new ();
00974
00975     // Opening input file
00976 #if DEBUG_INPUT
00977     fprintf (stderr, "input_open:  opening the input file %s\n", filename);
00978     fprintf (stderr, "input_open:  trying XML format\n");
00979 #endif
00980     doc = xmlParseFile (filename);
00981     if (!doc)
00982     {
00983         #if DEBUG_INPUT
00984             fprintf (stderr, "input_open:  trying JSON format\n");
00985         #endif
00986         parser = json_parser_new ();
00987         if (!json_parser_load_from_file (parser, filename, NULL))
00988         {
00989             input_error (_("Unable to parse the input file"));
00990             goto exit_on_error;
00991         }
00992         if (!input_open_json (parser))
00993             goto exit_on_error;
00994     }
00995     else if (!input_open_xml (doc))
00996         goto exit_on_error;
00997
00998     // Getting the working directory
00999     input->directory = g_path_get_dirname (filename);
01000     input->name = g_path_get_basename (filename);
01001
01002 #if DEBUG_INPUT
01003     fprintf (stderr, "input_open:  end\n");
01004 #endif
01005     return 1;
01006
01007 exit_on_error:
01008     jbw_show_error (error_message);
01009     g_free (error_message);
01010     input_free ();
01011 #if DEBUG_INPUT
01012     fprintf (stderr, "input_open:  end\n");
01013 #endif
01014     return 0;
01015 }

```

5.9 input.h File Reference

Header file to define the input functions.

This graph shows which files directly or indirectly include this file:



Data Structures

- struct [Input](#)

Struct to define the optimization input file.

Enumerations

- enum `ClimbingMethod` { `CLIMBING_METHOD_COORDINATES` = 0 , `CLIMBING_METHOD_RANDOM` = 1 }
Enum to define the methods to estimate the hill climbing.
- enum `ErrorNorm` { `ERROR_NORM_EUCLIDIAN` = 0 , `ERROR_NORM_MAXIMUM` = 1 , `ERROR_NORM_P` = 2 , `ERROR_NORM_TAXICAB` = 3 }
Enum to define the error norm.

Functions

- void `input_new` ()
- void `input_free` ()
- int `input_open` (char *filename)

Variables

- `Input` `input` [1]
Global `Input` struct to set the input data.
- const char * `result_name`
Name of the result file.
- const char * `variables_name`
Name of the variables file.

5.9.1 Detailed Description

Header file to define the input functions.

Authors

Javier Burguete.

Copyright

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Definition in file `input.h`.

5.9.2 Enumeration Type Documentation

5.9.2.1 ClimbingMethod

enum `ClimbingMethod`

Enum to define the methods to estimate the hill climbing.

Enumerator

CLIMBING_METHOD_COORDINATES	Coordinates hill climbing method.
CLIMBING_METHOD_RANDOM	Random hill climbing method.

Definition at line 42 of file [input.h](#).

```
00043 {
00044     CLIMBING_METHOD_COORDINATES = 0,
00045     CLIMBING_METHOD_RANDOM = 1,
00046 };
```

5.9.2.2 ErrorNorm

```
enum ErrorNorm
```

Enum to define the error norm.

Enumerator

ERROR_NORM_EUCLIDIAN	Euclidian norm: $\sqrt{\sum_i (w_i x_i)^2}$.
ERROR_NORM_MAXIMUM	Maximum norm: $\max_i w_i x_i $.
ERROR_NORM_P	P-norm $\sqrt[p]{\sum_i w_i x_i ^p}$.
ERROR_NORM_TAXICAB	Taxicab norm $\sum_i w_i x_i $.

Definition at line 49 of file [input.h](#).

```
00050 {
00051     ERROR_NORM_EUCLIDIAN = 0,
00053     ERROR_NORM_MAXIMUM = 1,
00055     ERROR_NORM_P = 2,
00057     ERROR_NORM_TAXICAB = 3
00059 };
```

5.9.3 Function Documentation

5.9.3.1 input_free()

```
void input_free ( )
```

Function to free the memory of the input file data.

Definition at line 84 of file [input.c](#).

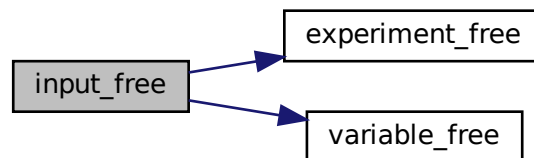
```
00085 {
00086     unsigned int i;
00087     #if DEBUG_INPUT
00088     fprintf (stderr, "input_free: start\n");
00089     #endif
00090     g_free (input->name);
00091     g_free (input->directory);
```

```

00092     for (i = 0; i < input->nexperiments; ++i)
00093         experiment_free (input->experiment + i, input->type);
00094     for (i = 0; i < input->nvariables; ++i)
00095         variable_free (input->variable + i, input->type);
00096     g_free (input->experiment);
00097     g_free (input->variable);
00098     if (input->type == INPUT_TYPE_XML)
00099     {
00100         xmlFree (input->evaluator);
00101         xmlFree (input->simulator);
00102         xmlFree (input->result);
00103         xmlFree (input->variables);
00104     }
00105     else
00106     {
00107         g_free (input->evaluator);
00108         g_free (input->simulator);
00109         g_free (input->result);
00110         g_free (input->variables);
00111     }
00112     input->nexperiments = input->nvariables = input->nsteps = 0;
00113     #if DEBUG_INPUT
00114     fprintf (stderr, "input_free:  end\n");
00115     #endif
00116 }

```

Here is the call graph for this function:



5.9.3.2 input_new()

```
void input_new ( )
```

Function to create a new [Input](#) struct.

Definition at line 66 of file [input.c](#).

```

00067 {
00068     #if DEBUG_INPUT
00069     fprintf (stderr, "input_new:  start\n");
00070     #endif
00071     input->nvariables = input->nexperiments = input->nsteps = 0;
00072     input->simulator = input->evaluator = input->directory = input->name = NULL;
00073     input->experiment = NULL;
00074     input->variable = NULL;
00075     #if DEBUG_INPUT
00076     fprintf (stderr, "input_new:  end\n");
00077     #endif
00078 }

```


5.9.3.3 input_open()

```
int input_open (
    char * filename )
```

Function to open the input file.

Returns

1_on_success, 0_on_error.

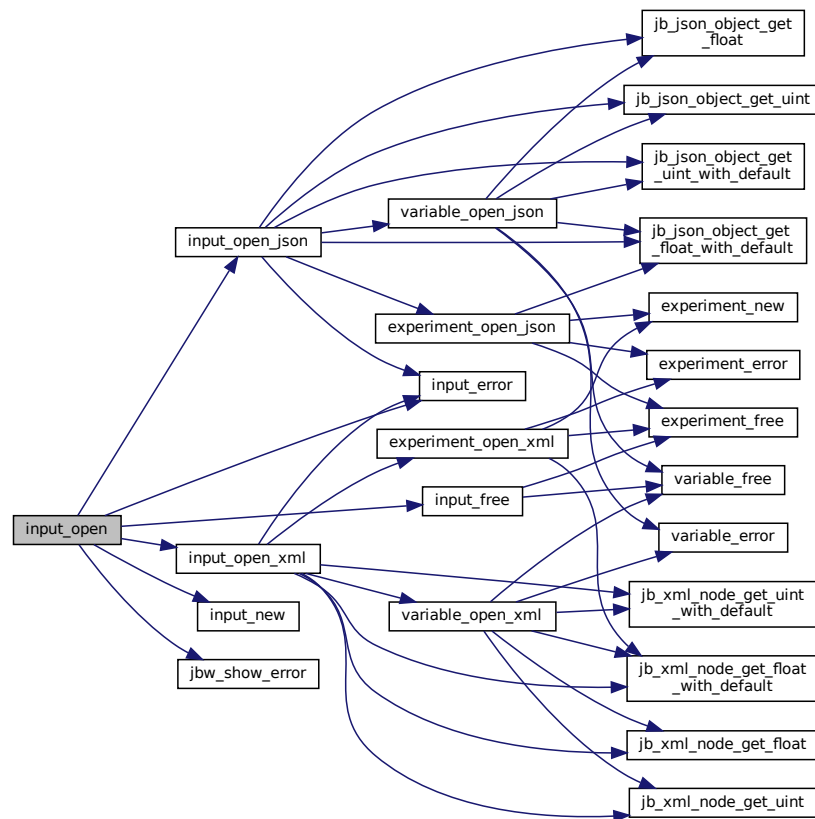
Parameters

<i>filename</i>	Input data file name.
-----------------	-----------------------

Definition at line 963 of file [input.c](#).

```
00964 {
00965     xmlDoc *doc;
00966     JsonParser *parser;
00967
00968     #if DEBUG_INPUT
00969     fprintf (stderr, "input_open:  start\n");
00970     #endif
00971
00972     // Resetting input data
00973     input_new ();
00974
00975     // Opening input file
00976     #if DEBUG_INPUT
00977     fprintf (stderr, "input_open:  opening the input file %s\n", filename);
00978     fprintf (stderr, "input_open:  trying XML format\n");
00979     #endif
00980     doc = xmlParseFile (filename);
00981     if (!doc)
00982     {
00983         #if DEBUG_INPUT
00984         fprintf (stderr, "input_open:  trying JSON format\n");
00985         #endif
00986         parser = json_parser_new ();
00987         if (!json_parser_load_from_file (parser, filename, NULL))
00988         {
00989             input_error (_("Unable to parse the input file"));
00990             goto exit_on_error;
00991         }
00992         if (!input_open_json (parser))
00993             goto exit_on_error;
00994     }
00995     else if (!input_open_xml (doc))
00996         goto exit_on_error;
00997
00998     // Getting the working directory
00999     input->directory = g_path_get_dirname (filename);
01000     input->name = g_path_get_basename (filename);
01001
01002     #if DEBUG_INPUT
01003     fprintf (stderr, "input_open:  end\n");
01004     #endif
01005     return 1;
01006
01007 exit_on_error:
01008     jbw_show_error (error_message);
01009     g_free (error_message);
01010     input_free ();
01011     #if DEBUG_INPUT
01012     fprintf (stderr, "input_open:  end\n");
01013     #endif
01014     return 0;
01015 }
```

Here is the call graph for this function:



5.9.4 Variable Documentation

5.9.4.1 input

```
Input input[1] [extern]
```

Global [Input](#) struct to set the input data.

Definition at line 57 of file [input.c](#).

5.9.4.2 result_name

```
const char* result_name [extern]
```

Name of the result file.

Definition at line 59 of file [input.c](#).

5.9.4.3 variables_name

```
const char* variables_name [extern]
```

Name of the variables file.

Definition at line 60 of file [input.c](#).

5.10 input.h

[Go to the documentation of this file.](#)

```
00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burquete and Borja Latorre.
00007
00008 Copyright 2012-2023, AUTHORS.
00009
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00013 1. Redistributions of source code must retain the above copyright notice,
00014 this list of conditions and the following disclaimer.
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00017 this list of conditions and the following disclaimer in the
00018 documentation and/or other materials provided with the distribution.
00019
00020 THIS SOFTWARE IS PROVIDED BY AUTHORS "AS IS" AND ANY EXPRESS OR IMPLIED
00021 WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
00022 MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
00023 SHALL AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
00024 SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
00025 PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
00026 BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #ifndef INPUT__H
00033 #define INPUT__H 1
00034
00035 enum ClimbingMethod
00036 {
00037     CLIMBING_METHOD_COORDINATES = 0,
00038     CLIMBING_METHOD_RANDOM = 1,
00039 };
00040
00041 enum ErrorNorm
00042 {
00043     ERROR_NORM_EUCLIDIAN = 0,
00044     ERROR_NORM_MAXIMUM = 1,
00045     ERROR_NORM_P = 2,
00046     ERROR_NORM_TAXICAB = 3
00047 };
00048
00049 typedef struct
00050 {
00051     Experiment *experiment;
00052     Variable *variable;
00053     char *result;
00054     char *variables;
00055     char *simulator;
00056     char *evaluator;
00057     char *directory;
00058     char *name;
00059     double tolerance;
00060     double mutation_ratio;
00061     double reproduction_ratio;
00062     double adaptation_ratio;
00063     double relaxation;
00064     double p;
00065     double threshold;
00066     unsigned long int seed;
```

```

00085 unsigned int nvariables;
00086 unsigned int nexperiments;
00087 unsigned int nsimulations;
00088 unsigned int algorithm;
00089 unsigned int nsteps;
00091 unsigned int climbing;
00092 unsigned int nestimates;
00094 unsigned int niterations;
00095 unsigned int nbest;
00096 unsigned int norm;
00097 unsigned int type;
00098 } Input;
00099
00100 extern Input input[1];
00101 extern const char *result_name;
00102 extern const char *variables_name;
00103
00104 // Public functions
00105 void input_new ();
00106 void input_free ();
00107 int input_open (char *filename);
00108
00109 #endif

```

5.11 interface.c File Reference

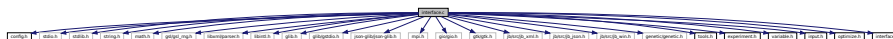
Source file to define the graphical interface functions.

```

#include "config.h"
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <math.h>
#include <gsl/gsl_rng.h>
#include <libxml/parser.h>
#include <libintl.h>
#include <glib.h>
#include <glib/gstdio.h>
#include <json-glib/json-glib.h>
#include <mpi.h>
#include <gio/gio.h>
#include <gtk/gtk.h>
#include "jb/src/jb_xml.h"
#include "jb/src/jb_json.h"
#include "jb/src/jb_win.h"
#include "genetic/genetic.h"
#include "tools.h"
#include "experiment.h"
#include "variable.h"
#include "input.h"
#include "optimize.h"
#include "interface.h"

```

Include dependency graph for interface.c:



Macros

- `#define DEBUG_INTERFACE 1`
Macro to debug interface functions.
- `#define INPUT_FILE "test-ga.xml"`
Macro to define the initial input file.

Functions

- static void [input_save_climbing_xml](#) (xmlNode *node)
- static void [input_save_climbing_json](#) (JsonNode *node)
- static void [input_save_xml](#) (xmlDoc *doc)
- static void [input_save_json](#) (JsonGenerator *generator)
- static void [input_save](#) (char *filename)
- static void [dialog_options_close](#) (GtkDialog *dlg, int response_id)
- static void [options_new](#) ()
- static void [running_new](#) ()
- static unsigned int [window_get_algorithm](#) ()
- static unsigned int [window_get_climbing](#) ()
- static unsigned int [window_get_norm](#) ()
- static void [window_save_climbing](#) ()
- static void [dialog_save_close](#) (GtkFileChooserDialog *dlg, int response_id)
- static void [window_save](#) ()
- static void [window_run](#) ()
- static void [window_help](#) ()
- static void [window_about](#) ()
- static void [window_update_climbing](#) ()
- static void [window_update](#) ()
- static void [window_set_algorithm](#) ()
- static void [window_set_experiment](#) ()
- static void [window_remove_experiment](#) ()
- static void [window_add_experiment](#) ()
- static void [dialog_name_experiment_close](#) (GtkFileChooserDialog *dlg, int response_id, void *data)
- static void [window_name_experiment](#) ()
- static void [window_weight_experiment](#) ()
- static void [window_inputs_experiment](#) ()
- static void [window_template_experiment_close](#) (GtkFileChooserDialog *dlg, int response_id, void *data)
- static void [window_template_experiment](#) (void *data)
- static void [window_set_variable](#) ()
- static void [window_remove_variable](#) ()
- static void [window_add_variable](#) ()
- static void [window_label_variable](#) ()
- static void [window_precision_variable](#) ()
- static void [window_rangemin_variable](#) ()
- static void [window_rangemax_variable](#) ()
- static void [window_rangeminabs_variable](#) ()
- static void [window_rangemaxabs_variable](#) ()
- static void [window_step_variable](#) ()
- static void [window_update_variable](#) ()
- static int [window_read](#) (char *filename)
- static void [dialog_open_close](#) (GtkFileChooserDialog *dlg, int response_id)
- static void [window_open](#) ()
- static void [dialog_simulator_close](#) (GtkFileChooserDialog *dlg, int response_id)
- static void [dialog_simulator](#) ()
- static void [dialog_evaluator_close](#) (GtkFileChooserDialog *dlg, int response_id)
- static void [dialog_evaluator](#) ()
- void [window_new](#) (GtkApplication *application)

Variables

- [Window window](#) [1]
Window struct to define the main interface window.
- static const char * [logo](#) []
Logo pixmap.
- static [Options options](#) [1]
Options struct to define the options dialog.
- static [Running running](#) [1]
Running struct to define the running dialog.

5.11.1 Detailed Description

Source file to define the graphical interface functions.

Authors

Javier Burguete and Borja Latorre.

Copyright

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Definition in file [interface.c](#).

5.11.2 Macro Definition Documentation

5.11.2.1 DEBUG_INTERFACE

```
#define DEBUG_INTERFACE 1
```

Macro to debug interface functions.

Definition at line 69 of file [interface.c](#).

5.11.2.2 INPUT_FILE

```
#define INPUT_FILE "test-ga.xml"
```

Macro to define the initial input file.

Definition at line 78 of file [interface.c](#).

5.11.3 Function Documentation

5.11.3.1 dialog_evaluator()

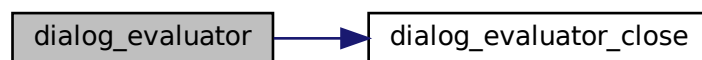
```
static void dialog_evaluator ( ) [static]
```

Function to open a dialog to save the evaluator file.

Definition at line 2251 of file [interface.c](#).

```
02252 {
02253     GtkFileChooserDialog *dlg;
02254     #if DEBUG_INTERFACE
02255     fprintf (stderr, "dialog_evaluator: start\n");
02256     #endif
02257     dlg = (GtkFileChooserDialog *)
02258         gtk_file_chooser_dialog_new (_("Open evaluator file"),
02259                                     window->window,
02260                                     GTK_FILE_CHOOSER_ACTION_OPEN,
02261                                     _("_Cancel"), GTK_RESPONSE_CANCEL,
02262                                     _("_Open"), GTK_RESPONSE_ACCEPT, NULL);
02263     g_signal_connect (dlg, "response", G_CALLBACK (dialog_evaluator_close), NULL);
02264     gtk_window_present (GTK_WINDOW (dlg));
02265     #if DEBUG_INTERFACE
02266     fprintf (stderr, "dialog_evaluator: end\n");
02267     #endif
02268 }
```

Here is the call graph for this function:



5.11.3.2 dialog_evaluator_close()

```
static void dialog_evaluator_close (
    GtkFileChooserDialog * dlg,
    int response_id ) [static]
```

Function to save the close the evaluator file dialog.

Parameters

<i>dlg</i>	GtkFileChooserDialog dialog.
<i>response</i> ↔ <i>_id</i>	Response identifier.

Definition at line 2220 of file [interface.c](#).

```

02223 {
02224     GFile *file1, *file2;
02225     char *buffer1, *buffer2;
02226     #if DEBUG_INTERFACE
02227     fprintf (stderr, "dialog_evaluator_close:  start\n");
02228     #endif
02229     if (response_id == GTK_RESPONSE_OK)
02230     {
02231         buffer1 = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
02232         file1 = g_file_new_for_path (buffer1);
02233         file2 = g_file_new_for_path (input->directory);
02234         buffer2 = g_file_get_relative_path (file2, file1);
02235         input->evaluator = g_strdup (buffer2);
02236         g_free (buffer2);
02237         g_object_unref (file2);
02238         g_object_unref (file1);
02239         g_free (buffer1);
02240     }
02241     gtk_window_destroy (GTK_WINDOW (dlg));
02242     #if DEBUG_INTERFACE
02243     fprintf (stderr, "dialog_evaluator_close:  end\n");
02244     #endif
02245 }
```

5.11.3.3 dialog_name_experiment_close()

```

static void dialog_name_experiment_close (
    GtkFileChooserDialog * dlg,
    int response_id,
    void * data ) [static]
```

Function to close the experiment name dialog.

Parameters

<i>dlg</i>	GtkFileChooserDialog struct.
<i>response_id</i>	Response identifier.
<i>data</i>	Function data.

Definition at line 1466 of file [interface.c](#).

```

01470 {
01471     char *buffer;
01472     unsigned int i;
01473     #if DEBUG_INTERFACE
01474     fprintf (stderr, "window_name_experiment_close:  start\n");
01475     #endif
01476     i = (size_t) data;
01477     if (response_id == GTK_RESPONSE_OK)
01478     {
01479         buffer = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
01480         g_signal_handler_block (window->combo_experiment, window->id_experiment);
01481         gtk_combo_box_text_remove (window->combo_experiment, i);
01482         gtk_combo_box_text_insert_text (window->combo_experiment, i, buffer);
01483         gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i);
01484         g_signal_handler_unblock (window->combo_experiment,
01485                                   window->id_experiment);
01486         g_free (buffer);
01487     }
01488     #if DEBUG_INTERFACE
01489     fprintf (stderr, "window_name_experiment_close:  end\n");
01490     #endif
01491 }
```


5.11.3.4 dialog_open_close()

```
static void dialog_open_close (
    GtkFileChooserDialog * dlg,
    int response_id ) [static]
```

Function to close the input data dialog.

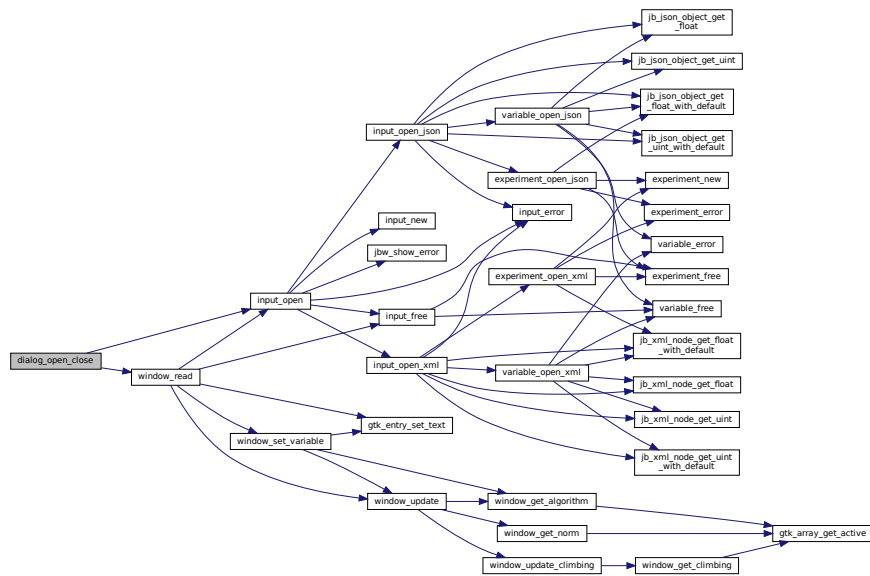
Parameters

<i>dlg</i>	GtkFileChooserDialog dialog.
<i>response_id</i>	Response identifier.

Definition at line 2060 of file [interface.c](#).

```
02063 {
02064     char *buffer, *directory, *name;
02065
02066     #if DEBUG_INTERFACE
02067     fprintf (stderr, "dialog_open_close: start\n");
02068     #endif
02069
02070     // Saving a backup of the current input file
02071     directory = g_strdup (input->directory);
02072     name = g_strdup (input->name);
02073
02074     // If OK saving
02075     if (response_id == GTK_RESPONSE_OK)
02076     {
02077
02078         // Trying to open the input file
02079         buffer = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
02080         if (!window_read (buffer))
02081         {
02082             #if DEBUG_INTERFACE
02083             fprintf (stderr, "dialog_open_close: error reading input file\n");
02084             #endif
02085             g_free (buffer);
02086
02087             // Reading backup file on error
02088             buffer = g_build_filename (directory, name, NULL);
02089             input->result = input->variables = NULL;
02090             if (!input_open (buffer))
02091             {
02092
02093                 // Closing on backup file reading error
02094                 #if DEBUG_INTERFACE
02095                 fprintf (stderr,
02096                     "dialog_open_close: error reading backup file\n");
02097                 #endif
02098             }
02099         }
02100         g_free (buffer);
02101     }
02102
02103     // Freeing and closing
02104     g_free (name);
02105     g_free (directory);
02106     gtk_window_destroy (GTK_WINDOW (dlg));
02107
02108     #if DEBUG_INTERFACE
02109     fprintf (stderr, "dialog_open_close: end\n");
02110     #endif
02111 }
02112 }
```

Here is the call graph for this function:



5.11.3.5 dialog_options_close()

```
static void dialog_options_close (
    GtkDialog * dlg,
    int response_id ) [static]
```

Function to close the options dialog.

Parameters

<i>dlg</i>	GtkDialog options dialog.
<i>response_id</i>	Response identifier.

Definition at line 638 of file [interface.c](#).

```
00640 {
00641     #if DEBUG_INTERFACE
00642     fprintf(stderr, "dialog_options_close: start\n");
00643     #endif
00644     if (response_id == GTK_RESPONSE_OK)
00645     {
00646         input->seed
00647         = (unsigned long int) gtk_spin_button_get_value (options->spin_seed);
00648         nthreads = gtk_spin_button_get_value_as_int (options->spin_threads);
00649         nthreads_climbing
00650         = gtk_spin_button_get_value_as_int (options->spin_climbing);
00651     }
00652     gtk_window_destroy (GTK_WINDOW (dlg));
00653     #if DEBUG_INTERFACE
00654     fprintf(stderr, "dialog_options_close: end\n");
00655     #endif
00656 }
```

5.11.3.6 dialog_save_close()

```
static void dialog_save_close (
    GtkFileChooserDialog * dlg,
    int response_id ) [static]
```

Function to close the save dialog.

Parameters

<i>dlg</i>	GtkFileChooserDialog dialog.
<i>response_id</i>	Response identifier.

Definition at line 852 of file [interface.c](#).

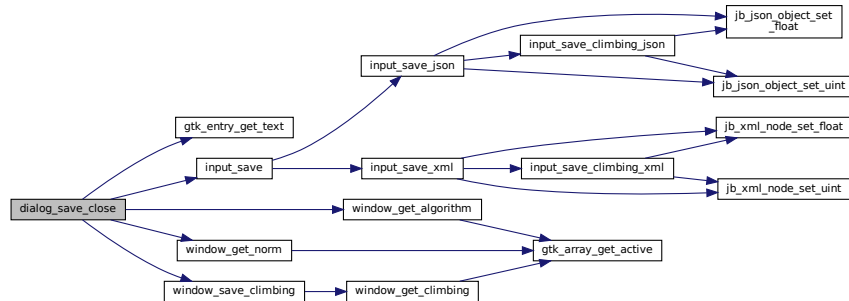
```
00855 {
00856     GtkFileFilter *filter1;
00857     char *buffer;
00858     #if DEBUG_INTERFACE
00859     fprintf (stderr, "dialog_save_close: start\n");
00860     #endif
00861     // If OK response then saving
00862     if (response_id == GTK_RESPONSE_OK)
00863     {
00864         // Setting input file type
00865         filter1 = gtk_file_chooser_get_filter (GTK_FILE_CHOOSER (dlg));
00866         buffer = (char *) gtk_file_filter_get_name (filter1);
00867         if (!strcmp (buffer, "XML"))
00868             input->type = INPUT_TYPE_XML;
00869         else
00870             input->type = INPUT_TYPE_JSON;
00871
00872         // Adding properties to the root XML node
00873         input->simulator
00874         = g_strdup (gtk_button_get_label (window->button_simulator));
00875         if (gtk_check_button_get_active (window->check_evaluator))
00876             input->evaluator
00877             = g_strdup (gtk_button_get_label (window->button_evaluator));
00878         else
00879             input->evaluator = NULL;
00880         if (input->type == INPUT_TYPE_XML)
00881         {
00882             input->result
00883             = (char *) xmlStrdup ((const xmlChar *)
00884                                   gtk_entry_get_text (window->entry_result));
00885             input->variables
00886             = (char *) xmlStrdup ((const xmlChar *)
00887                                   gtk_entry_get_text (window->entry_variables));
00888         }
00889         else
00890         {
00891             input->result = g_strdup (gtk_entry_get_text (window->entry_result));
00892             input->variables =
00893             g_strdup (gtk_entry_get_text (window->entry_variables));
00894         }
00895
00896         // Setting the algorithm
00897         switch (window_get_algorithm ())
00898         {
00899             case ALGORITHM_MONTE_CARLO:
00900                 input->algorithm = ALGORITHM_MONTE_CARLO;
00901                 input->nsimulations
00902                 = gtk_spin_button_get_value_as_int (window->spin_simulations);
00903                 input->niterations
00904                 = gtk_spin_button_get_value_as_int (window->spin_iterations);
00905                 input->tolerance = gtk_spin_button_get_value (window->spin_tolerance);
00906                 input->nbest = gtk_spin_button_get_value_as_int (window->spin_bests);
00907                 window_save_climbing ();
00908                 break;
00909             case ALGORITHM_SWEEP:
00910                 input->algorithm = ALGORITHM_SWEEP;
00911                 input->niterations
00912                 = gtk_spin_button_get_value_as_int (window->spin_iterations);
00913                 input->tolerance = gtk_spin_button_get_value (window->spin_tolerance);
00914                 input->nbest = gtk_spin_button_get_value_as_int (window->spin_bests);
00915                 window_save_climbing ();
00916                 break;
```

```

00917     case ALGORITHM_ORTHOGONAL:
00918         input->algorithm = ALGORITHM_ORTHOGONAL;
00919         input->niterations
00920             = gtk_spin_button_get_value_as_int (window->spin_iterations);
00921         input->tolerance = gtk_spin_button_get_value (window->spin_tolerance);
00922         input->nbest = gtk_spin_button_get_value_as_int (window->spin_best);
00923         window_save_climbing ();
00924         break;
00925     default:
00926         input->algorithm = ALGORITHM_GENETIC;
00927         input->nsimulations
00928             = gtk_spin_button_get_value_as_int (window->spin_population);
00929         input->niterations
00930             = gtk_spin_button_get_value_as_int (window->spin_generations);
00931         input->mutation_ratio
00932             = gtk_spin_button_get_value (window->spin_mutation);
00933         input->reproduction_ratio
00934             = gtk_spin_button_get_value (window->spin_reproduction);
00935         input->adaptation_ratio
00936             = gtk_spin_button_get_value (window->spin_adaptation);
00937     }
00938     input->norm = window_get_norm ();
00939     input->p = gtk_spin_button_get_value (window->spin_p);
00940     input->threshold = gtk_spin_button_get_value (window->spin_threshold);
00941
00942     // Saving the XML file
00943     buffer = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
00944     input_save (buffer);
00945
00946     // Closing and freeing memory
00947     g_free (buffer);
00948 }
00949 gtk_window_destroy (GTK_WINDOW (dlg));
00950 #if DEBUG_INTERFACE
00951 fprintf (stderr, "dialog_save_close: end\n");
00952 #endif
00953 }

```

Here is the call graph for this function:



5.11.3.7 dialog_simulator()

```
static void dialog_simulator ( ) [static]
```

Function to open a dialog to save the simulator file.

Definition at line 2197 of file [interface.c](#).

```

02198 {
02199     GtkFileChooserDialog *dlg;
02200     #if DEBUG_INTERFACE
02201     fprintf (stderr, "dialog_simulator: start\n");
02202     #endif
02203     dlg = (GtkFileChooserDialog *)
02204         gtk_file_chooser_dialog_new (_, "Open simulator file",

```

```

02205             window->window,
02206             GTK_FILE_CHOOSER_ACTION_OPEN,
02207             _("_Cancel"), GTK_RESPONSE_CANCEL,
02208             _("_Open"), GTK_RESPONSE_ACCEPT, NULL);
02209     g_signal_connect (dlg, "response", G_CALLBACK (dialog_simulator_close), NULL);
02210     gtk_window_present (GTK_WINDOW (dlg));
02211     #if DEBUG_INTERFACE
02212     fprintf (stderr, "dialog_simulator:  end\n");
02213     #endif
02214 }

```

Here is the call graph for this function:



5.11.3.8 dialog_simulator_close()

```

static void dialog_simulator_close (
    GtkFileChooserDialog * dlg,
    int response_id ) [static]

```

Function to save the close the simulator file dialog.

Parameters

<i>dlg</i>	GtkFileChooserDialog dialog.
<i>response_id</i>	Response identifier.

Definition at line 2166 of file [interface.c](#).

```

02169 {
02170     GFile *file1, *file2;
02171     char *buffer1, *buffer2;
02172     #if DEBUG_INTERFACE
02173     fprintf (stderr, "dialog_simulator_close:  start\n");
02174     #endif
02175     if (response_id == GTK_RESPONSE_OK)
02176     {
02177         buffer1 = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
02178         file1 = g_file_new_for_path (buffer1);
02179         file2 = g_file_new_for_path (input->directory);
02180         buffer2 = g_file_get_relative_path (file2, file1);
02181         input->simulator = g_strdup (buffer2);
02182         g_free (buffer2);
02183         g_object_unref (file2);
02184         g_object_unref (file1);
02185         g_free (buffer1);
02186     }
02187     gtk_window_destroy (GTK_WINDOW (dlg));
02188     #if DEBUG_INTERFACE
02189     fprintf (stderr, "dialog_simulator_close:  end\n");
02190     #endif
02191 }

```

5.11.3.9 input_save()

```
static void input_save (
    char * filename ) [inline], [static]
```

Function to save the input file.

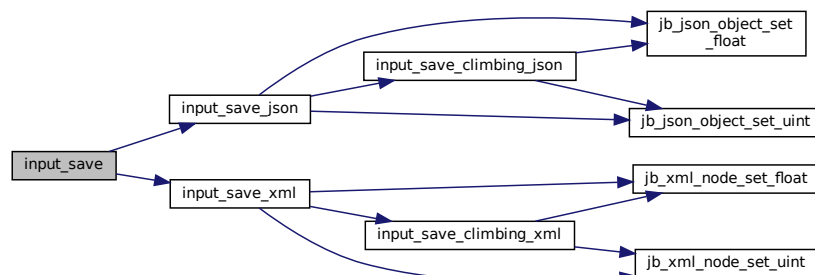
Parameters

<i>filename</i>	Input file name.
-----------------	------------------

Definition at line 590 of file [interface.c](#).

```
00591 {
00592     xmlDoc *doc;
00593     JsonGenerator *generator;
00594
00595     #if DEBUG_INTERFACE
00596         fprintf (stderr, "input_save: start\n");
00597     #endif
00598
00599     // Getting the input file directory
00600     input->name = g_path_get_basename (filename);
00601     input->directory = g_path_get_dirname (filename);
00602
00603     if (input->type == INPUT_TYPE_XML)
00604     {
00605         // Opening the input file
00606         doc = xmlNewDoc ((const xmlChar *) "1.0");
00607         input_save_xml (doc);
00608
00609         // Saving the XML file
00610         xmlSaveFormatFile (filename, doc, 1);
00611
00612         // Freeing memory
00613         xmlFreeDoc (doc);
00614     }
00615     else
00616     {
00617         // Opening the input file
00618         generator = json_generator_new ();
00619         json_generator_set_pretty (generator, TRUE);
00620         input_save_json (generator);
00621
00622         // Saving the JSON file
00623         json_generator_to_file (generator, filename, NULL);
00624
00625         // Freeing memory
00626         g_object_unref (generator);
00627     }
00628
00629     #if DEBUG_INTERFACE
00630         fprintf (stderr, "input_save: end\n");
00631     #endif
00632 }
```

Here is the call graph for this function:



5.11.3.10 input_save_climbing_json()

```
static void input_save_climbing_json (
    JsonNode * node ) [static]
```

Function to save the hill climbing method data in a JSON node.

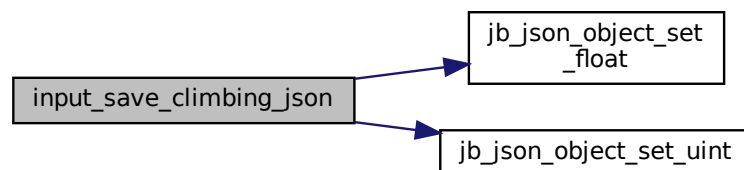
Parameters

<i>node</i>	JSON node.
-------------	------------

Definition at line 206 of file [interface.c](#).

```
00207 {
00208     JsonObject *object;
00209     #if DEBUG_INTERFACE
00210     fprintf (stderr, "input_save_climbing_json:  start\n");
00211     #endif
00212     object = json_node_get_object (node);
00213     if (input->nsteps)
00214     {
00215         jb_json_object_set_uint (object, LABEL_NSTEPS, input->nsteps);
00216         if (input->relaxation != DEFAULT_RELAXATION)
00217             jb_json_object_set_float (object, LABEL_RELAXATION, input->relaxation);
00218         switch (input->climbing)
00219         {
00220             case CLIMBING_METHOD_COORDINATES:
00221                 json_object_set_string_member (object, LABEL_CLIMBING,
00222                                                 LABEL_COORDINATES);
00223                 break;
00224             default:
00225                 json_object_set_string_member (object, LABEL_CLIMBING, LABEL_RANDOM);
00226                 jb_json_object_set_uint (object, LABEL_NESTIMATES, input->nestimates);
00227         }
00228     }
00229     #if DEBUG_INTERFACE
00230     fprintf (stderr, "input_save_climbing_json:  end\n");
00231     #endif
00232 }
```

Here is the call graph for this function:



5.11.3.11 input_save_climbing_xml()

```
static void input_save_climbing_xml (
    xmlNode * node ) [static]
```

Function to save the hill climbing method data in a XML node.

Parameters

<i>node</i>	XML node.
-------------	-----------

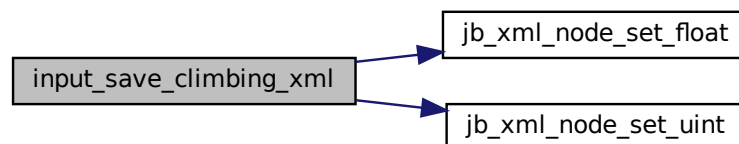
Definition at line 172 of file [interface.c](#).

```

00173 {
00174     #if DEBUG_INTERFACE
00175     fprintf (stderr, "input_save_climbing_xml:  start\n");
00176     #endif
00177     if (input->nsteps)
00178     {
00179         jb_xml_node_set_uint (node, (const xmlChar *) LABEL_NSTEPS,
00180                             input->nsteps);
00181         if (input->relaxation != DEFAULT_RELAXATION)
00182             jb_xml_node_set_float (node, (const xmlChar *) LABEL_RELAXATION,
00183                                   input->relaxation);
00184         switch (input->climbing)
00185         {
00186             case CLIMBING_METHOD_COORDINATES:
00187                 xmlSetProp (node, (const xmlChar *) LABEL_CLIMBING,
00188                             (const xmlChar *) LABEL_COORDINATES);
00189                 break;
00190             default:
00191                 xmlSetProp (node, (const xmlChar *) LABEL_CLIMBING,
00192                             (const xmlChar *) LABEL_RANDOM);
00193                 jb_xml_node_set_uint (node, (const xmlChar *) LABEL_NESTIMATES,
00194                                     input->nestimates);
00195         }
00196     }
00197     #if DEBUG_INTERFACE
00198     fprintf (stderr, "input_save_climbing_xml:  end\n");
00199     #endif
00200 }

```

Here is the call graph for this function:



5.11.3.12 input_save_json()

```

static void input_save_json (
    JsonGenerator * generator ) [inline], [static]

```

Function to save the input file in JSON format.

Parameters

<i>generator</i>	JsonGenerator struct.
------------------	-----------------------

Definition at line 418 of file [interface.c](#).


```

00419 {
00420     unsigned int i, j;
00421     char *buffer;
00422     JsonNode *node, *child;
00423     JsonObject *object;
00424     JsonArray *array;
00425     GFile *file, *file2;
00426
00427 #if DEBUG_INTERFACE
00428     fprintf (stderr, "input_save_json: start\n");
00429 #endif
00430
00431     // Setting root JSON node
00432     object = json_object_new ();
00433     node = json_node_new (JSON_NODE_OBJECT);
00434     json_node_set_object (node, object);
00435     json_generator_set_root (generator, node);
00436
00437     // Adding properties to the root JSON node
00438     if (strcmp (input->result, result_name))
00439         json_object_set_string_member (object, LABEL_RESULT_FILE, input->result);
00440     if (strcmp (input->variables, variables_name))
00441         json_object_set_string_member (object, LABEL_VARIABLES_FILE,
00442                                     input->variables);
00443     file = g_file_new_for_path (input->directory);
00444     file2 = g_file_new_for_path (input->simulator);
00445     buffer = g_file_get_relative_path (file, file2);
00446     g_object_unref (file2);
00447     json_object_set_string_member (object, LABEL_SIMULATOR, buffer);
00448     g_free (buffer);
00449     if (input->evaluator)
00450     {
00451         file2 = g_file_new_for_path (input->evaluator);
00452         buffer = g_file_get_relative_path (file, file2);
00453         g_object_unref (file2);
00454         if (strlen (buffer))
00455             json_object_set_string_member (object, LABEL_EVALUATOR, buffer);
00456         g_free (buffer);
00457     }
00458     if (input->seed != DEFAULT_RANDOM_SEED)
00459         json_object_set_uint (object, LABEL_SEED, input->seed);
00460
00461     // Setting the algorithm
00462     buffer = (char *) g_slice_alloc (64);
00463     switch (input->algorithm)
00464     {
00465     case ALGORITHM_MONTE_CARLO:
00466         json_object_set_string_member (object, LABEL_ALGORITHM,
00467                                     LABEL_MONTE_CARLO);
00468         snprintf (buffer, 64, "%u", input->nsimulations);
00469         json_object_set_string_member (object, LABEL_NSIMULATIONS, buffer);
00470         snprintf (buffer, 64, "%u", input->niterations);
00471         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);
00472         snprintf (buffer, 64, "%.3lg", input->tolerance);
00473         json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00474         snprintf (buffer, 64, "%u", input->nbest);
00475         json_object_set_string_member (object, LABEL_NBEST, buffer);
00476         input_save_climbing_json (node);
00477         break;
00478     case ALGORITHM_SWEEP:
00479         json_object_set_string_member (object, LABEL_ALGORITHM, LABEL_SWEEP);
00480         snprintf (buffer, 64, "%u", input->niterations);
00481         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);
00482         snprintf (buffer, 64, "%.3lg", input->tolerance);
00483         json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00484         snprintf (buffer, 64, "%u", input->nbest);
00485         json_object_set_string_member (object, LABEL_NBEST, buffer);
00486         input_save_climbing_json (node);
00487         break;
00488     case ALGORITHM_ORTHOGONAL:
00489         json_object_set_string_member (object, LABEL_ALGORITHM, LABEL_ORTHOGONAL);
00490         snprintf (buffer, 64, "%u", input->niterations);
00491         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);
00492         snprintf (buffer, 64, "%.3lg", input->tolerance);
00493         json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00494         snprintf (buffer, 64, "%u", input->nbest);
00495         json_object_set_string_member (object, LABEL_NBEST, buffer);
00496         input_save_climbing_json (node);
00497         break;
00498     default:
00499         json_object_set_string_member (object, LABEL_ALGORITHM, LABEL_GENETIC);
00500         snprintf (buffer, 64, "%u", input->nsimulations);
00501         json_object_set_string_member (object, LABEL_NPOPULATION, buffer);
00502         snprintf (buffer, 64, "%u", input->niterations);
00503         json_object_set_string_member (object, LABEL_NGENERATIONS, buffer);
00504         snprintf (buffer, 64, "%.3lg", input->mutation_ratio);
00505         json_object_set_string_member (object, LABEL_MUTATION, buffer);

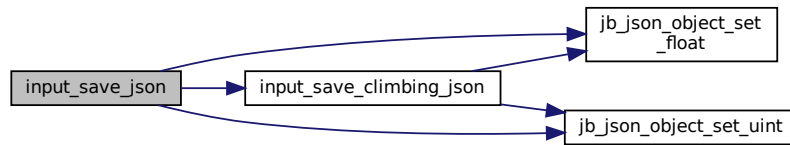
```

```

00506     snprintf (buffer, 64, "%.3lg", input->reproduction_ratio);
00507     json_object_set_string_member (object, LABEL_REPRODUCTION, buffer);
00508     snprintf (buffer, 64, "%.3lg", input->adaptation_ratio);
00509     json_object_set_string_member (object, LABEL_ADAPTATION, buffer);
00510     break;
00511 }
00512 g_slice_free1 (64, buffer);
00513 if (input->threshold != 0.)
00514     jb_json_object_set_float (object, LABEL_THRESHOLD, input->threshold);
00515
00516 // Setting the experimental data
00517 array = json_array_new ();
00518 for (i = 0; i < input->nexperiments; ++i)
00519 {
00520     child = json_node_new (JSON_NODE_OBJECT);
00521     object = json_node_get_object (child);
00522     json_object_set_string_member (object, LABEL_NAME,
00523                                   input->experiment[i].name);
00524     if (input->experiment[i].weight != 1.)
00525         jb_json_object_set_float (object, LABEL_WEIGHT,
00526                                   input->experiment[i].weight);
00527     for (j = 0; j < input->experiment->ninputs; ++j)
00528         json_object_set_string_member (object, stencil[j],
00529                                       input->experiment[i].stencil[j]);
00530     json_array_add_element (array, child);
00531 }
00532 json_object_set_array_member (object, LABEL_EXPERIMENTS, array);
00533
00534 // Setting the variables data
00535 array = json_array_new ();
00536 for (i = 0; i < input->nvariables; ++i)
00537 {
00538     child = json_node_new (JSON_NODE_OBJECT);
00539     object = json_node_get_object (child);
00540     json_object_set_string_member (object, LABEL_NAME,
00541                                   input->variable[i].name);
00542     jb_json_object_set_float (object, LABEL_MINIMUM,
00543                               input->variable[i].rangemin);
00544     if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
00545         jb_json_object_set_float (object, LABEL_ABSOLUTE_MINIMUM,
00546                                   input->variable[i].rangeminabs);
00547     jb_json_object_set_float (object, LABEL_MAXIMUM,
00548                               input->variable[i].rangemax);
00549     if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
00550         jb_json_object_set_float (object, LABEL_ABSOLUTE_MAXIMUM,
00551                                   input->variable[i].rangemaxabs);
00552     if (input->variable[i].precision != DEFAULT_PRECISION)
00553         jb_json_object_set_uint (object, LABEL_PRECISION,
00554                                  input->variable[i].precision);
00555     if (input->algorithm == ALGORITHM_SWEEP
00556         || input->algorithm == ALGORITHM_ORTHOGONAL)
00557         jb_json_object_set_uint (object, LABEL_NSWEEPS,
00558                                  input->variable[i].nsweeps);
00559     else if (input->algorithm == ALGORITHM_GENETIC)
00560         jb_json_object_set_uint (object, LABEL_NBITS, input->variable[i].nbits);
00561     if (input->nsteps)
00562         jb_json_object_set_float (object, LABEL_STEP, input->variable[i].step);
00563     json_array_add_element (array, child);
00564 }
00565 json_object_set_array_member (object, LABEL_VARIABLES, array);
00566
00567 // Saving the error norm
00568 switch (input->norm)
00569 {
00570     case ERROR_NORM_MAXIMUM:
00571         json_object_set_string_member (object, LABEL_NORM, LABEL_MAXIMUM);
00572         break;
00573     case ERROR_NORM_P:
00574         json_object_set_string_member (object, LABEL_NORM, LABEL_P);
00575         jb_json_object_set_float (object, LABEL_P, input->p);
00576         break;
00577     case ERROR_NORM_TAXICAB:
00578         json_object_set_string_member (object, LABEL_NORM, LABEL_TAXICAB);
00579 }
00580
00581 #if DEBUG_INTERFACE
00582 fprintf (stderr, "input_save_json: end\n");
00583 #endif
00584 }

```

Here is the call graph for this function:



5.11.3.13 input_save_xml()

```
static void input_save_xml (
    xmlDoc * doc ) [inline], [static]
```

Function to save the input file in XML format.

Parameters

<i>doc</i>	xmlDoc struct.
------------	----------------

Definition at line 238 of file [interface.c](#).

```

00239 {
00240     unsigned int i, j;
00241     char *buffer;
00242     xmlNode *node, *child;
00243     GFile *file, *file2;
00244
00245     #if DEBUG_INTERFACE
00246         fprintf (stderr, "input_save_xml: start\n");
00247     #endif
00248
00249     // Setting root XML node
00250     node = xmlNewDocNode (doc, 0, (const xmlChar *) LABEL_OPTIMIZE, 0);
00251     xmlDocSetRootElement (doc, node);
00252
00253     // Adding properties to the root XML node
00254     if (xmlStrcmp
00255         ((const xmlChar *) input->result, (const xmlChar *) result_name))
00256         xmlSetProp (node, (const xmlChar *) LABEL_RESULT_FILE,
00257             (xmlChar *) input->result);
00258     if (xmlStrcmp
00259         ((const xmlChar *) input->variables, (const xmlChar *) variables_name))
00260         xmlSetProp (node, (const xmlChar *) LABEL_VARIABLES_FILE,
00261             (xmlChar *) input->variables);
00262     file = g_file_new_for_path (input->directory);
00263     file2 = g_file_new_for_path (input->simulator);
00264     buffer = g_file_get_relative_path (file, file2);
00265     g_object_unref (file2);
00266     xmlSetProp (node, (const xmlChar *) LABEL_SIMULATOR, (xmlChar *) buffer);
00267     g_free (buffer);
00268     if (input->evaluator)
00269     {
00270         file2 = g_file_new_for_path (input->evaluator);
00271         buffer = g_file_get_relative_path (file, file2);
00272         g_object_unref (file2);
00273         if (xmlStrlen ((xmlChar *) buffer))
00274             xmlSetProp (node, (const xmlChar *) LABEL_EVALUATOR,
00275                 (xmlChar *) buffer);
00276         g_free (buffer);
00277     }
00278     if (input->seed != DEFAULT_RANDOM_SEED)
00279         jb_xml_node_set_uint (node, (const xmlChar *) LABEL_SEED, input->seed);

```

```

00280
00281 // Setting the algorithm
00282 buffer = (char *) g_slice_alloc (64);
00283 switch (input->algorithm)
00284 {
00285     case ALGORITHM_MONTE_CARLO:
00286         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00287                     (const xmlChar *) LABEL_MONTE_CARLO);
00288         snprintf (buffer, 64, "%u", input->nsimulations);
00289         xmlSetProp (node, (const xmlChar *) LABEL_NSIMULATIONS,
00290                     (xmlChar *) buffer);
00291         snprintf (buffer, 64, "%u", input->niterations);
00292         xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00293                     (xmlChar *) buffer);
00294         snprintf (buffer, 64, "%.3lg", input->tolerance);
00295         xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00296         snprintf (buffer, 64, "%u", input->nbest);
00297         xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00298         input_save_climbing_xml (node);
00299         break;
00300     case ALGORITHM_SWEEP:
00301         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00302                     (const xmlChar *) LABEL_SWEEP);
00303         snprintf (buffer, 64, "%u", input->niterations);
00304         xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00305                     (xmlChar *) buffer);
00306         snprintf (buffer, 64, "%.3lg", input->tolerance);
00307         xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00308         snprintf (buffer, 64, "%u", input->nbest);
00309         xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00310         input_save_climbing_xml (node);
00311         break;
00312     case ALGORITHM_ORTHOGONAL:
00313         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00314                     (const xmlChar *) LABEL_ORTHOGONAL);
00315         snprintf (buffer, 64, "%u", input->niterations);
00316         xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00317                     (xmlChar *) buffer);
00318         snprintf (buffer, 64, "%.3lg", input->tolerance);
00319         xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00320         snprintf (buffer, 64, "%u", input->nbest);
00321         xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00322         input_save_climbing_xml (node);
00323         break;
00324     default:
00325         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00326                     (const xmlChar *) LABEL_GENETIC);
00327         snprintf (buffer, 64, "%u", input->nsimulations);
00328         xmlSetProp (node, (const xmlChar *) LABEL_NPOPULATION,
00329                     (xmlChar *) buffer);
00330         snprintf (buffer, 64, "%u", input->niterations);
00331         xmlSetProp (node, (const xmlChar *) LABEL_NGENERATIONS,
00332                     (xmlChar *) buffer);
00333         snprintf (buffer, 64, "%.3lg", input->mutation_ratio);
00334         xmlSetProp (node, (const xmlChar *) LABEL_MUTATION, (xmlChar *) buffer);
00335         snprintf (buffer, 64, "%.3lg", input->reproduction_ratio);
00336         xmlSetProp (node, (const xmlChar *) LABEL_REPRODUCTION,
00337                     (xmlChar *) buffer);
00338         snprintf (buffer, 64, "%.3lg", input->adaptation_ratio);
00339         xmlSetProp (node, (const xmlChar *) LABEL_ADAPTATION, (xmlChar *) buffer);
00340         break;
00341 }
00342 g_slice_free1 (64, buffer);
00343 if (input->threshold != 0.)
00344     jb_xml_node_set_float (node, (const xmlChar *) LABEL_THRESHOLD,
00345                           input->threshold);
00346
00347 // Setting the experimental data
00348 for (i = 0; i < input->nexperiments; ++i)
00349 {
00350     child = xmlNewChild (node, 0, (const xmlChar *) LABEL_EXPERIMENT, 0);
00351     xmlSetProp (child, (const xmlChar *) LABEL_NAME,
00352                 (xmlChar *) input->experiment[i].name);
00353     if (input->experiment[i].weight != 1.)
00354         jb_xml_node_set_float (child, (const xmlChar *) LABEL_WEIGHT,
00355                                input->experiment[i].weight);
00356     for (j = 0; j < input->experiment->ninputs; ++j)
00357         xmlSetProp (child, (const xmlChar *) stencil[j],
00358                     (xmlChar *) input->experiment[i].stencil[j]);
00359 }
00360
00361 // Setting the variables data
00362 for (i = 0; i < input->nvariables; ++i)
00363 {
00364     child = xmlNewChild (node, 0, (const xmlChar *) LABEL_VARIABLE, 0);
00365     xmlSetProp (child, (const xmlChar *) LABEL_NAME,
00366                 (xmlChar *) input->variable[i].name);
00367 }

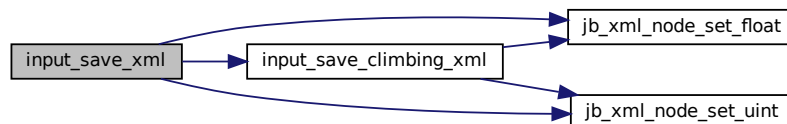
```

```

00367     jb_xml_node_set_float (child, (const xmlChar *) LABEL_MINIMUM,
00368                           input->variable[i].rangemin);
00369     if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
00370         jb_xml_node_set_float (child, (const xmlChar *) LABEL_ABSOLUTE_MINIMUM,
00371                               input->variable[i].rangeminabs);
00372     jb_xml_node_set_float (child, (const xmlChar *) LABEL_MAXIMUM,
00373                           input->variable[i].rangemax);
00374     if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
00375         jb_xml_node_set_float (child, (const xmlChar *) LABEL_ABSOLUTE_MAXIMUM,
00376                               input->variable[i].rangemaxabs);
00377     if (input->variable[i].precision != DEFAULT_PRECISION)
00378         jb_xml_node_set_uint (child, (const xmlChar *) LABEL_PRECISION,
00379                              input->variable[i].precision);
00380     if (input->algorithm == ALGORITHM_SWEEP
00381         || input->algorithm == ALGORITHM_ORTHOGONAL)
00382         jb_xml_node_set_uint (child, (const xmlChar *) LABEL_NSWEEPS,
00383                              input->variable[i].nsweeps);
00384     else if (input->algorithm == ALGORITHM_GENETIC)
00385         jb_xml_node_set_uint (child, (const xmlChar *) LABEL_NBITS,
00386                              input->variable[i].nbits);
00387     if (input->nsteps)
00388         jb_xml_node_set_float (child, (const xmlChar *) LABEL_STEP,
00389                               input->variable[i].step);
00390 }
00391
00392 // Saving the error norm
00393 switch (input->norm)
00394 {
00395     case ERROR_NORM_MAXIMUM:
00396         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00397                   (const xmlChar *) LABEL_MAXIMUM);
00398         break;
00399     case ERROR_NORM_P:
00400         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00401                   (const xmlChar *) LABEL_P);
00402         jb_xml_node_set_float (node, (const xmlChar *) LABEL_P, input->p);
00403         break;
00404     case ERROR_NORM_TAXICAB:
00405         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00406                   (const xmlChar *) LABEL_TAXICAB);
00407 }
00408
00409 #if DEBUG_INTERFACE
00410     fprintf (stderr, "input_save: end\n");
00411 #endif
00412 }

```

Here is the call graph for this function:



5.11.3.14 options_new()

```
static void options_new ( ) [static]
```

Function to open the options dialog.

Definition at line 662 of file [interface.c](#).

```

00663 {
00664     #if DEBUG_INTERFACE
00665         fprintf (stderr, "options_new: start\n");
00666     #endif

```

```

00667 options->label_seed = (GtkLabel *)
00668     gtk_label_new (_("Pseudo-random numbers generator seed"));
00669 options->spin_seed = (GtkSpinButton *)
00670     gtk_spin_button_new_with_range (0., (gdouble) G_MAXULONG, 1.);
00671 gtk_widget_set_tooltip_text
00672     (GTK_WIDGET (options->spin_seed),
00673      _("Seed to init the pseudo-random numbers generator"));
00674 gtk_spin_button_set_value (options->spin_seed, (gdouble) input->seed);
00675 options->label_threads = (GtkLabel *)
00676     gtk_label_new (_("Threads number for the stochastic algorithm"));
00677 options->spin_threads
00678     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
00679 gtk_widget_set_tooltip_text
00680     (GTK_WIDGET (options->spin_threads),
00681      _("Number of threads to perform the calibration/optimization for "
00682        "the stochastic algorithm"));
00683 gtk_spin_button_set_value (options->spin_threads, (gdouble) nthreads);
00684 options->label_climbing = (GtkLabel *)
00685     gtk_label_new (_("Threads number for the hill climbing method"));
00686 options->spin_climbing =
00687     (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
00688 gtk_widget_set_tooltip_text
00689     (GTK_WIDGET (options->spin_climbing),
00690      _("Number of threads to perform the calibration/optimization for the "
00691        "hill climbing method"));
00692 gtk_spin_button_set_value (options->spin_climbing,
00693     (gdouble) nthreads_climbing);
00694 options->grid = (GtkGrid *) gtk_grid_new ();
00695 gtk_grid_attach (options->grid, GTK_WIDGET (options->label_seed), 0, 0, 1, 1);
00696 gtk_grid_attach (options->grid, GTK_WIDGET (options->spin_seed), 1, 0, 1, 1);
00697 gtk_grid_attach (options->grid, GTK_WIDGET (options->label_threads),
00698     0, 1, 1, 1);
00699 gtk_grid_attach (options->grid, GTK_WIDGET (options->spin_threads),
00700     1, 1, 1, 1);
00701 gtk_grid_attach (options->grid, GTK_WIDGET (options->label_climbing), 0, 2, 1,
00702     1);
00703 gtk_grid_attach (options->grid, GTK_WIDGET (options->spin_climbing), 1, 2, 1,
00704     1);
00705 #if !GTK4
00706     gtk_widget_show_all (GTK_WIDGET (options->grid));
00707 #else
00708     gtk_widget_show (GTK_WIDGET (options->grid));
00709 #endif
00710 options->dialog = (GtkDialog *)
00711     gtk_dialog_new_with_buttons (_("Options"),
00712     window->window,
00713     GTK_DIALOG_MODAL,
00714     _("_OK"), GTK_RESPONSE_OK,
00715     _("_Cancel"), GTK_RESPONSE_CANCEL, NULL);
00716 gtk_box_append (GTK_BOX (gtk_dialog_get_content_area (options->dialog)),
00717     GTK_WIDGET (options->grid));
00718 g_signal_connect (options->dialog, "response",
00719     G_CALLBACK (dialog_options_close), NULL);
00720 gtk_window_present (GTK_WINDOW (options->dialog));
00721 #if DEBUG_INTERFACE
00722     fprintf (stderr, "options_new: end\n");
00723 #endif
00724 }

```

5.11.3.15 running_new()

```
static void running_new ( ) [inline], [static]
```

Function to open the running dialog.

Definition at line 730 of file [interface.c](#).

```

00731 {
00732 #if DEBUG_INTERFACE
00733     fprintf (stderr, "running_new: start\n");
00734 #endif
00735     running->label = (GtkLabel *) gtk_label_new (_("Calculating ..."));
00736     running->spinner = (GtkSpinner *) gtk_spinner_new ();
00737     running->grid = (GtkGrid *) gtk_grid_new ();
00738     gtk_grid_attach (running->grid, GTK_WIDGET (running->label), 0, 0, 1, 1);
00739     gtk_grid_attach (running->grid, GTK_WIDGET (running->spinner), 0, 1, 1, 1);
00740     running->dialog = (GtkDialog *)
00741         gtk_dialog_new_with_buttons (_("Calculating"),
00742         window->window, GTK_DIALOG_MODAL, NULL, NULL);

```

```

00743     gtk_window_set_child (GTK_WINDOW
00744                           (gtk_dialog_get_content_area (running->dialog)),
00745                           GTK_WIDGET (running->grid));
00746     gtk_spinner_start (running->spinner);
00747     #if !GTK4
00748     gtk_widget_show_all (GTK_WIDGET (running->dialog));
00749     #else
00750     gtk_widget_show (GTK_WIDGET (running->dialog));
00751     #endif
00752     #if DEBUG_INTERFACE
00753     fprintf (stderr, "running_new: end\n");
00754     #endif
00755 }

```

5.11.3.16 window_about()

```
static void window_about ( ) [static]
```

Function to show an about dialog.

Definition at line 1102 of file [interface.c](#).

```

01103 {
01104     static const gchar *authors[] = {
01105         "Javier Burguete Tolosa <jburguete@eead.csic.es>",
01106         "Borja Latorre Garcés <borja.latorre@csic.es>",
01107         NULL
01108     };
01109     #if DEBUG_INTERFACE
01110     fprintf (stderr, "window_about: start\n");
01111     #endif
01112     gtk_show_about_dialog
01113         (window->window,
01114          "program_name", "MPCOTool",
01115          "comments",
01116          _("The Multi-Purposes Calibration and Optimization Tool.\n"
01117           "A software to perform calibrations or optimizations of empirical "
01118           "parameters"),
01119          "authors", authors,
01120          "translator-credits",
01121          "Javier Burguete Tolosa <jburguete@eead.csic.es> "
01122           "(english, french and spanish)\n"
01123           "Uğur Çayoğlu (german)",
01124          "version", "4.4.1",
01125          "copyright", "Copyright 2012-2023 Javier Burguete Tolosa",
01126          "logo", window->logo,
01127          "website", "https://github.com/jburguete/mpcotool",
01128          "license-type", GTK_LICENSE_BSD, NULL);
01129     #if DEBUG_INTERFACE
01130     fprintf (stderr, "window_about: end\n");
01131     #endif
01132 }

```

5.11.3.17 window_add_experiment()

```
static void window_add_experiment ( ) [static]
```

Function to add an experiment in the main window.

Definition at line 1417 of file [interface.c](#).

```

01418 {
01419     unsigned int i, j;
01420     #if DEBUG_INTERFACE
01421     fprintf (stderr, "window_add_experiment: start\n");
01422     #endif
01423     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01424     g_signal_handler_block (window->combo_experiment, window->id_experiment);
01425     gtk_combo_box_text_insert_text
01426         (window->combo_experiment, i, input->experiment[i].name);

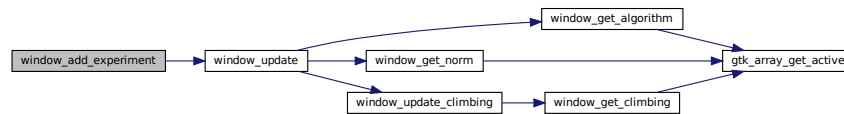
```

```

01427 g_signal_handler_unblock (window->combo_experiment, window->id_experiment);
01428 input->experiment = (Experiment *) g_realloc
01429 (input->experiment, (input->nexperiments + 1) * sizeof (Experiment));
01430 for (j = input->nexperiments - 1; j > i; --j)
01431     memcpy (input->experiment + j + 1, input->experiment + j,
01432             sizeof (Experiment));
01433 input->experiment[j + 1].weight = input->experiment[j].weight;
01434 input->experiment[j + 1].ninputs = input->experiment[j].ninputs;
01435 if (input->type == INPUT_TYPE_XML)
01436 {
01437     input->experiment[j + 1].name
01438     = (char *) xmlStrdup ((xmlChar *) input->experiment[j].name);
01439     for (j = 0; j < input->experiment->ninputs; ++j)
01440         input->experiment[i + 1].stencil[j]
01441         = (char *) xmlStrdup ((xmlChar *) input->experiment[i].stencil[j]);
01442 }
01443 else
01444 {
01445     input->experiment[j + 1].name = g_strdup (input->experiment[j].name);
01446     for (j = 0; j < input->experiment->ninputs; ++j)
01447         input->experiment[i + 1].stencil[j]
01448         = g_strdup (input->experiment[i].stencil[j]);
01449 }
01450 ++input->nexperiments;
01451 for (j = 0; j < input->experiment->ninputs; ++j)
01452     g_signal_handler_block (window->button_template[j], window->id_input[j]);
01453 gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i + 1);
01454 for (j = 0; j < input->experiment->ninputs; ++j)
01455     g_signal_handler_unblock (window->button_template[j], window->id_input[j]);
01456 window_update ();
01457 #if DEBUG_INTERFACE
01458 fprintf (stderr, "window_add_experiment: end\n");
01459 #endif
01460 }

```

Here is the call graph for this function:



5.11.3.18 window_add_variable()

```
static void window_add_variable ( ) [static]
```

Function to add a variable in the main window.

Definition at line 1752 of file [interface.c](#).

```

01753 {
01754     unsigned int i, j;
01755     #if DEBUG_INTERFACE
01756     fprintf (stderr, "window_add_variable: start\n");
01757     #endif
01758     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01759     g_signal_handler_block (window->combo_variable, window->id_variable);
01760     gtk_combo_box_text_insert_text (window->combo_variable, i,
01761                                     input->variable[i].name);
01762     g_signal_handler_unblock (window->combo_variable, window->id_variable);
01763     input->variable = (Variable *) g_realloc
01764     (input->variable, (input->nvariables + 1) * sizeof (Variable));
01765     for (j = input->nvariables - 1; j > i; --j)
01766         memcpy (input->variable + j + 1, input->variable + j, sizeof (Variable));
01767     memcpy (input->variable + j + 1, input->variable + j, sizeof (Variable));
01768     if (input->type == INPUT_TYPE_XML)
01769         input->variable[j + 1].name
01770         = (char *) xmlStrdup ((xmlChar *) input->variable[j].name);
01771     else

```

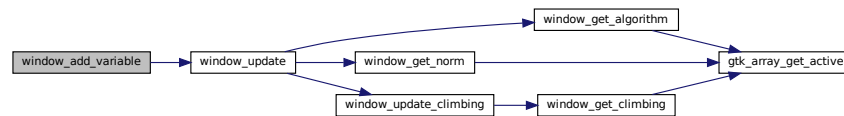


```

01772     input->variable[j + 1].name = g_strdup (input->variable[j].name);
01773     ++input->nvariables;
01774     g_signal_handler_block (window->entry_variable, window->id_variable_label);
01775     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i + 1);
01776     g_signal_handler_unblock (window->entry_variable, window->id_variable_label);
01777     window_update ();
01778     #if DEBUG_INTERFACE
01779     fprintf (stderr, "window_add_variable:  end\n");
01780     #endif
01781 }

```

Here is the call graph for this function:



5.11.3.19 window_get_algorithm()

```
static unsigned int window_get_algorithm ( ) [static]
```

Function to get the stochastic algorithm number.

Returns

Stochastic algorithm number.

Definition at line 763 of file [interface.c](#).

```

00764 {
00765     unsigned int i;
00766     #if DEBUG_INTERFACE
00767     fprintf (stderr, "window_get_algorithm:  start\n");
00768     #endif
00769     i = gtk_array_get_active (window->button_algorithm, NALGORITHMS);
00770     #if DEBUG_INTERFACE
00771     fprintf (stderr, "window_get_algorithm:  %u\n", i);
00772     fprintf (stderr, "window_get_algorithm:  end\n");
00773     #endif
00774     return i;
00775 }

```

Here is the call graph for this function:



5.11.3.20 window_get_climbing()

```
static unsigned int window_get_climbing ( ) [static]
```

Function to get the hill climbing method number.

Returns

Hill climbing method number.

Definition at line 783 of file [interface.c](#).

```
00784 {
00785     unsigned int i;
00786     #if DEBUG_INTERFACE
00787         fprintf (stderr, "window_get_climbing:  start\n");
00788     #endif
00789     i = gtk_array_get_active (window->button_climbing, NCLIMBINGS);
00790     #if DEBUG_INTERFACE
00791         fprintf (stderr, "window_get_climbing:  %u\n", i);
00792         fprintf (stderr, "window_get_climbing:  end\n");
00793     #endif
00794     return i;
00795 }
```

Here is the call graph for this function:



5.11.3.21 window_get_norm()

```
static unsigned int window_get_norm ( ) [static]
```

Function to get the norm method number.

Returns

Norm method number.

Definition at line 803 of file [interface.c](#).

```
00804 {
00805     unsigned int i;
00806     #if DEBUG_INTERFACE
00807         fprintf (stderr, "window_get_norm:  start\n");
00808     #endif
00809     i = gtk_array_get_active (window->button_norm, NNORMS);
00810     #if DEBUG_INTERFACE
00811         fprintf (stderr, "window_get_norm:  %u\n", i);
00812         fprintf (stderr, "window_get_norm:  end\n");
00813     #endif
00814     return i;
00815 }
```

Here is the call graph for this function:



5.11.3.22 window_help()

```
static void window_help ( ) [static]
```

Function to show a help dialog.

Definition at line 1070 of file [interface.c](#).

```

01071 {
01072     char *buffer, *buffer2;
01073     #if DEBUG_INTERFACE
01074     fprintf (stderr, "window_help: start\n");
01075     #endif
01076     buffer2 = g_build_filename (window->application_directory, "..", "manuals",
01077                               _("user-manual.pdf"), NULL);
01078     buffer = g_filename_to_uri (buffer2, NULL, NULL);
01079     g_free (buffer2);
01080     #if !GTK4
01081     #if GTK_MINOR_VERSION >= 22
01082     gtk_show_uri_on_window (window->window, buffer, GDK_CURRENT_TIME, NULL);
01083     #else
01084     gtk_show_uri (NULL, buffer, GDK_CURRENT_TIME, NULL);
01085     #endif
01086     #else
01087     gtk_show_uri (window->window, buffer, GDK_CURRENT_TIME);
01088     #endif
01089     #if DEBUG_INTERFACE
01090     fprintf (stderr, "window_help: uri=%s\n", buffer);
01091     #endif
01092     g_free (buffer);
01093     #if DEBUG_INTERFACE
01094     fprintf (stderr, "window_help: end\n");
01095     #endif
01096 }
```

5.11.3.23 window_inputs_experiment()

```
static void window_inputs_experiment ( ) [static]
```

Function to update the experiment input templates number in the main window.

Definition at line 1550 of file [interface.c](#).

```

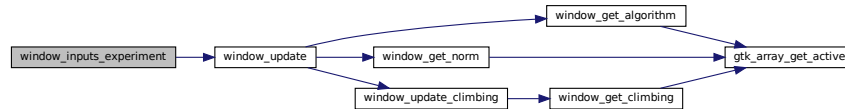
01551 {
01552     unsigned int j;
01553     #if DEBUG_INTERFACE
01554     fprintf (stderr, "window_inputs_experiment: start\n");
01555     #endif
01556     j = input->experiment->ninputs - 1;
01557     if (j && !gtk_check_button_get_active (window->check_template[j]))
01558         --input->experiment->ninputs;
01559 }
```

```

01559  if (input->experiment->ninputs < MAX_NINPUTS
01560      && gtk_check_button_get_active (window->check_template[j]))
01561      ++input->experiment->ninputs;
01562  window_update ();
01563  #if DEBUG_INTERFACE
01564      fprintf (stderr, "window_inputs_experiment:  end\n");
01565  #endif
01566  }

```

Here is the call graph for this function:



5.11.3.24 window_label_variable()

```
static void window_label_variable ( ) [static]
```

Function to set the variable label in the main window.

Definition at line 1787 of file [interface.c](#).

```

01788 {
01789     unsigned int i;
01790     const char *buffer;
01791     #if DEBUG_INTERFACE
01792         fprintf (stderr, "window_label_variable:  start\n");
01793     #endif
01794     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01795     buffer = gtk_entry_get_text (window->entry_variable);
01796     g_signal_handler_block (window->combo_variable, window->id_variable);
01797     gtk_combo_box_text_remove (window->combo_variable, i);
01798     gtk_combo_box_text_insert_text (window->combo_variable, i, buffer);
01799     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i);
01800     g_signal_handler_unblock (window->combo_variable, window->id_variable);
01801     #if DEBUG_INTERFACE
01802         fprintf (stderr, "window_label_variable:  end\n");
01803     #endif
01804 }

```

Here is the call graph for this function:



5.11.3.25 window_name_experiment()

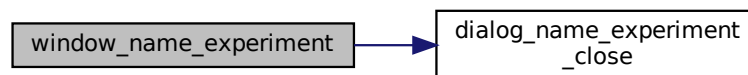
```
static void window_name_experiment ( ) [static]
```

Function to set the experiment name in the main window.

Definition at line 1497 of file [interface.c](#).

```
01498 {
01499     GtkFileChooserDialog *dlg;
01500     GMainLoop *loop;
01501     const char *buffer;
01502     unsigned int i;
01503     #if DEBUG_INTERFACE
01504     fprintf (stderr, "window_name_experiment: start\n");
01505     #endif
01506     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01507     buffer = gtk_button_get_label (window->button_experiment);
01508     dlg = (GtkFileChooserDialog *)
01509         gtk_file_chooser_dialog_new (_("Open experiment file"),
01510                                     window->window,
01511                                     GTK_FILE_CHOOSER_ACTION_OPEN,
01512                                     _("_Cancel"),
01513                                     GTK_RESPONSE_CANCEL,
01514                                     _("_Open"), GTK_RESPONSE_OK, NULL);
01515     gtk_file_chooser_set_current_name (GTK_FILE_CHOOSER (dlg), buffer);
01516     g_signal_connect (dlg, "response", G_CALLBACK (dialog_name_experiment_close),
01517                     (void *) (size_t) i);
01518     gtk_window_present (GTK_WINDOW (dlg));
01519     loop = g_main_loop_new (NULL, 0);
01520     g_signal_connect_swapped (dlg, "destroy", G_CALLBACK (g_main_loop_quit),
01521                             loop);
01522     g_main_loop_run (loop);
01523     g_main_loop_unref (loop);
01524     #if DEBUG_INTERFACE
01525     fprintf (stderr, "window_name_experiment: end\n");
01526     #endif
01527 }
```

Here is the call graph for this function:



5.11.3.26 window_new()

```
void window_new (
    GtkApplication * application )
```

Function to open the main window.

Parameters

<i>application</i>	GtkApplication struct.
--------------------	------------------------

Definition at line 2274 of file [interface.c](#).

```

02275 {
02276     unsigned int i;
02277     char *buffer, *buffer2, buffer3[64];
02278     const char *label_algorithm[NALGORITHMS] = {
02279         "_Monte-Carlo", _("_Sweep"), _("_Genetic"), _("_Orthogonal")
02280     };
02281     const char *tip_algorithm[NALGORITHMS] = {
02282         _("Monte-Carlo brute force algorithm"),
02283         _("Sweep brute force algorithm"),
02284         _("Genetic algorithm"),
02285         _("Orthogonal sampling brute force algorithm"),
02286     };
02287     const char *label_climbing[NCLIMBINGS] = {
02288         _("_Coordinates climbing"), _("_Random climbing")
02289     };
02290     const char *tip_climbing[NCLIMBINGS] = {
02291         _("Coordinates climbing estimate method"),
02292         _("Random climbing estimate method")
02293     };
02294     const char *label_norm[NNORMS] = { "L2", "L", "Lp", "L1" };
02295     const char *tip_norm[NNORMS] = {
02296         _("Euclidean error norm (L2)"),
02297         _("Maximum error norm (L)"),
02298         _("P error norm (Lp)"),
02299         _("Taxicab error norm (L1)")
02300     };
02301     #if !GTK4
02302     const char *close = "delete-event";
02303     #else
02304     const char *close = "close-request";
02305     #endif
02306
02307     #if DEBUG_INTERFACE
02308     fprintf (stderr, "window_new: start\n");
02309     #endif
02310
02311     // Creating the window
02312     window->window = main_window
02313         = (GtkWindow *) gtk_application_window_new (application);
02314
02315     // Finish when closing the window
02316     g_signal_connect_swapped (window->window, close,
02317                             G_CALLBACK (g_application_quit),
02318                             G_APPLICATION (application));
02319
02320     // Setting the window title
02321     gtk_window_set_title (window->window, "MPCOTool");
02322
02323     // Creating the open button
02324     window->button_open = (GtkButton *)
02325     #if !GTK4
02326         gtk_button_new_from_icon_name ("document-open", GTK_ICON_SIZE_BUTTON);
02327     #else
02328         gtk_button_new_from_icon_name ("document-open");
02329     #endif
02330     g_signal_connect (window->button_open, "clicked", window_open, NULL);
02331
02332     // Creating the save button
02333     window->button_save = (GtkButton *)
02334     #if !GTK4
02335         gtk_button_new_from_icon_name ("document-save", GTK_ICON_SIZE_BUTTON);
02336     #else
02337         gtk_button_new_from_icon_name ("document-save");
02338     #endif
02339     g_signal_connect (window->button_save, "clicked", (GCallback) window_save,
02340                     NULL);
02341
02342     // Creating the run button
02343     window->button_run = (GtkButton *)
02344     #if !GTK4
02345         gtk_button_new_from_icon_name ("system-run", GTK_ICON_SIZE_BUTTON);
02346     #else
02347         gtk_button_new_from_icon_name ("system-run");
02348     #endif
02349     g_signal_connect (window->button_run, "clicked", window_run, NULL);
02350
02351     // Creating the options button
02352     window->button_options = (GtkButton *)
02353     #if !GTK4
02354         gtk_button_new_from_icon_name ("preferences-system", GTK_ICON_SIZE_BUTTON);
02355     #else
02356         gtk_button_new_from_icon_name ("preferences-system");
02357     #endif
02358     g_signal_connect (window->button_options, "clicked", options_new, NULL);
02359
02360     // Creating the help button
02361     window->button_help = (GtkButton *)

```

```

02362 #if !GTK4
02363     gtk_button_new_from_icon_name ("help-browser", GTK_ICON_SIZE_BUTTON);
02364 #else
02365     gtk_button_new_from_icon_name ("help-browser");
02366 #endif
02367 g_signal_connect (window->button_help, "clicked", window_help, NULL);
02368
02369 // Creating the about button
02370 window->button_about = (GtkButton *)
02371 #if !GTK4
02372     gtk_button_new_from_icon_name ("help-about", GTK_ICON_SIZE_BUTTON);
02373 #else
02374     gtk_button_new_from_icon_name ("help-about");
02375 #endif
02376 g_signal_connect (window->button_about, "clicked", window_about, NULL);
02377
02378 // Creating the exit button
02379 window->button_exit = (GtkButton *)
02380 #if !GTK4
02381     gtk_button_new_from_icon_name ("application-exit", GTK_ICON_SIZE_BUTTON);
02382 #else
02383     gtk_button_new_from_icon_name ("application-exit");
02384 #endif
02385 g_signal_connect_swapped (window->button_exit, "clicked",
02386     G_CALLBACK (g_application_quit),
02387     G_APPLICATION (application));
02388
02389 // Creating the buttons bar
02390 window->box_buttons = (GtkBox *) gtk_box_new (GTK_ORIENTATION_HORIZONTAL, 0);
02391 gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_open));
02392 gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_save));
02393 gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_run));
02394 gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_options));
02395 gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_help));
02396 gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_about));
02397 gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_exit));
02398
02399 // Creating the simulator program label and entry
02400 window->label_simulator = (GtkLabel *) gtk_label_new (_("Simulator program"));
02401 window->button_simulator = (GtkButton *)
02402     gtk_button_new_with_mnemonic (_("Simulator program"));
02403 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_simulator),
02404     _("Simulator program executable file"));
02405 gtk_widget_set_expand (GTK_WIDGET (window->button_simulator), TRUE);
02406 g_signal_connect (window->button_simulator, "clicked",
02407     G_CALLBACK (dialog_simulator), NULL);
02408
02409 // Creating the evaluator program label and entry
02410 window->check_evaluator = (GtkCheckButton *)
02411     gtk_check_button_new_with_mnemonic (_("Evaluator program"));
02412 g_signal_connect (window->check_evaluator, "toggled", window_update, NULL);
02413 window->button_evaluator = (GtkButton *)
02414     gtk_button_new_with_mnemonic (_("Evaluator program"));
02415 gtk_widget_set_tooltip_text
02416     (GTK_WIDGET (window->button_evaluator),
02417     _("Optional evaluator program executable file"));
02418 g_signal_connect (window->button_evaluator, "clicked",
02419     G_CALLBACK (dialog_evaluator), NULL);
02420
02421 // Creating the results files labels and entries
02422 window->label_result = (GtkLabel *) gtk_label_new (_("Result file"));
02423 window->entry_result = (GtkEntry *) gtk_entry_new ();
02424 gtk_widget_set_tooltip_text
02425     (GTK_WIDGET (window->entry_result), _("Best results file"));
02426 window->label_variables = (GtkLabel *) gtk_label_new (_("Variables file"));
02427 window->entry_variables = (GtkEntry *) gtk_entry_new ();
02428 gtk_widget_set_tooltip_text
02429     (GTK_WIDGET (window->entry_variables), _("All simulated results file"));
02430
02431 // Creating the files grid and attaching widgets
02432 window->grid_files = (GtkGrid *) gtk_grid_new ();
02433 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->label_simulator),
02434     0, 0, 1, 1);
02435 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->button_simulator),
02436     1, 0, 1, 1);
02437 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->check_evaluator),
02438     0, 1, 1, 1);
02439 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->button_evaluator),
02440     1, 1, 1, 1);
02441 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->label_result),
02442     0, 2, 1, 1);
02443 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->entry_result),
02444     1, 2, 1, 1);
02445 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->label_variables),
02446     0, 3, 1, 1);
02447 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->entry_variables),
02448     1, 3, 1, 1);

```

```

02449
02450 // Creating the algorithm properties
02451 window->label_simulations = (GtkLabel *) gtk_label_new
02452     _("Simulations number");
02453 window->spin_simulations
02454     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02455 gtk_widget_set_tooltip_text
02456     (GTK_WIDGET (window->spin_simulations),
02457      _("Number of simulations to perform for each iteration"));
02458 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_simulations), TRUE);
02459 window->label_iterations = (GtkLabel *)
02460     gtk_label_new _("Iterations number");
02461 window->spin_iterations
02462     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02463 gtk_widget_set_tooltip_text
02464     (GTK_WIDGET (window->spin_iterations), _("Number of iterations"));
02465 g_signal_connect
02466     (window->spin_iterations, "value-changed", window_update, NULL);
02467 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_iterations), TRUE);
02468 window->label_tolerance = (GtkLabel *) gtk_label_new _("Tolerance");
02469 window->spin_tolerance =
02470     (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02471 gtk_widget_set_tooltip_text
02472     (GTK_WIDGET (window->spin_tolerance),
02473      _("Tolerance to set the variable interval on the next iteration"));
02474 window->label_bests = (GtkLabel *) gtk_label_new _("Bests number");
02475 window->spin_bests
02476     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02477 gtk_widget_set_tooltip_text
02478     (GTK_WIDGET (window->spin_bests),
02479      _("Number of best simulations used to set the variable interval "
02480       "on the next iteration"));
02481 window->label_population
02482     = (GtkLabel *) gtk_label_new _("Population number");
02483 window->spin_population
02484     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02485 gtk_widget_set_tooltip_text
02486     (GTK_WIDGET (window->spin_population),
02487      _("Number of population for the genetic algorithm"));
02488 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_population), TRUE);
02489 window->label_generations
02490     = (GtkLabel *) gtk_label_new _("Generations number");
02491 window->spin_generations
02492     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02493 gtk_widget_set_tooltip_text
02494     (GTK_WIDGET (window->spin_generations),
02495      _("Number of generations for the genetic algorithm"));
02496 window->label_mutation = (GtkLabel *) gtk_label_new _("Mutation ratio");
02497 window->spin_mutation
02498     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02499 gtk_widget_set_tooltip_text
02500     (GTK_WIDGET (window->spin_mutation),
02501      _("Ratio of mutation for the genetic algorithm"));
02502 window->label_reproduction
02503     = (GtkLabel *) gtk_label_new _("Reproduction ratio");
02504 window->spin_reproduction
02505     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02506 gtk_widget_set_tooltip_text
02507     (GTK_WIDGET (window->spin_reproduction),
02508      _("Ratio of reproduction for the genetic algorithm"));
02509 window->label_adaptation = (GtkLabel *) gtk_label_new _("Adaptation ratio");
02510 window->spin_adaptation
02511     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02512 gtk_widget_set_tooltip_text
02513     (GTK_WIDGET (window->spin_adaptation),
02514      _("Ratio of adaptation for the genetic algorithm"));
02515 window->label_threshold = (GtkLabel *) gtk_label_new _("Threshold");
02516 window->spin_threshold = (GtkSpinButton *)
02517     gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE,
02518                                     precision[DEFAULT_PRECISION]);
02519 gtk_widget_set_tooltip_text
02520     (GTK_WIDGET (window->spin_threshold),
02521      _("Threshold in the objective function to finish the simulations"));
02522 window->scrolled_threshold = (GtkScrolledWindow *)
02523 #if !GTK4
02524     gtk_scrolled_window_new (NULL, NULL);
02525 #else
02526     gtk_scrolled_window_new ();
02527 #endif
02528 gtk_scrolled_window_set_child (window->scrolled_threshold,
02529                                GTK_WIDGET (window->spin_threshold));
02530 // gtk_widget_set_hexpand (GTK_WIDGET (window->scrolled_threshold), TRUE);
02531 // gtk_widget_set_halign (GTK_WIDGET (window->scrolled_threshold),
02532 //                          GTK_ALIGN_FILL);
02533
02534 // Creating the hill climbing method properties
02535 window->check_climbing = (GtkCheckButton *)

```



```

02536     gtk_check_button_new_with_mnemonic (_("Hill climbing method"));
02537     g_signal_connect (window->check_climbing, "toggled", window_update, NULL);
02538     window->grid_climbing = (GtkGrid *) gtk_grid_new ();
02539     #if !GTK4
02540     window->button_climbing[0] = (GtkRadioButton *)
02541     gtk_radio_button_new_with_mnemonic (NULL, label_climbing[0]);
02542     #else
02543     window->button_climbing[0] = (GtkCheckButton *)
02544     gtk_check_button_new_with_mnemonic (label_climbing[0]);
02545     #endif
02546     gtk_grid_attach (window->grid_climbing,
02547     GTK_WIDGET (window->button_climbing[0]), 0, 0, 1, 1);
02548     g_signal_connect (window->button_climbing[0], "toggled", window_update, NULL);
02549     for (i = 0; ++i < NCLIMBINGS;)
02550     {
02551     #if !GTK4
02552     window->button_climbing[i] = (GtkRadioButton *)
02553     gtk_radio_button_new_with_mnemonic
02554     (gtk_radio_button_get_group (window->button_climbing[0]),
02555     label_climbing[i]);
02556     #else
02557     window->button_climbing[i] = (GtkCheckButton *)
02558     gtk_check_button_new_with_mnemonic (label_climbing[i]);
02559     gtk_check_button_set_group (window->button_climbing[i],
02560     window->button_climbing[0]);
02561     #endif
02562     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_climbing[i]),
02563     tip_climbing[i]);
02564     gtk_grid_attach (window->grid_climbing,
02565     GTK_WIDGET (window->button_climbing[i]), 0, i, 1, 1);
02566     g_signal_connect (window->button_climbing[i], "toggled", window_update,
02567     NULL);
02568     }
02569     window->label_steps = (GtkLabel *) gtk_label_new (_("Steps number"));
02570     window->spin_steps = (GtkSpinButton *)
02571     gtk_spin_button_new_with_range (1., 1.e12, 1.);
02572     gtk_widget_set_hexpand (GTK_WIDGET (window->spin_steps), TRUE);
02573     window->label_estimates
02574     = (GtkLabel *) gtk_label_new (_("Climbing estimates number"));
02575     window->spin_estimates = (GtkSpinButton *)
02576     gtk_spin_button_new_with_range (1., 1.e3, 1.);
02577     window->label_relaxation
02578     = (GtkLabel *) gtk_label_new (_("Relaxation parameter"));
02579     window->spin_relaxation = (GtkSpinButton *)
02580     gtk_spin_button_new_with_range (0., 2., 0.001);
02581     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->label_steps),
02582     0, NCLIMBINGS, 1, 1);
02583     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->spin_steps),
02584     1, NCLIMBINGS, 1, 1);
02585     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->label_estimates),
02586     0, NCLIMBINGS + 1, 1, 1);
02587     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->spin_estimates),
02588     1, NCLIMBINGS + 1, 1, 1);
02589     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->label_relaxation),
02590     0, NCLIMBINGS + 2, 1, 1);
02591     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->spin_relaxation),
02592     1, NCLIMBINGS + 2, 1, 1);
02593
02594     // Creating the array of algorithms
02595     window->grid_algorithm = (GtkGrid *) gtk_grid_new ();
02596     #if !GTK4
02597     window->button_algorithm[0] = (GtkRadioButton *)
02598     gtk_radio_button_new_with_mnemonic (NULL, label_algorithm[0]);
02599     #else
02600     window->button_algorithm[0] = (GtkCheckButton *)
02601     gtk_check_button_new_with_mnemonic (label_algorithm[0]);
02602     #endif
02603     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[0]),
02604     tip_algorithm[0]);
02605     gtk_grid_attach (window->grid_algorithm,
02606     GTK_WIDGET (window->button_algorithm[0]), 0, 0, 1, 1);
02607     g_signal_connect (window->button_algorithm[0], "toggled",
02608     window_set_algorithm, NULL);
02609     for (i = 0; ++i < NALGORITHMS;)
02610     {
02611     #if !GTK4
02612     window->button_algorithm[i] = (GtkRadioButton *)
02613     gtk_radio_button_new_with_mnemonic
02614     (gtk_radio_button_get_group (window->button_algorithm[0]),
02615     label_algorithm[i]);
02616     #else
02617     window->button_algorithm[i] = (GtkCheckButton *)
02618     gtk_check_button_new_with_mnemonic (label_algorithm[i]);
02619     gtk_check_button_set_group (window->button_algorithm[i],
02620     window->button_algorithm[0]);
02621     #endif
02622     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[i]),

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02623         tip_algorithm[i]);
02624     gtk_grid_attach (window->grid_algorithm,
02625         GTK_WIDGET (window->button_algorithm[i]), 0, i, 1, 1);
02626     g_signal_connect (window->button_algorithm[i], "toggled",
02627         window_set_algorithm, NULL);
02628 }
02629 gtk_grid_attach (window->grid_algorithm,
02630     GTK_WIDGET (window->label_simulations),
02631     0, NALGORITHMS, 1, 1);
02632 gtk_grid_attach (window->grid_algorithm,
02633     GTK_WIDGET (window->spin_simulations), 1, NALGORITHMS, 1, 1);
02634 gtk_grid_attach (window->grid_algorithm,
02635     GTK_WIDGET (window->label_iterations),
02636     0, NALGORITHMS + 1, 1, 1);
02637 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_iterations),
02638     1, NALGORITHMS + 1, 1, 1);
02639 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_tolerance),
02640     0, NALGORITHMS + 2, 1, 1);
02641 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_tolerance),
02642     1, NALGORITHMS + 2, 1, 1);
02643 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_bests),
02644     0, NALGORITHMS + 3, 1, 1);
02645 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_bests),
02646     1, NALGORITHMS + 3, 1, 1);
02647 gtk_grid_attach (window->grid_algorithm,
02648     GTK_WIDGET (window->label_population),
02649     0, NALGORITHMS + 4, 1, 1);
02650 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_population),
02651     1, NALGORITHMS + 4, 1, 1);
02652 gtk_grid_attach (window->grid_algorithm,
02653     GTK_WIDGET (window->label_generations),
02654     0, NALGORITHMS + 5, 1, 1);
02655 gtk_grid_attach (window->grid_algorithm,
02656     GTK_WIDGET (window->spin_generations),
02657     1, NALGORITHMS + 5, 1, 1);
02658 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_mutation),
02659     0, NALGORITHMS + 6, 1, 1);
02660 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_mutation),
02661     1, NALGORITHMS + 6, 1, 1);
02662 gtk_grid_attach (window->grid_algorithm,
02663     GTK_WIDGET (window->label_reproduction),
02664     0, NALGORITHMS + 7, 1, 1);
02665 gtk_grid_attach (window->grid_algorithm,
02666     GTK_WIDGET (window->spin_reproduction),
02667     1, NALGORITHMS + 7, 1, 1);
02668 gtk_grid_attach (window->grid_algorithm,
02669     GTK_WIDGET (window->label_adaptation),
02670     0, NALGORITHMS + 8, 1, 1);
02671 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_adaptation),
02672     1, NALGORITHMS + 8, 1, 1);
02673 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->check_climbing),
02674     0, NALGORITHMS + 9, 2, 1);
02675 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->grid_climbing),
02676     0, NALGORITHMS + 10, 2, 1);
02677 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_threshold),
02678     0, NALGORITHMS + 11, 1, 1);
02679 gtk_grid_attach (window->grid_algorithm,
02680     GTK_WIDGET (window->scrolled_threshold),
02681     1, NALGORITHMS + 11, 1, 1);
02682 window->frame_algorithm = (GtkFrame *) gtk_frame_new (_("Algorithm"));
02683 gtk_frame_set_child (window->frame_algorithm,
02684     GTK_WIDGET (window->grid_algorithm));
02685
02686 // Creating the variable widgets
02687 window->combo_variable = (GtkComboBoxText *) gtk_combo_box_text_new ();
02688 gtk_widget_set_tooltip_text
02689     (GTK_WIDGET (window->combo_variable), _("Variables selector"));
02690 window->id_variable = g_signal_connect
02691     (window->combo_variable, "changed", window_set_variable, NULL);
02692 #if !GTK4
02693     window->button_add_variable = (GtkButton *)
02694         gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);
02695 #else
02696     window->button_add_variable = (GtkButton *)
02697         gtk_button_new_from_icon_name ("list-add");
02698 #endif
02699 g_signal_connect (window->button_add_variable, "clicked", window_add_variable,
02700     NULL);
02701 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_variable),
02702     _("Add variable"));
02703 #if !GTK4
02704     window->button_remove_variable = (GtkButton *)
02705         gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02706 #else
02707     window->button_remove_variable = (GtkButton *)
02708         gtk_button_new_from_icon_name ("list-remove");
02709 #endif

```

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02710 g_signal_connect (window->button_remove_variable, "clicked",
02711                  window_remove_variable, NULL);
02712 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_remove_variable),
02713                              _("Remove variable"));
02714 window->label_variable = (GtkLabel *) gtk_label_new (_("Name"));
02715 window->entry_variable = (GtkEntry *) gtk_entry_new ();
02716 gtk_widget_set_tooltip_text
02717   (GTK_WIDGET (window->entry_variable), _("Variable name"));
02718 gtk_widget_set_hexpand (GTK_WIDGET (window->entry_variable), TRUE);
02719 window->id_variable_label = g_signal_connect
02720   (window->entry_variable, "changed", window_label_variable, NULL);
02721 window->label_min = (GtkLabel *) gtk_label_new (_("Minimum"));
02722 window->spin_min = (GtkSpinButton *) gtk_spin_button_new_with_range
02723   (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02724 gtk_widget_set_tooltip_text
02725   (GTK_WIDGET (window->spin_min), _("Minimum initial value of the variable"));
02726 window->scrolled_min = (GtkScrolledWindow *)
02727 #if !GTK4
02728   gtk_scrolled_window_new (NULL, NULL);
02729 #else
02730   gtk_scrolled_window_new ();
02731 #endif
02732 gtk_scrolled_window_set_child (window->scrolled_min,
02733                                GTK_WIDGET (window->spin_min));
02734 g_signal_connect (window->spin_min, "value-changed",
02735                  window_rangemin_variable, NULL);
02736 window->label_max = (GtkLabel *) gtk_label_new (_("Maximum"));
02737 window->spin_max = (GtkSpinButton *) gtk_spin_button_new_with_range
02738   (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02739 gtk_widget_set_tooltip_text
02740   (GTK_WIDGET (window->spin_max), _("Maximum initial value of the variable"));
02741 window->scrolled_max = (GtkScrolledWindow *)
02742 #if !GTK4
02743   gtk_scrolled_window_new (NULL, NULL);
02744 #else
02745   gtk_scrolled_window_new ();
02746 #endif
02747 gtk_scrolled_window_set_child (window->scrolled_max,
02748                                GTK_WIDGET (window->spin_max));
02749 g_signal_connect (window->spin_max, "value-changed",
02750                  window_rangemax_variable, NULL);
02751 window->check_minabs = (GtkCheckButton *)
02752   gtk_check_button_new_with_mnemonic (_("_Absolute minimum"));
02753 g_signal_connect (window->check_minabs, "toggled", window_update, NULL);
02754 window->spin_minabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02755   (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02756 gtk_widget_set_tooltip_text
02757   (GTK_WIDGET (window->spin_minabs),
02758    _("Minimum allowed value of the variable"));
02759 window->scrolled_minabs = (GtkScrolledWindow *)
02760 #if !GTK4
02761   gtk_scrolled_window_new (NULL, NULL);
02762 #else
02763   gtk_scrolled_window_new ();
02764 #endif
02765 gtk_scrolled_window_set_child (window->scrolled_minabs,
02766                                GTK_WIDGET (window->spin_minabs));
02767 g_signal_connect (window->spin_minabs, "value-changed",
02768                  window_rangeminabs_variable, NULL);
02769 window->check_maxabs = (GtkCheckButton *)
02770   gtk_check_button_new_with_mnemonic (_("_Absolute maximum"));
02771 g_signal_connect (window->check_maxabs, "toggled", window_update, NULL);
02772 window->spin_maxabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02773   (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02774 gtk_widget_set_tooltip_text
02775   (GTK_WIDGET (window->spin_maxabs),
02776    _("Maximum allowed value of the variable"));
02777 window->scrolled_maxabs = (GtkScrolledWindow *)
02778 #if !GTK4
02779   gtk_scrolled_window_new (NULL, NULL);
02780 #else
02781   gtk_scrolled_window_new ();
02782 #endif
02783 gtk_scrolled_window_set_child (window->scrolled_maxabs,
02784                                GTK_WIDGET (window->spin_maxabs));
02785 g_signal_connect (window->spin_maxabs, "value-changed",
02786                  window_rangemaxabs_variable, NULL);
02787 window->label_precision = (GtkLabel *) gtk_label_new (_("Precision digits"));
02788 window->spin_precision = (GtkSpinButton *)
02789   gtk_spin_button_new_with_range (0., (gdouble) DEFAULT_PRECISION, 1.);
02790 gtk_widget_set_tooltip_text
02791   (GTK_WIDGET (window->spin_precision),
02792    _("Number of precision floating point digits\n"
02793      "0 is for integer numbers"));
02794 g_signal_connect (window->spin_precision, "value-changed",
02795                  window_precision_variable, NULL);
02796 window->label_sweeps = (GtkLabel *) gtk_label_new (_("Sweeps number"));

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02797 window->spin_sweeps =
02798     (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02799 gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_sweeps),
02800     _("Number of steps sweeping the variable"));
02801 g_signal_connect (window->spin_sweeps, "value-changed",
02802     window_update_variable, NULL);
02803 window->label_bits = (GtkLabel *) gtk_label_new (_("Bits number"));
02804 window->spin_bits
02805     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
02806 gtk_widget_set_tooltip_text
02807     (GTK_WIDGET (window->spin_bits),
02808     _("Number of bits to encode the variable"));
02809 g_signal_connect
02810     (window->spin_bits, "value-changed", window_update_variable, NULL);
02811 window->label_step = (GtkLabel *) gtk_label_new (_("Step size"));
02812 window->spin_step = (GtkSpinButton *) gtk_spin_button_new_with_range
02813     (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02814 gtk_widget_set_tooltip_text
02815     (GTK_WIDGET (window->spin_step),
02816     _("Initial step size for the hill climbing method"));
02817 window->scrolled_step = (GtkScrolledWindow *)
02818 #if !GTK4
02819     gtk_scrolled_window_new (NULL, NULL);
02820 #else
02821     gtk_scrolled_window_new ();
02822 #endif
02823 gtk_scrolled_window_set_child (window->scrolled_step,
02824     GTK_WIDGET (window->spin_step));
02825 g_signal_connect
02826     (window->spin_step, "value-changed", window_step_variable, NULL);
02827 window->grid_variable = (GtkGrid *) gtk_grid_new ();
02828 gtk_grid_attach (window->grid_variable,
02829     GTK_WIDGET (window->combo_variable), 0, 0, 2, 1);
02830 gtk_grid_attach (window->grid_variable,
02831     GTK_WIDGET (window->button_add_variable), 2, 0, 1, 1);
02832 gtk_grid_attach (window->grid_variable,
02833     GTK_WIDGET (window->button_remove_variable), 3, 0, 1, 1);
02834 gtk_grid_attach (window->grid_variable,
02835     GTK_WIDGET (window->label_variable), 0, 1, 1, 1);
02836 gtk_grid_attach (window->grid_variable,
02837     GTK_WIDGET (window->entry_variable), 1, 1, 3, 1);
02838 gtk_grid_attach (window->grid_variable,
02839     GTK_WIDGET (window->label_min), 0, 2, 1, 1);
02840 gtk_grid_attach (window->grid_variable,
02841     GTK_WIDGET (window->scrolled_min), 1, 2, 3, 1);
02842 gtk_grid_attach (window->grid_variable,
02843     GTK_WIDGET (window->label_max), 0, 3, 1, 1);
02844 gtk_grid_attach (window->grid_variable,
02845     GTK_WIDGET (window->scrolled_max), 1, 3, 3, 1);
02846 gtk_grid_attach (window->grid_variable,
02847     GTK_WIDGET (window->check_minabs), 0, 4, 1, 1);
02848 gtk_grid_attach (window->grid_variable,
02849     GTK_WIDGET (window->scrolled_minabs), 1, 4, 3, 1);
02850 gtk_grid_attach (window->grid_variable,
02851     GTK_WIDGET (window->check_maxabs), 0, 5, 1, 1);
02852 gtk_grid_attach (window->grid_variable,
02853     GTK_WIDGET (window->scrolled_maxabs), 1, 5, 3, 1);
02854 gtk_grid_attach (window->grid_variable,
02855     GTK_WIDGET (window->label_precision), 0, 6, 1, 1);
02856 gtk_grid_attach (window->grid_variable,
02857     GTK_WIDGET (window->spin_precision), 1, 6, 3, 1);
02858 gtk_grid_attach (window->grid_variable,
02859     GTK_WIDGET (window->label_sweeps), 0, 7, 1, 1);
02860 gtk_grid_attach (window->grid_variable,
02861     GTK_WIDGET (window->spin_sweeps), 1, 7, 3, 1);
02862 gtk_grid_attach (window->grid_variable,
02863     GTK_WIDGET (window->label_bits), 0, 8, 1, 1);
02864 gtk_grid_attach (window->grid_variable,
02865     GTK_WIDGET (window->spin_bits), 1, 8, 3, 1);
02866 gtk_grid_attach (window->grid_variable,
02867     GTK_WIDGET (window->label_step), 0, 9, 1, 1);
02868 gtk_grid_attach (window->grid_variable,
02869     GTK_WIDGET (window->scrolled_step), 1, 9, 3, 1);
02870 window->frame_variable = (GtkFrame *) gtk_frame_new (_("Variable"));
02871 gtk_frame_set_child (window->frame_variable,
02872     GTK_WIDGET (window->grid_variable));
02873
02874 // Creating the experiment widgets
02875 window->combo_experiment = (GtkComboBoxText *) gtk_combo_box_text_new ();
02876 gtk_widget_set_tooltip_text (GTK_WIDGET (window->combo_experiment),
02877     _("Experiment selector"));
02878 window->id_experiment = g_signal_connect
02879     (window->combo_experiment, "changed", window_set_experiment, NULL);
02880 #if !GTK4
02881 window->button_add_experiment = (GtkButton *)
02882     gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);
02883 #else

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02884     window->button_add_experiment = (GtkButton *)
02885     gtk_button_new_from_icon_name ("list-add");
02886 #endif
02887     g_signal_connect
02888     (window->button_add_experiment, "clicked", window_add_experiment, NULL);
02889     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_experiment),
02890     _("Add experiment"));
02891 #if !GTK4
02892     window->button_remove_experiment = (GtkButton *)
02893     gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02894 #else
02895     window->button_remove_experiment = (GtkButton *)
02896     gtk_button_new_from_icon_name ("list-remove");
02897 #endif
02898     g_signal_connect (window->button_remove_experiment, "clicked",
02899     window_remove_experiment, NULL);
02900     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_remove_experiment),
02901     _("Remove experiment"));
02902     window->label_experiment
02903     = (GtkLabel *) gtk_label_new (_("Experimental data file"));
02904     window->button_experiment = (GtkButton *)
02905     gtk_button_new_with_mnemonic (_("Experimental data file"));
02906     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_experiment),
02907     _("Experimental data file"));
02908     g_signal_connect (window->button_experiment, "clicked",
02909     window_name_experiment, NULL);
02910     gtk_widget_set_hexpand (GTK_WIDGET (window->button_experiment), TRUE);
02911     window->label_weight = (GtkLabel *) gtk_label_new (_("Weight"));
02912     window->spin_weight
02913     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02914     gtk_widget_set_tooltip_text
02915     (GTK_WIDGET (window->spin_weight),
02916     _("Weight factor to build the objective function"));
02917     g_signal_connect
02918     (window->spin_weight, "value-changed", window_weight_experiment, NULL);
02919     window->grid_experiment = (GtkGrid *) gtk_grid_new ();
02920     gtk_grid_attach (window->grid_experiment,
02921     GTK_WIDGET (window->combo_experiment), 0, 0, 2, 1);
02922     gtk_grid_attach (window->grid_experiment,
02923     GTK_WIDGET (window->button_add_experiment), 2, 0, 1, 1);
02924     gtk_grid_attach (window->grid_experiment,
02925     GTK_WIDGET (window->button_remove_experiment), 3, 0, 1, 1);
02926     gtk_grid_attach (window->grid_experiment,
02927     GTK_WIDGET (window->label_experiment), 0, 1, 1, 1);
02928     gtk_grid_attach (window->grid_experiment,
02929     GTK_WIDGET (window->button_experiment), 1, 1, 3, 1);
02930     gtk_grid_attach (window->grid_experiment,
02931     GTK_WIDGET (window->label_weight), 0, 2, 1, 1);
02932     gtk_grid_attach (window->grid_experiment,
02933     GTK_WIDGET (window->spin_weight), 1, 2, 3, 1);
02934     for (i = 0; i < MAX_NINPUTS; ++i)
02935     {
02936         snprintf (buffer3, 64, "%s %u", _("Input template"), i + 1);
02937         window->check_template[i] = (GtkCheckButton *)
02938         gtk_check_button_new_with_label (buffer3);
02939         window->id_template[i]
02940         = g_signal_connect (window->check_template[i], "toggled",
02941         window_inputs_experiment, NULL);
02942         gtk_grid_attach (window->grid_experiment,
02943         GTK_WIDGET (window->check_template[i]), 0, 3 + i, 1, 1);
02944         window->button_template[i] = (GtkButton *)
02945         gtk_button_new_with_mnemonic (_("Input template"));
02946         gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_template[i]),
02947         _("Experimental input template file"));
02948         window->id_input[i] =
02949         g_signal_connect_swapped (window->button_template[i], "clicked",
02950         (GCallback) window_template_experiment,
02951         (void *) (size_t) i);
02952         gtk_grid_attach (window->grid_experiment,
02953         GTK_WIDGET (window->button_template[i]), 1, 3 + i, 3, 1);
02954     }
02955     window->frame_experiment = (GtkFrame *) gtk_frame_new (_("Experiment"));
02956     gtk_frame_set_child (window->frame_experiment,
02957     GTK_WIDGET (window->grid_experiment));
02958 // Creating the error norm widgets
02959     window->frame_norm = (GtkFrame *) gtk_frame_new (_("Error norm"));
02960     window->grid_norm = (GtkGrid *) gtk_grid_new ();
02961     gtk_frame_set_child (window->frame_norm, GTK_WIDGET (window->grid_norm));
02962 #if !GTK4
02963     window->button_norm[0] = (GtkRadioButton *)
02964     gtk_radio_button_new_with_mnemonic (NULL, label_norm[0]);
02965 #else
02966     window->button_norm[0] = (GtkCheckButton *)
02967     gtk_check_button_new_with_mnemonic (label_norm[0]);
02968 #endif
02969 #endif

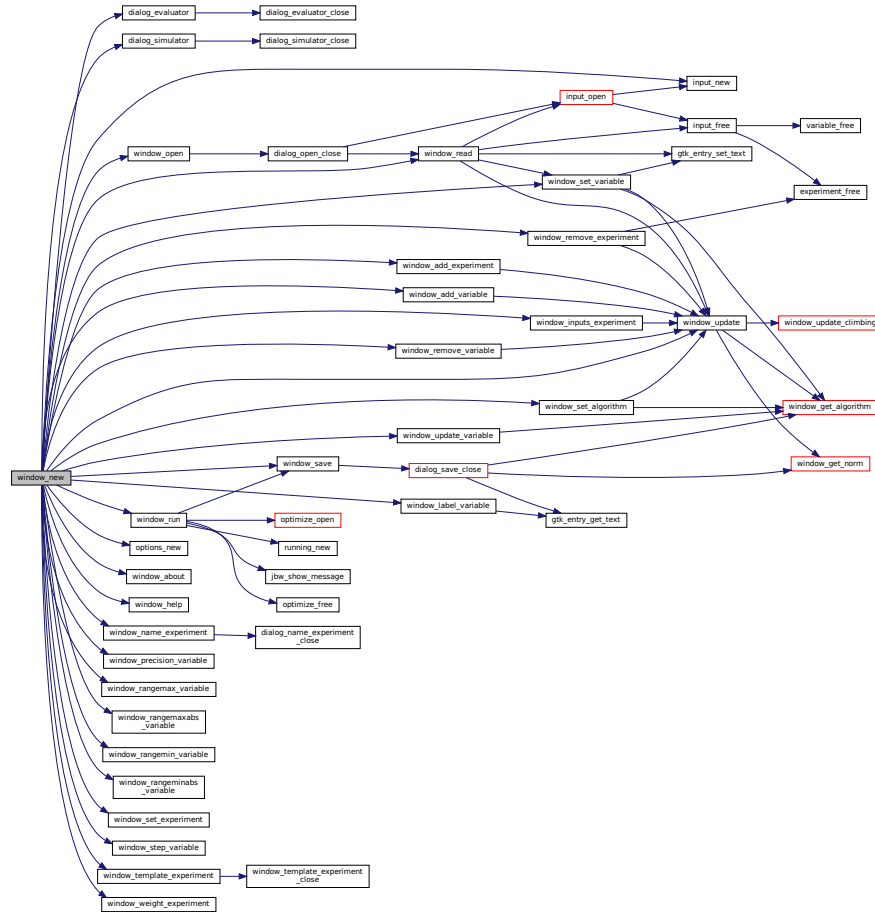
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02971 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[0]),
02972                             tip_norm[0]);
02973 gtk_grid_attach (window->grid_norm,
02974                 GTK_WIDGET (window->button_norm[0]), 0, 0, 1, 1);
02975 g_signal_connect (window->button_norm[0], "toggled", window_update, NULL);
02976 for (i = 0; ++i < NNORMS;)
02977 {
02978 #if !GTK4
02979     window->button_norm[i] = (GtkRadioButton *)
02980         gtk_radio_button_new_with_mnemonic
02981         (gtk_radio_button_get_group (window->button_norm[0]), label_norm[i]);
02982 #else
02983     window->button_norm[i] = (GtkCheckButton *)
02984         gtk_check_button_new_with_mnemonic (label_norm[i]);
02985     gtk_check_button_set_group (window->button_norm[i],
02986                               window->button_norm[0]);
02987 #endif
02988     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[i]),
02989                                 tip_norm[i]);
02990     gtk_grid_attach (window->grid_norm,
02991                     GTK_WIDGET (window->button_norm[i]), 0, i, 1, 1);
02992     g_signal_connect (window->button_norm[i], "toggled", window_update, NULL);
02993 }
02994 window->label_p = (GtkLabel *) gtk_label_new (_("P parameter"));
02995 gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->label_p), 1, 1, 1, 1);
02996 window->spin_p = (GtkSpinButton *)
02997     gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE, 0.01);
02998 gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_p),
02999                             _("P parameter for the P error norm"));
03000 window->scrolled_p = (GtkScrolledWindow *)
03001 #if !GTK4
03002     gtk_scrolled_window_new (NULL, NULL);
03003 #else
03004     gtk_scrolled_window_new ();
03005 #endif
03006 gtk_scrolled_window_set_child (window->scrolled_p,
03007                                GTK_WIDGET (window->spin_p));
03008 gtk_widget_set_hexpand (GTK_WIDGET (window->scrolled_p), TRUE);
03009 gtk_widget_set_halign (GTK_WIDGET (window->scrolled_p), GTK_ALIGN_FILL);
03010 gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->scrolled_p),
03011                 1, 2, 1, 2);
03012
03013 // Creating the grid and attaching the widgets to the grid
03014 window->grid = (GtkGrid *) gtk_grid_new ();
03015 gtk_grid_attach (window->grid, GTK_WIDGET (window->box_buttons), 0, 0, 3, 1);
03016 gtk_grid_attach (window->grid, GTK_WIDGET (window->grid_files), 0, 1, 1, 1);
03017 gtk_grid_attach (window->grid,
03018                 GTK_WIDGET (window->frame_algorithm), 0, 2, 1, 1);
03019 gtk_grid_attach (window->grid,
03020                 GTK_WIDGET (window->frame_variable), 1, 2, 1, 1);
03021 gtk_grid_attach (window->grid,
03022                 GTK_WIDGET (window->frame_experiment), 2, 2, 1, 1);
03023 gtk_grid_attach (window->grid, GTK_WIDGET (window->frame_norm), 1, 1, 2, 1);
03024 gtk_window_set_child (window->window, GTK_WIDGET (window->grid));
03025
03026 // Setting the window logo
03027 window->logo = gdk_pixbuf_new_from_xpm_data (logo);
03028 #if !GTK4
03029 gtk_window_set_icon (window->window, window->logo);
03030 #endif
03031
03032 // Showing the window
03033 #if !GTK4
03034 gtk_widget_show_all (GTK_WIDGET (window->window));
03035 #else
03036 gtk_widget_show (GTK_WIDGET (window->window));
03037 #endif
03038
03039 // In GTK+ 3.16 and 3.18 the default scrolled size is wrong
03040 #if GTK_MINOR_VERSION >= 16
03041 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_min), -1, 40);
03042 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_max), -1, 40);
03043 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_minabs), -1, 40);
03044 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_maxabs), -1, 40);
03045 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_step), -1, 40);
03046 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_p), -1, 40);
03047 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_threshold), -1, 40);
03048 #endif
03049
03050 // Reading initial example
03051 input_new ();
03052 buffer2 = g_get_current_dir ();
03053 buffer = g_build_filename (buffer2, "..", "tests", "test1", INPUT_FILE, NULL);
03054 g_free (buffer2);
03055 window_read (buffer);
03056 g_free (buffer);
03057

```

Here is the call graph for this function:



```
static void window_open ( ) [static]
```

Definition at line 2118 of file interface.c.

Generated by Doxygen


```

01817     input->variable[i].precision
01818     = (unsigned int) gtk_spin_button_get_value_as_int (window->spin_precision);
01819     gtk_spin_button_set_digits (window->spin_min, input->variable[i].precision);
01820     gtk_spin_button_set_digits (window->spin_max, input->variable[i].precision);
01821     gtk_spin_button_set_digits (window->spin_minabs,
01822                                input->variable[i].precision);
01823     gtk_spin_button_set_digits (window->spin_maxabs,
01824                                input->variable[i].precision);
01825 #if DEBUG_INTERFACE
01826     fprintf (stderr, "window_precision_variable:  end\n");
01827 #endif
01828 }

```

5.11.3.29 window_rangemax_variable()

static void window_rangemax_variable () [static]

Function to update the variable rangemax in the main window.

Definition at line 1851 of file [interface.c](#).

```

01852 {
01853     unsigned int i;
01854 #if DEBUG_INTERFACE
01855     fprintf (stderr, "window_rangemax_variable:  start\n");
01856 #endif
01857     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01858     input->variable[i].rangemax = gtk_spin_button_get_value (window->spin_max);
01859 #if DEBUG_INTERFACE
01860     fprintf (stderr, "window_rangemax_variable:  end\n");
01861 #endif
01862 }

```

5.11.3.30 window_rangemaxabs_variable()

static void window_rangemaxabs_variable () [static]

Function to update the variable rangemaxabs in the main window.

Definition at line 1886 of file [interface.c](#).

```

01887 {
01888     unsigned int i;
01889 #if DEBUG_INTERFACE
01890     fprintf (stderr, "window_rangemaxabs_variable:  start\n");
01891 #endif
01892     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01893     input->variable[i].rangemaxabs
01894     = gtk_spin_button_get_value (window->spin_maxabs);
01895 #if DEBUG_INTERFACE
01896     fprintf (stderr, "window_rangemaxabs_variable:  end\n");
01897 #endif
01898 }

```

5.11.3.31 window_rangemin_variable()

static void window_rangemin_variable () [static]

Function to update the variable rangemin in the main window.

Definition at line 1834 of file [interface.c](#).

```

01835 {
01836     unsigned int i;
01837 #if DEBUG_INTERFACE
01838     fprintf (stderr, "window_rangemin_variable:  start\n");
01839 #endif
01840     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01841     input->variable[i].rangemin = gtk_spin_button_get_value (window->spin_min);
01842 #if DEBUG_INTERFACE
01843     fprintf (stderr, "window_rangemin_variable:  end\n");
01844 #endif
01845 }

```

5.11.3.32 window_rangeminabs_variable()

```
static void window_rangeminabs_variable ( ) [static]
```

Function to update the variable rangeminabs in the main window.

Definition at line 1868 of file [interface.c](#).

```
01869 {
01870     unsigned int i;
01871     #if DEBUG_INTERFACE
01872     fprintf (stderr, "window_rangeminabs_variable:  start\n");
01873     #endif
01874     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01875     input->variable[i].rangeminabs
01876     = gtk_spin_button_get_value (window->spin_minabs);
01877     #if DEBUG_INTERFACE
01878     fprintf (stderr, "window_rangeminabs_variable:  end\n");
01879     #endif
01880 }
```

5.11.3.33 window_read()

```
static int window_read (
    char * filename ) [static]
```

Function to read the input data of a file.

Returns

1 on succes, 0 on error.

Parameters

<i>filename</i>	File name.
-----------------	------------

Definition at line 1960 of file [interface.c](#).

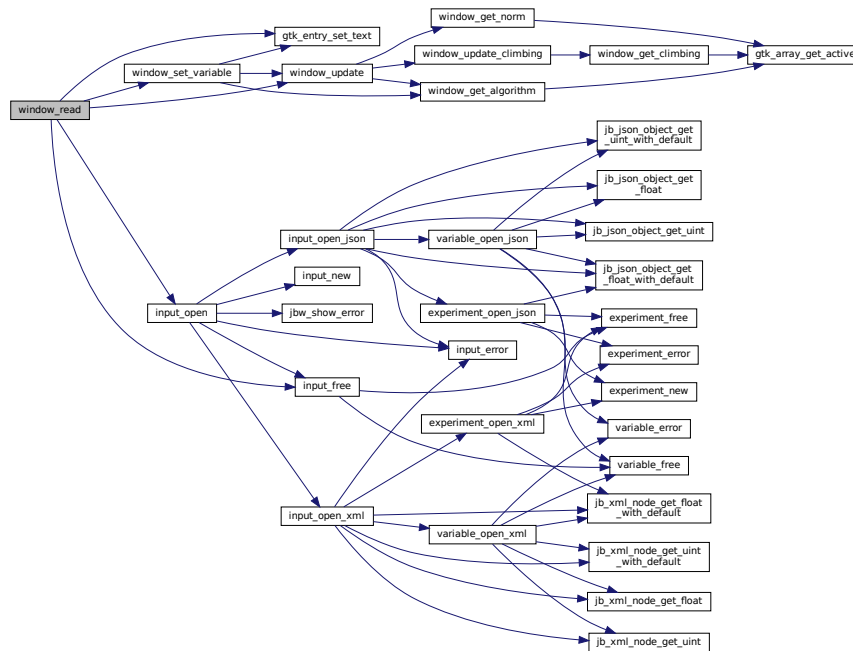
```
01961 {
01962     unsigned int i;
01963     #if DEBUG_INTERFACE
01964     fprintf (stderr, "window_read:  start\n");
01965     #endif
01966     // Reading new input file
01967     input_free ();
01968     input->result = input->variables = NULL;
01969     if (!input_open (filename))
01970     {
01971         #if DEBUG_INTERFACE
01972         fprintf (stderr, "window_read:  end\n");
01973         #endif
01974         return 0;
01975     }
01976     // Setting GTK+ widgets data
01977     gtk_entry_set_text (window->entry_result, input->result);
01978     gtk_entry_set_text (window->entry_variables, input->variables);
01979     gtk_button_set_label (window->button_simulator, input->simulator);
01980     gtk_check_button_set_active (window->check_evaluator,
01981                                 (size_t) input->evaluator);
01982     if (input->evaluator)
01983         gtk_button_set_label (window->button_evaluator, input->evaluator);
01984     gtk_check_button_set_active (window->button_algorithm[input->algorithm],
01985                                 TRUE);
01986     switch (input->algorithm)
01987     {
01988     }
```

```

01990     case ALGORITHM_MONTE_CARLO:
01991         gtk_spin_button_set_value (window->spin_simulations,
01992                                   (gdouble) input->nsimulations);
01993         // fallthrough
01994     case ALGORITHM_SWEEP:
01995     case ALGORITHM_ORTHOGONAL:
01996         gtk_spin_button_set_value (window->spin_iterations,
01997                                   (gdouble) input->niterations);
01998         gtk_spin_button_set_value (window->spin_bests, (gdouble) input->nbest);
01999         gtk_spin_button_set_value (window->spin_tolerance, input->tolerance);
02000         gtk_check_button_set_active (window->check_climbing, input->nsteps);
02001         if (input->nsteps)
02002         {
02003             gtk_check_button_set_active
02004                 (window->button_climbing[input->climbing], TRUE);
02005             gtk_spin_button_set_value (window->spin_steps,
02006                                       (gdouble) input->nsteps);
02007             gtk_spin_button_set_value (window->spin_relaxation,
02008                                       (gdouble) input->relaxation);
02009             switch (input->climbing)
02010             {
02011                 case CLIMBING_METHOD_RANDOM:
02012                     gtk_spin_button_set_value (window->spin_estimates,
02013                                                 (gdouble) input->nestimates);
02014             }
02015         }
02016         break;
02017     default:
02018         gtk_spin_button_set_value (window->spin_population,
02019                                   (gdouble) input->nsimulations);
02020         gtk_spin_button_set_value (window->spin_generations,
02021                                   (gdouble) input->niterations);
02022         gtk_spin_button_set_value (window->spin_mutation, input->mutation_ratio);
02023         gtk_spin_button_set_value (window->spin_reproduction,
02024                                   input->reproduction_ratio);
02025         gtk_spin_button_set_value (window->spin_adaptation,
02026                                   input->adaptation_ratio);
02027     }
02028     gtk_check_button_set_active (window->button_norm[input->norm], TRUE);
02029     gtk_spin_button_set_value (window->spin_p, input->p);
02030     gtk_spin_button_set_value (window->spin_threshold, input->threshold);
02031     g_signal_handler_block (window->combo_experiment, window->id_experiment);
02032     gtk_combo_box_text_remove_all (window->combo_experiment);
02033     for (i = 0; i < input->nexperiments; ++i)
02034         gtk_combo_box_text_append_text (window->combo_experiment,
02035                                         input->experiment[i].name);
02036     g_signal_handler_unblock (window->combo_experiment, window->id_experiment);
02037     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), 0);
02038     g_signal_handler_block (window->combo_variable, window->id_variable);
02039     g_signal_handler_block (window->entry_variable, window->id_variable_label);
02040     gtk_combo_box_text_remove_all (window->combo_variable);
02041     for (i = 0; i < input->nvariables; ++i)
02042         gtk_combo_box_text_append_text (window->combo_variable,
02043                                         input->variable[i].name);
02044     g_signal_handler_unblock (window->entry_variable, window->id_variable_label);
02045     g_signal_handler_unblock (window->combo_variable, window->id_variable);
02046     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), 0);
02047     window_set_variable ();
02048     window_update ();
02049
02050 #if DEBUG_INTERFACE
02051     fprintf (stderr, "window_read: end\n");
02052 #endif
02053     return 1;
02054 }

```

Here is the call graph for this function:



5.11.3.34 window_remove_experiment()

```
static void window_remove_experiment ( ) [static]
```

Function to remove an experiment in the main window.

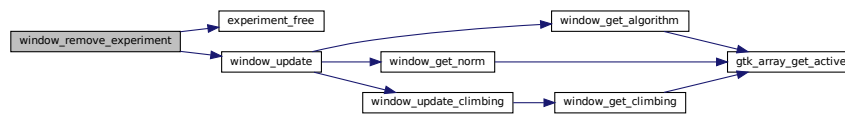
Definition at line 1384 of file [interface.c](#).

```

01385 {
01386     unsigned int i, j;
01387     #if DEBUG_INTERFACE
01388     fprintf (stderr, "window_remove_experiment: start\n");
01389     #endif
01390     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01391     g_signal_handler_block (window->combo_experiment, window->id_experiment);
01392     gtk_combo_box_text_remove (window->combo_experiment, i);
01393     g_signal_handler_unblock (window->combo_experiment, window->id_experiment);
01394     experiment_free (input->experiment + i, input->type);
01395     --input->nexperiments;
01396     for (j = i; j < input->nexperiments; ++j)
01397         memcpy (input->experiment + j, input->experiment + j + 1,
01398             sizeof (Experiment));
01399     j = input->nexperiments - 1;
01400     if (i > j)
01401         i = j;
01402     for (j = 0; j < input->experiment->ninputs; ++j)
01403         g_signal_handler_block (window->button_template[j], window->id_input[j]);
01404     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i);
01405     for (j = 0; j < input->experiment->ninputs; ++j)
01406         g_signal_handler_unblock (window->button_template[j], window->id_input[j]);
01407     window_update ();
01408     #if DEBUG_INTERFACE
01409     fprintf (stderr, "window_remove_experiment: end\n");
01410     #endif
01411 }

```

Here is the call graph for this function:



5.11.3.35 window_remove_variable()

```
static void window_remove_variable ( ) [static]
```

Function to remove a variable in the main window.

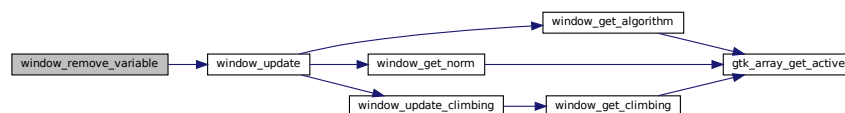
Definition at line 1722 of file [interface.c](#).

```

01723 {
01724     unsigned int i, j;
01725     #if DEBUG_INTERFACE
01726     fprintf (stderr, "window_remove_variable:  start\n");
01727     #endif
01728     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01729     g_signal_handler_block (window->combo_variable, window->id_variable);
01730     gtk_combo_box_text_remove (window->combo_variable, i);
01731     g_signal_handler_unblock (window->combo_variable, window->id_variable);
01732     xmlFree (input->variable[i].name);
01733     --input->nvariables;
01734     for (j = i; j < input->nvariables; ++j)
01735         memcpy (input->variable + j, input->variable + j + 1, sizeof (Variable));
01736     j = input->nvariables - 1;
01737     if (i > j)
01738         i = j;
01739     g_signal_handler_block (window->entry_variable, window->id_variable_label);
01740     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i);
01741     g_signal_handler_unblock (window->entry_variable, window->id_variable_label);
01742     window_update ();
01743     #if DEBUG_INTERFACE
01744     fprintf (stderr, "window_remove_variable:  end\n");
01745     #endif
01746 }

```

Here is the call graph for this function:



5.11.3.37 window_save()

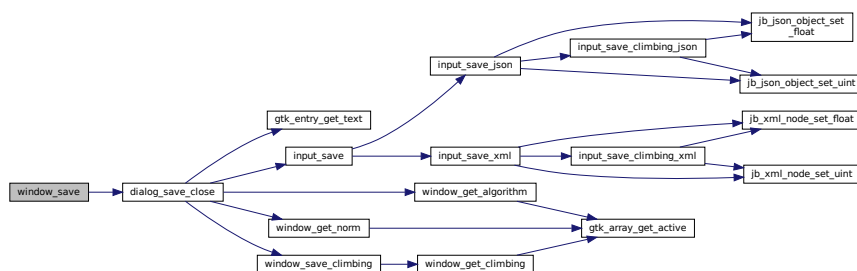
```
static void window_save ( ) [static]
```

Function to save the input file.

Definition at line 959 of file [interface.c](#).

```
00960 {
00961     GtkFileChooserDialog *dlg;
00962     GtkFileFilter *filter1, *filter2;
00963     char *buffer;
00964
00965     #if DEBUG_INTERFACE
00966         fprintf (stderr, "window_save: start\n");
00967     #endif
00968
00969     // Opening the saving dialog
00970     dlg = (GtkFileChooserDialog *)
00971         gtk_file_chooser_dialog_new (_("Save file"),
00972                                     window->window,
00973                                     GTK_FILE_CHOOSER_ACTION_SAVE,
00974                                     _("_Cancel"), GTK_RESPONSE_CANCEL,
00975                                     _("_OK"), GTK_RESPONSE_OK, NULL);
00976     #if !GTK4
00977         gtk_file_chooser_set_do_overwrite_confirmation (GTK_FILE_CHOOSER (dlg), TRUE);
00978     #endif
00979     buffer = g_build_filename (input->directory, input->name, NULL);
00980     gtk_file_chooser_set_current_name (GTK_FILE_CHOOSER (dlg), buffer);
00981     g_free (buffer);
00982
00983     // Adding XML filter
00984     filter1 = (GtkFileFilter *) gtk_file_filter_new ();
00985     gtk_file_filter_set_name (filter1, "XML");
00986     gtk_file_filter_add_pattern (filter1, "*.xml");
00987     gtk_file_filter_add_pattern (filter1, "*.XML");
00988     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter1);
00989
00990     // Adding JSON filter
00991     filter2 = (GtkFileFilter *) gtk_file_filter_new ();
00992     gtk_file_filter_set_name (filter2, "JSON");
00993     gtk_file_filter_add_pattern (filter2, "*.json");
00994     gtk_file_filter_add_pattern (filter2, "*.JSON");
00995     gtk_file_filter_add_pattern (filter2, "*.js");
00996     gtk_file_filter_add_pattern (filter2, "*.JS");
00997     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter2);
00998
00999     if (input->type == INPUT_TYPE_XML)
01000         gtk_file_chooser_set_filter (GTK_FILE_CHOOSER (dlg), filter1);
01001     else
01002         gtk_file_chooser_set_filter (GTK_FILE_CHOOSER (dlg), filter2);
01003
01004     // Connecting the close function
01005     g_signal_connect (dlg, "response", G_CALLBACK (dialog_save_close), NULL);
01006
01007     // Showing modal dialog
01008     gtk_window_present (GTK_WINDOW (dlg));
01009
01010     #if DEBUG_INTERFACE
01011         fprintf (stderr, "window_save: end\n");
01012     #endif
01013 }
```

Here is the call graph for this function:



5.11.3.38 window_save_climbing()

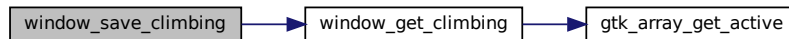
```
static void window_save_climbing ( ) [static]
```

Function to save the hill climbing method data in the input file.

Definition at line 821 of file [interface.c](#).

```
00822 {
00823 #if DEBUG_INTERFACE
00824     fprintf (stderr, "window_save_climbing:  start\n");
00825 #endif
00826     if (gtk_check_button_get_active (window->check_climbing))
00827     {
00828         input->nsteps = gtk_spin_button_get_value_as_int (window->spin_steps);
00829         input->relaxation = gtk_spin_button_get_value (window->spin_relaxation);
00830         switch (window_get_climbing ())
00831         {
00832             case CLIMBING_METHOD_COORDINATES:
00833                 input->climbing = CLIMBING_METHOD_COORDINATES;
00834                 break;
00835             default:
00836                 input->climbing = CLIMBING_METHOD_RANDOM;
00837                 input->nestimates
00838                     = gtk_spin_button_get_value_as_int (window->spin_estimates);
00839         }
00840     }
00841     else
00842         input->nsteps = 0;
00843 #if DEBUG_INTERFACE
00844     fprintf (stderr, "window_save_climbing:  end\n");
00845 #endif
00846 }
```

Here is the call graph for this function:



5.11.3.39 window_set_algorithm()

```
static void window_set_algorithm ( ) [static]
```

Function to avoid memory errors changing the algorithm.

Definition at line 1321 of file [interface.c](#).

```
01322 {
01323     int i;
01324 #if DEBUG_INTERFACE
01325     fprintf (stderr, "window_set_algorithm:  start\n");
01326 #endif
01327     i = window_get_algorithm ();
01328     switch (i)
01329     {
01330         case ALGORITHM_SWEEP:
01331         case ALGORITHM_ORTHOGONAL:
01332             i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01333             if (i < 0)
01334                 i = 0;
01335             gtk_spin_button_set_value (window->spin_sweeps,
01336                                       (gdouble) input->variable[i].nsweeps);
01337             break;
01338         case ALGORITHM_GENETIC:
01339             i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
```

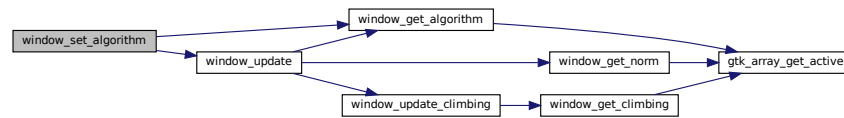


```

01340     if (i < 0)
01341         i = 0;
01342     gtk_spin_button_set_value (window->spin_bits,
01343                               (gdouble) input->variable[i].nbits);
01344 }
01345 window_update ();
01346 #if DEBUG_INTERFACE
01347 fprintf (stderr, "window_set_algorithm: end\n");
01348 #endif
01349 }

```

Here is the call graph for this function:



5.11.3.40 window_set_experiment()

```
static void window_set_experiment ( ) [static]
```

Function to set the experiment data in the main window.

Definition at line 1355 of file [interface.c](#).

```

01356 {
01357     unsigned int i, j;
01358     char *buffer1;
01359     #if DEBUG_INTERFACE
01360     fprintf (stderr, "window_set_experiment: start\n");
01361     #endif
01362     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01363     gtk_spin_button_set_value (window->spin_weight, input->experiment[i].weight);
01364     buffer1 = gtk_combo_box_text_get_active_text (window->combo_experiment);
01365     gtk_button_set_label (window->button_experiment, buffer1);
01366     g_free (buffer1);
01367     for (j = 0; j < input->experiment->ninputs; ++j)
01368     {
01369         g_signal_handler_block (window->button_template[j], window->id_input[j]);
01370         gtk_button_set_label (window->button_template[j],
01371                               input->experiment[i].stencil[j]);
01372         g_signal_handler_unblock
01373             (window->button_template[j], window->id_input[j]);
01374     }
01375     #if DEBUG_INTERFACE
01376     fprintf (stderr, "window_set_experiment: end\n");
01377     #endif
01378 }

```

5.11.3.41 window_set_variable()

```
static void window_set_variable ( ) [static]
```

Function to set the variable data in the main window.

Definition at line 1649 of file [interface.c](#).

```

01650 {
01651     unsigned int i;

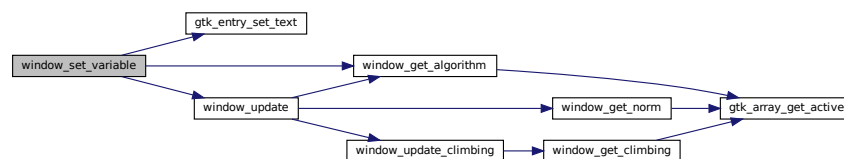
```

```

01652 #if DEBUG_INTERFACE
01653     fprintf (stderr, "window_set_variable:  start\n");
01654 #endif
01655     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01656     g_signal_handler_block (window->entry_variable, window->id_variable_label);
01657     gtk_entry_set_text (window->entry_variable, input->variable[i].name);
01658     g_signal_handler_unblock (window->entry_variable, window->id_variable_label);
01659     gtk_spin_button_set_value (window->spin_min, input->variable[i].rangemin);
01660     gtk_spin_button_set_value (window->spin_max, input->variable[i].rangemax);
01661     if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
01662     {
01663         gtk_spin_button_set_value (window->spin_minabs,
01664                                   input->variable[i].rangeminabs);
01665         gtk_check_button_set_active (window->check_minabs, 1);
01666     }
01667     else
01668     {
01669         gtk_spin_button_set_value (window->spin_minabs, -G_MAXDOUBLE);
01670         gtk_check_button_set_active (window->check_minabs, 0);
01671     }
01672     if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
01673     {
01674         gtk_spin_button_set_value (window->spin_maxabs,
01675                                   input->variable[i].rangemaxabs);
01676         gtk_check_button_set_active (window->check_maxabs, 1);
01677     }
01678     else
01679     {
01680         gtk_spin_button_set_value (window->spin_maxabs, G_MAXDOUBLE);
01681         gtk_check_button_set_active (window->check_maxabs, 0);
01682     }
01683     gtk_spin_button_set_value (window->spin_precision,
01684                               input->variable[i].precision);
01685     gtk_spin_button_set_value (window->spin_steps, (gdouble) input->nsteps);
01686     if (input->nsteps)
01687         gtk_spin_button_set_value (window->spin_step, input->variable[i].step);
01688 #if DEBUG_INTERFACE
01689     fprintf (stderr, "window_set_variable:  precision[%u]=%u\n", i,
01690             input->variable[i].precision);
01691 #endif
01692     switch (window_get_algorithm ())
01693     {
01694     case ALGORITHM_SWEEP:
01695     case ALGORITHM_ORTHOGONAL:
01696         gtk_spin_button_set_value (window->spin_sweeps,
01697                                   (gdouble) input->variable[i].nsweeps);
01698 #if DEBUG_INTERFACE
01699         fprintf (stderr, "window_set_variable:  nsweeps[%u]=%u\n", i,
01700                 input->variable[i].nsweeps);
01701 #endif
01702         break;
01703     case ALGORITHM_GENETIC:
01704         gtk_spin_button_set_value (window->spin_bits,
01705                                   (gdouble) input->variable[i].nbits);
01706 #if DEBUG_INTERFACE
01707         fprintf (stderr, "window_set_variable:  nbits[%u]=%u\n", i,
01708                 input->variable[i].nbits);
01709 #endif
01710         break;
01711     }
01712     window_update ();
01713 #if DEBUG_INTERFACE
01714     fprintf (stderr, "window_set_variable:  end\n");
01715 #endif
01716 }

```

Here is the call graph for this function:



5.11.3.42 window_step_variable()

```
static void window_step_variable ( ) [static]
```

Function to update the variable step in the main window.

Definition at line 1904 of file [interface.c](#).

```
01905 {
01906     unsigned int i;
01907     #if DEBUG_INTERFACE
01908     fprintf (stderr, "window_step_variable:  start\n");
01909     #endif
01910     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01911     input->variable[i].step = gtk_spin_button_get_value (window->spin_step);
01912     #if DEBUG_INTERFACE
01913     fprintf (stderr, "window_step_variable:  end\n");
01914     #endif
01915 }
```

5.11.3.43 window_template_experiment()

```
static void window_template_experiment (
    void * data ) [static]
```

Function to update the experiment i-th input template in the main window.

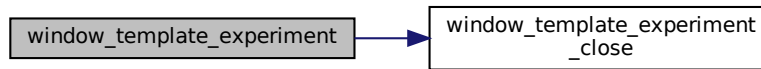
Parameters

<i>data</i>	Callback data (i-th input template).
-------------	--------------------------------------

Definition at line 1612 of file [interface.c](#).

```
01614 {
01615     GtkFileChooserDialog *dlg;
01616     GMainLoop *loop;
01617     const char *buffer;
01618     unsigned int i;
01619     #if DEBUG_INTERFACE
01620     fprintf (stderr, "window_template_experiment:  start\n");
01621     #endif
01622     i = (size_t) data;
01623     buffer = gtk_button_get_label (window->button_template[i]);
01624     dlg = (GtkFileChooserDialog *)
01625         gtk_file_chooser_dialog_new (_("Open template file"),
01626                                     window->window,
01627                                     GTK_FILE_CHOOSER_ACTION_OPEN,
01628                                     _("_Cancel"),
01629                                     GTK_RESPONSE_CANCEL,
01630                                     _("_Open"), GTK_RESPONSE_ACCEPT, NULL);
01631     gtk_file_chooser_set_current_name (GTK_FILE_CHOOSER (dlg), buffer);
01632     g_signal_connect (dlg, "response",
01633                      G_CALLBACK (window_template_experiment_close), data);
01634     gtk_window_present (GTK_WINDOW (dlg));
01635     loop = g_main_loop_new (NULL, 0);
01636     g_signal_connect_swapped (dlg, "destroy", G_CALLBACK (g_main_loop_quit),
01637                               loop);
01638     g_main_loop_run (loop);
01639     g_main_loop_unref (loop);
01640     #if DEBUG_INTERFACE
01641     fprintf (stderr, "window_template_experiment:  end\n");
01642     #endif
01643 }
```

Here is the call graph for this function:



5.11.3.44 window_template_experiment_close()

```
static void window_template_experiment_close (
    GtkFileChooserDialog * dlg,
    int response_id,
    void * data ) [static]
```

Function to close the experiment template dialog.

Parameters

<i>dlg</i>	GtkFileChooserDialog struct.
<i>response_id</i>	Response identifier.
<i>data</i>	Function data.

Definition at line 1572 of file [interface.c](#).

```
01577 {
01578     GFile *file1, *file2;
01579     char *buffer1, *buffer2;
01580     unsigned int i, j;
01581     #if DEBUG_INTERFACE
01582     fprintf (stderr, "window_template_experiment_close: start\n");
01583     #endif
01584     if (response_id == GTK_RESPONSE_OK)
01585     {
01586         i = (size_t) data;
01587         j = gtk_combo_box_get_active(GTK_COMBO_BOX (window->combo_experiment));
01588         buffer1 = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
01589         file1 = g_file_new_for_path (buffer1);
01590         file2 = g_file_new_for_path (input->directory);
01591         buffer2 = g_file_get_relative_path (file2, file1);
01592         if (input->type == INPUT_TYPE_XML)
01593             input->experiment[j].stencil[i]
01594             = (char *) xmlStrdup ((xmlChar *) buffer2);
01595         else
01596             input->experiment[j].stencil[i] = g_strdup (buffer2);
01597         g_free (buffer2);
01598         g_object_unref (file2);
01599         g_object_unref (file1);
01600         g_free (buffer1);
01601     }
01602     gtk_window_destroy (GTK_WINDOW (dlg));
01603     #if DEBUG_INTERFACE
01604     fprintf (stderr, "window_template_experiment_close: end\n");
01605     #endif
01606 }
```

5.11.3.45 window_update()

```
static void window_update ( ) [static]
```

Function to update the main window view.

Definition at line 1169 of file [interface.c](#).

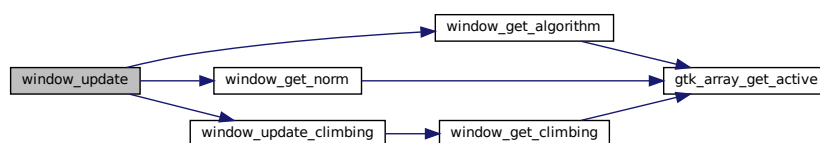
```
01170 {
01171     unsigned int i;
01172     #if DEBUG_INTERFACE
01173     fprintf (stderr, "window_update: start\n");
01174     #endif
01175     gtk_widget_set_sensitive
01176         (GTK_WIDGET (window->button_evaluator),
01177          gtk_check_button_get_active (window->check_evaluator));
01178     gtk_widget_hide (GTK_WIDGET (window->label_simulations));
01179     gtk_widget_hide (GTK_WIDGET (window->spin_simulations));
01180     gtk_widget_hide (GTK_WIDGET (window->label_iterations));
01181     gtk_widget_hide (GTK_WIDGET (window->spin_iterations));
01182     gtk_widget_hide (GTK_WIDGET (window->label_tolerance));
01183     gtk_widget_hide (GTK_WIDGET (window->spin_tolerance));
01184     gtk_widget_hide (GTK_WIDGET (window->label_bests));
01185     gtk_widget_hide (GTK_WIDGET (window->spin_bests));
01186     gtk_widget_hide (GTK_WIDGET (window->label_population));
01187     gtk_widget_hide (GTK_WIDGET (window->spin_population));
01188     gtk_widget_hide (GTK_WIDGET (window->label_generations));
01189     gtk_widget_hide (GTK_WIDGET (window->spin_generations));
01190     gtk_widget_hide (GTK_WIDGET (window->label_mutation));
01191     gtk_widget_hide (GTK_WIDGET (window->spin_mutation));
01192     gtk_widget_hide (GTK_WIDGET (window->label_reproduction));
01193     gtk_widget_hide (GTK_WIDGET (window->spin_reproduction));
01194     gtk_widget_hide (GTK_WIDGET (window->label_adaptation));
01195     gtk_widget_hide (GTK_WIDGET (window->spin_adaptation));
01196     gtk_widget_hide (GTK_WIDGET (window->label_sweeps));
01197     gtk_widget_hide (GTK_WIDGET (window->spin_sweeps));
01198     gtk_widget_hide (GTK_WIDGET (window->label_bits));
01199     gtk_widget_hide (GTK_WIDGET (window->spin_bits));
01200     gtk_widget_hide (GTK_WIDGET (window->check_climbing));
01201     gtk_widget_hide (GTK_WIDGET (window->grid_climbing));
01202     gtk_widget_hide (GTK_WIDGET (window->label_step));
01203     gtk_widget_hide (GTK_WIDGET (window->spin_step));
01204     gtk_widget_hide (GTK_WIDGET (window->label_p));
01205     gtk_widget_hide (GTK_WIDGET (window->spin_p));
01206     i = gtk_spin_button_get_value_as_int (window->spin_iterations);
01207     switch (window_get_algorithm ())
01208     {
01209     case ALGORITHM_MONTE_CARLO:
01210         gtk_widget_show (GTK_WIDGET (window->label_simulations));
01211         gtk_widget_show (GTK_WIDGET (window->spin_simulations));
01212         gtk_widget_show (GTK_WIDGET (window->label_iterations));
01213         gtk_widget_show (GTK_WIDGET (window->spin_iterations));
01214         if (i > 1)
01215         {
01216             gtk_widget_show (GTK_WIDGET (window->label_tolerance));
01217             gtk_widget_show (GTK_WIDGET (window->spin_tolerance));
01218             gtk_widget_show (GTK_WIDGET (window->label_bests));
01219             gtk_widget_show (GTK_WIDGET (window->spin_bests));
01220         }
01221         window_update_climbing ();
01222         break;
01223     case ALGORITHM_SWEEP:
01224     case ALGORITHM_ORTHOGONAL:
01225         gtk_widget_show (GTK_WIDGET (window->label_iterations));
01226         gtk_widget_show (GTK_WIDGET (window->spin_iterations));
01227         if (i > 1)
01228         {
01229             gtk_widget_show (GTK_WIDGET (window->label_tolerance));
01230             gtk_widget_show (GTK_WIDGET (window->spin_tolerance));
01231             gtk_widget_show (GTK_WIDGET (window->label_bests));
01232             gtk_widget_show (GTK_WIDGET (window->spin_bests));
01233         }
01234         gtk_widget_show (GTK_WIDGET (window->label_sweeps));
01235         gtk_widget_show (GTK_WIDGET (window->spin_sweeps));
01236         gtk_widget_show (GTK_WIDGET (window->check_climbing));
01237         window_update_climbing ();
01238         break;
01239     default:
01240         gtk_widget_show (GTK_WIDGET (window->label_population));
01241         gtk_widget_show (GTK_WIDGET (window->spin_population));
01242         gtk_widget_show (GTK_WIDGET (window->label_generations));
01243         gtk_widget_show (GTK_WIDGET (window->spin_generations));
01244         gtk_widget_show (GTK_WIDGET (window->label_mutation));
01245         gtk_widget_show (GTK_WIDGET (window->spin_mutation));
```

```

01246     gtk_widget_show (GTK_WIDGET (window->label_reproduction));
01247     gtk_widget_show (GTK_WIDGET (window->spin_reproduction));
01248     gtk_widget_show (GTK_WIDGET (window->label_adaptation));
01249     gtk_widget_show (GTK_WIDGET (window->spin_adaptation));
01250     gtk_widget_show (GTK_WIDGET (window->label_bits));
01251     gtk_widget_show (GTK_WIDGET (window->spin_bits));
01252 }
01253 gtk_widget_set_sensitive
01254 (GTK_WIDGET (window->button_remove_experiment), input->nexperiments > 1);
01255 gtk_widget_set_sensitive
01256 (GTK_WIDGET (window->button_remove_variable), input->nvariables > 1);
01257 for (i = 0; i < input->experiment->ninputs; ++i)
01258 {
01259     gtk_widget_show (GTK_WIDGET (window->check_template[i]));
01260     gtk_widget_show (GTK_WIDGET (window->button_template[i]));
01261     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i]), 0);
01262     gtk_widget_set_sensitive (GTK_WIDGET (window->button_template[i]), 1);
01263     g_signal_handler_block
01264     (window->check_template[i], window->id_template[i]);
01265     g_signal_handler_block (window->button_template[i], window->id_input[i]);
01266     gtk_check_button_set_active (window->check_template[i], 1);
01267     g_signal_handler_unblock (window->button_template[i],
01268                             window->id_input[i]);
01269     g_signal_handler_unblock (window->check_template[i],
01270                             window->id_template[i]);
01271 }
01272 if (i > 0)
01273 {
01274     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i - 1]), 1);
01275     gtk_widget_set_sensitive (GTK_WIDGET (window->button_template[i - 1]),
01276                             gtk_check_button_get_active
01277                             (window->check_template[i - 1]));
01278 }
01279 if (i < MAX_NINPUTS)
01280 {
01281     gtk_widget_show (GTK_WIDGET (window->check_template[i]));
01282     gtk_widget_show (GTK_WIDGET (window->button_template[i]));
01283     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i]), 1);
01284     gtk_widget_set_sensitive
01285     (GTK_WIDGET (window->button_template[i]),
01286      gtk_check_button_get_active (window->check_template[i]));
01287     g_signal_handler_block
01288     (window->check_template[i], window->id_template[i]);
01289     g_signal_handler_block (window->button_template[i], window->id_input[i]);
01290     gtk_check_button_set_active (window->check_template[i], 0);
01291     g_signal_handler_unblock (window->button_template[i],
01292                             window->id_input[i]);
01293     g_signal_handler_unblock (window->check_template[i],
01294                             window->id_template[i]);
01295 }
01296 while (++i < MAX_NINPUTS)
01297 {
01298     gtk_widget_hide (GTK_WIDGET (window->check_template[i]));
01299     gtk_widget_hide (GTK_WIDGET (window->button_template[i]));
01300 }
01301 gtk_widget_set_sensitive
01302 (GTK_WIDGET (window->spin_minabs),
01303  gtk_check_button_get_active (window->check_minabs));
01304 gtk_widget_set_sensitive
01305 (GTK_WIDGET (window->spin_maxabs),
01306  gtk_check_button_get_active (window->check_maxabs));
01307 if (window_get_norm () == ERROR_NORM_P)
01308 {
01309     gtk_widget_show (GTK_WIDGET (window->label_p));
01310     gtk_widget_show (GTK_WIDGET (window->spin_p));
01311 }
01312 #if DEBUG_INTERFACE
01313 fprintf (stderr, "window_update: end\n");
01314 #endif
01315 }

```

Here is the call graph for this function:



5.11.3.46 window_update_climbing()

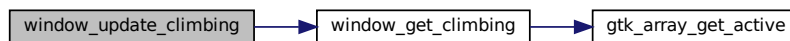
```
static void window_update_climbing ( ) [static]
```

Function to update hill climbing method widgets view in the main window.

Definition at line 1138 of file [interface.c](#).

```
01139 {
01140 #if DEBUG_INTERFACE
01141     fprintf (stderr, "window_update_climbing:  start\n");
01142 #endif
01143     gtk_widget_show (GTK_WIDGET (window->check_climbing));
01144     if (gtk_check_button_get_active (window->check_climbing))
01145     {
01146         gtk_widget_show (GTK_WIDGET (window->grid_climbing));
01147         gtk_widget_show (GTK_WIDGET (window->label_step));
01148         gtk_widget_show (GTK_WIDGET (window->spin_step));
01149     }
01150     switch (window_get_climbing ())
01151     {
01152     case CLIMBING_METHOD_COORDINATES:
01153         gtk_widget_hide (GTK_WIDGET (window->label_estimates));
01154         gtk_widget_hide (GTK_WIDGET (window->spin_estimates));
01155         break;
01156     default:
01157         gtk_widget_show (GTK_WIDGET (window->label_estimates));
01158         gtk_widget_show (GTK_WIDGET (window->spin_estimates));
01159     }
01160 #if DEBUG_INTERFACE
01161     fprintf (stderr, "window_update_climbing:  end\n");
01162 #endif
01163 }
```

Here is the call graph for this function:



5.11.3.47 window_update_variable()

```
static void window_update_variable ( ) [static]
```

Function to update the variable data in the main window.

Definition at line 1921 of file [interface.c](#).

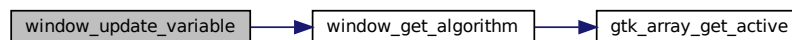
```
01922 {
01923     int i;
01924 #if DEBUG_INTERFACE
01925     fprintf (stderr, "window_update_variable:  start\n");
01926 #endif
01927     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01928     if (i < 0)
01929         i = 0;
01930     switch (window_get_algorithm ())
01931     {
01932     case ALGORITHM_SWEEP:
01933     case ALGORITHM_ORTHOGONAL:
01934         input->variable[i].nsweeps
01935         = gtk_spin_button_get_value_as_int (window->spin_sweeps);
01936     }
```

```

01936 #if DEBUG_INTERFACE
01937     fprintf (stderr, "window_update_variable:  nsweeps[%d]=%u\n", i,
01938             input->variable[i].nsweeps);
01939 #endif
01940     break;
01941     case ALGORITHM_GENETIC:
01942         input->variable[i].nbits
01943         = gtk_spin_button_get_value_as_int (window->spin_bits);
01944 #if DEBUG_INTERFACE
01945     fprintf (stderr, "window_update_variable:  nbits[%d]=%u\n", i,
01946             input->variable[i].nbits);
01947 #endif
01948 }
01949 #if DEBUG_INTERFACE
01950 fprintf (stderr, "window_update_variable:  end\n");
01951 #endif
01952 }

```

Here is the call graph for this function:



5.11.3.48 window_weight_experiment()

```
static void window_weight_experiment ( ) [static]
```

Function to update the experiment weight in the main window.

Definition at line 1533 of file [interface.c](#).

```

01534 {
01535     unsigned int i;
01536 #if DEBUG_INTERFACE
01537     fprintf (stderr, "window_weight_experiment:  start\n");
01538 #endif
01539     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01540     input->experiment[i].weight = gtk_spin_button_get_value (window->spin_weight);
01541 #if DEBUG_INTERFACE
01542     fprintf (stderr, "window_weight_experiment:  end\n");
01543 #endif
01544 }

```

5.11.4 Variable Documentation

5.11.4.1 logo

```
const char* logo[] [static]
```

Logo pixmap.

Definition at line 84 of file [interface.c](#).

5.11.4.2 options

`Options` options[1] [static]

`Options` struct to define the options dialog.

Definition at line 163 of file [interface.c](#).

5.11.4.3 running

`Running` running[1] [static]

`Running` struct to define the running dialog.

Definition at line 165 of file [interface.c](#).

5.11.4.4 window

`Window` window[1]

`Window` struct to define the main interface window.

Definition at line 81 of file [interface.c](#).

5.12 interface.c

[Go to the documentation of this file.](#)

```
00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burguete and Borja Latorre.
00007
00008 Copyright 2012-2023, AUTHORS.
00009
00010 Redistribution and use in source and binary forms, with or without modification,
00011 are permitted provided that the following conditions are met:
00012
00013 1. Redistributions of source code must retain the above copyright notice,
00014 this list of conditions and the following disclaimer.
00015
00016 2. Redistributions in binary form must reproduce the above copyright notice,
00017 this list of conditions and the following disclaimer in the
00018 documentation and/or other materials provided with the distribution.
00019
00020 THIS SOFTWARE IS PROVIDED BY AUTHORS "AS IS" AND ANY EXPRESS OR IMPLIED
00021 WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
00022 MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
00023 SHALL AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
00024 SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
00025 PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
00026 BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00038 #define _GNU_SOURCE
```

```

00039 #include "config.h"
00040 #include <stdio.h>
00041 #include <stdlib.h>
00042 #include <string.h>
00043 #include <math.h>
00044 #include <gsl/gsl_rng.h>
00045 #include <libxml/parser.h>
00046 #include <libintl.h>
00047 #include <glib.h>
00048 #include <glib/gstdio.h>
00049 #include <json-glib/json-glib.h>
00050 #ifdef G_OS_WIN32
00051 #include <windows.h>
00052 #endif
00053 #if HAVE_MPI
00054 #include <mpi.h>
00055 #endif
00056 #include <gio/gio.h>
00057 #include <gtk/gtk.h>
00058 #include "jb/src/jb_xml.h"
00059 #include "jb/src/jb_json.h"
00060 #include "jb/src/jb_win.h"
00061 #include "genetic/genetic.h"
00062 #include "tools.h"
00063 #include "experiment.h"
00064 #include "variable.h"
00065 #include "input.h"
00066 #include "optimize.h"
00067 #include "interface.h"
00068
00069 #define DEBUG_INTERFACE 1
00070
00075 #ifdef G_OS_WIN32
00076 #define INPUT_FILE "test-ga-win.xml"
00077 #else
00078 #define INPUT_FILE "test-ga.xml"
00079 #endif
00080
00081 Window window[1];
00083
00084 static const char *logo[] = {
00085     "32 32 3 1",
00086     "    c None",
00087     ".    c #0000FF",
00088     "+    c #FF0000",
00089     "                                ",
00090     "                                ",
00091     "                                ",
00092     "    .    .    .    .    .    ",
00093     "    .    .    .    .    .    ",
00094     "    .    .    .    .    .    ",
00095     "    .    .    .    .    .    ",
00096     "    .    .    .    +++    .    ",
00097     "    .    .    .    +++++    .    ",
00098     "    .    .    .    +++++    .    ",
00099     "    .    .    .    +++++    .    ",
00100     "    +++    .    .    +++    +++    ",
00101     "    +++++    .    .    +++++    ",
00102     "    +++++    .    .    +++++    ",
00103     "    +++++    .    .    +++++    ",
00104     "    +++    .    .    +++    ",
00105     "    .    .    .    .    .    ",
00106     "    .    .    .    .    .    ",
00107     "    .    .    .    .    .    ",
00108     "    .    .    .    .    .    ",
00109     "    .    .    .    .    .    ",
00110     "    .    .    .    .    .    ",
00111     "    .    .    .    .    .    ",
00112     "    .    .    .    .    .    ",
00113     "    .    .    .    .    .    ",
00114     "    .    .    .    .    .    ",
00115     "    .    .    .    .    .    ",
00116     "    .    .    .    .    .    ",
00117     "    .    .    .    .    .    ",
00118     "    .    .    .    .    .    ",
00119     "    .    .    .    .    .    ",
00120     "    .    .    .    .    .    ",
00121 };
00122
00123 /*
00124 const char * logo[] = {
00125     "32 32 3 1",
00126     "    c #FFFFFFFF",
00127     ".    c #00000000FFFF",
00128     "X    c #FFFF00000000",
00129     "                                ",
00130     "                                "

```

```

00131 "
00132 " . . . . "
00133 " . . . . "
00134 " . . . . "
00135 " . . . . "
00136 " . . . . XXX "
00137 " . . . . XXXXX "
00138 " . . . . XXXXX "
00139 " . . . . XXXXX "
00140 " XXX . . . . XXX "
00141 " XXXXX . . . . XXXXX "
00142 " XXXXX . . . . XXXXX "
00143 " XXXXX . . . . XXXXX "
00144 " XXX . . . . XXX "
00145 " . . . . "
00146 " . . . . XXX "
00147 " . . . . XXXXX "
00148 " . . . . XXXXX "
00149 " . . . . XXXXX "
00150 " . . . . XXX "
00151 " . . . . "
00152 " . . . . "
00153 " . . . . "
00154 " . . . . "
00155 " . . . . "
00156 " . . . . "
00157 " . . . . "
00158 " . . . . "
00159 " . . . . "
00160 " . . . . "
00161 */
00162
00163 static Options options[1];
00165 static Running running[1];
00167
00171 static void
00172 input_save_climbing_xml (xmlNode * node)
00173 {
00174     #if DEBUG_INTERFACE
00175     fprintf (stderr, "input_save_climbing_xml: start\n");
00176     #endif
00177     if (input->nsteps)
00178     {
00179         jb_xml_node_set_uint (node, (const xmlChar *) LABEL_NSTEPS,
00180                               input->nsteps);
00181         if (input->relaxation != DEFAULT_RELAXATION)
00182             jb_xml_node_set_float (node, (const xmlChar *) LABEL_RELAXATION,
00183                                    input->relaxation);
00184         switch (input->climbing)
00185         {
00186             case CLIMBING_METHOD_COORDINATES:
00187                 xmlSetProp (node, (const xmlChar *) LABEL_CLIMBING,
00188                             (const xmlChar *) LABEL_COORDINATES);
00189                 break;
00190             default:
00191                 xmlSetProp (node, (const xmlChar *) LABEL_CLIMBING,
00192                             (const xmlChar *) LABEL_RANDOM);
00193                 jb_xml_node_set_uint (node, (const xmlChar *) LABEL_NESTIMATES,
00194                                       input->nestimates);
00195         }
00196     }
00197     #if DEBUG_INTERFACE
00198     fprintf (stderr, "input_save_climbing_xml: end\n");
00199     #endif
00200 }
00201
00205 static void
00206 input_save_climbing_json (JsonNode * node)
00207 {
00208     JsonObject *object;
00209     #if DEBUG_INTERFACE
00210     fprintf (stderr, "input_save_climbing_json: start\n");
00211     #endif
00212     object = json_node_get_object (node);
00213     if (input->nsteps)
00214     {
00215         jb_json_object_set_uint (object, LABEL_NSTEPS, input->nsteps);
00216         if (input->relaxation != DEFAULT_RELAXATION)
00217             jb_json_object_set_float (object, LABEL_RELAXATION, input->relaxation);
00218         switch (input->climbing)
00219         {
00220             case CLIMBING_METHOD_COORDINATES:
00221                 json_object_set_string_member (object, LABEL_CLIMBING,
00222                                                 LABEL_COORDINATES);
00223                 break;
00224             default:
00225                 json_object_set_string_member (object, LABEL_CLIMBING, LABEL_RANDOM);

```

```

00226         jbson_object_set_uint (object, LABEL_NESTIMATES, input->nestimates);
00227     }
00228 }
00229 #if DEBUG_INTERFACE
00230 fprintf (stderr, "input_save_climbing_json: end\n");
00231 #endif
00232 }
00233
00237 static inline void
00238 input_save_xml (xmlDoc * doc)
00239 {
00240     unsigned int i, j;
00241     char *buffer;
00242     xmlNode *node, *child;
00243     GFile *file, *file2;
00244
00245     #if DEBUG_INTERFACE
00246     fprintf (stderr, "input_save_xml: start\n");
00247     #endif
00248
00249     // Setting root XML node
00250     node = xmlNewDocNode (doc, 0, (const xmlChar *) LABEL_OPTIMIZE, 0);
00251     xmlDocSetRootElement (doc, node);
00252
00253     // Adding properties to the root XML node
00254     if (xmlStrcmp
00255         ((const xmlChar *) input->result, (const xmlChar *) result_name))
00256         xmlSetProp (node, (const xmlChar *) LABEL_RESULT_FILE,
00257                     (xmlChar *) input->result);
00258     if (xmlStrcmp
00259         ((const xmlChar *) input->variables, (const xmlChar *) variables_name))
00260         xmlSetProp (node, (const xmlChar *) LABEL_VARIABLES_FILE,
00261                     (xmlChar *) input->variables);
00262     file = g_file_new_for_path (input->directory);
00263     file2 = g_file_new_for_path (input->simulator);
00264     buffer = g_file_get_relative_path (file, file2);
00265     g_object_unref (file2);
00266     xmlSetProp (node, (const xmlChar *) LABEL_SIMULATOR, (xmlChar *) buffer);
00267     g_free (buffer);
00268     if (input->evaluator)
00269     {
00270         file2 = g_file_new_for_path (input->evaluator);
00271         buffer = g_file_get_relative_path (file, file2);
00272         g_object_unref (file2);
00273         if (xmlStrlen ((xmlChar *) buffer))
00274             xmlSetProp (node, (const xmlChar *) LABEL_EVALUATOR,
00275                         (xmlChar *) buffer);
00276         g_free (buffer);
00277     }
00278     if (input->seed != DEFAULT_RANDOM_SEED)
00279         jbson_node_set_uint (node, (const xmlChar *) LABEL_SEED, input->seed);
00280
00281     // Setting the algorithm
00282     buffer = (char *) g_slice_alloc (64);
00283     switch (input->algorithm)
00284     {
00285     case ALGORITHM_MONTE_CARLO:
00286         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00287                     (const xmlChar *) LABEL_MONTE_CARLO);
00288         snprintf (buffer, 64, "%u", input->nsimulations);
00289         xmlSetProp (node, (const xmlChar *) LABEL_NSIMULATIONS,
00290                     (xmlChar *) buffer);
00291         snprintf (buffer, 64, "%u", input->niterations);
00292         xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00293                     (xmlChar *) buffer);
00294         snprintf (buffer, 64, "%.3lg", input->tolerance);
00295         xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00296         snprintf (buffer, 64, "%u", input->nbest);
00297         xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00298         input_save_climbing_xml (node);
00299         break;
00300     case ALGORITHM_SWEEP:
00301         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00302                     (const xmlChar *) LABEL_SWEEP);
00303         snprintf (buffer, 64, "%u", input->niterations);
00304         xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00305                     (xmlChar *) buffer);
00306         snprintf (buffer, 64, "%.3lg", input->tolerance);
00307         xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00308         snprintf (buffer, 64, "%u", input->nbest);
00309         xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00310         input_save_climbing_xml (node);
00311         break;
00312     case ALGORITHM_ORTHOGONAL:
00313         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00314                     (const xmlChar *) LABEL_ORTHOGONAL);
00315         snprintf (buffer, 64, "%u", input->niterations);

```

```

00316     xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00317                 (xmlChar *) buffer);
00318     snprintf (buffer, 64, "%.3lg", input->tolerance);
00319     xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00320     snprintf (buffer, 64, "%u", input->nbest);
00321     xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00322     input_save_climbing_xml (node);
00323     break;
00324 default:
00325     xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00326                 (const xmlChar *) LABEL_GENETIC);
00327     snprintf (buffer, 64, "%u", input->nsimulations);
00328     xmlSetProp (node, (const xmlChar *) LABEL_NPOPULATION,
00329                 (xmlChar *) buffer);
00330     snprintf (buffer, 64, "%u", input->niterations);
00331     xmlSetProp (node, (const xmlChar *) LABEL_NGENERATIONS,
00332                 (xmlChar *) buffer);
00333     snprintf (buffer, 64, "%.3lg", input->mutation_ratio);
00334     xmlSetProp (node, (const xmlChar *) LABEL_MUTATION, (xmlChar *) buffer);
00335     snprintf (buffer, 64, "%.3lg", input->reproduction_ratio);
00336     xmlSetProp (node, (const xmlChar *) LABEL_REPRODUCTION,
00337                 (xmlChar *) buffer);
00338     snprintf (buffer, 64, "%.3lg", input->adaptation_ratio);
00339     xmlSetProp (node, (const xmlChar *) LABEL_ADAPTATION, (xmlChar *) buffer);
00340     break;
00341 }
00342 g_slice_free1 (64, buffer);
00343 if (input->threshold != 0.)
00344     jb_xml_node_set_float (node, (const xmlChar *) LABEL_THRESHOLD,
00345                           input->threshold);
00346
00347 // Setting the experimental data
00348 for (i = 0; i < input->nexperiments; ++i)
00349 {
00350     child = xmlNewChild (node, 0, (const xmlChar *) LABEL_EXPERIMENT, 0);
00351     xmlSetProp (child, (const xmlChar *) LABEL_NAME,
00352                 (xmlChar *) input->experiment[i].name);
00353     if (input->experiment[i].weight != 1.)
00354         jb_xml_node_set_float (child, (const xmlChar *) LABEL_WEIGHT,
00355                               input->experiment[i].weight);
00356     for (j = 0; j < input->experiment->ninputs; ++j)
00357         xmlSetProp (child, (const xmlChar *) stencil[j],
00358                     (xmlChar *) input->experiment[i].stencil[j]);
00359 }
00360
00361 // Setting the variables data
00362 for (i = 0; i < input->nvariables; ++i)
00363 {
00364     child = xmlNewChild (node, 0, (const xmlChar *) LABEL_VARIABLE, 0);
00365     xmlSetProp (child, (const xmlChar *) LABEL_NAME,
00366                 (xmlChar *) input->variable[i].name);
00367     jb_xml_node_set_float (child, (const xmlChar *) LABEL_MINIMUM,
00368                           input->variable[i].rangemin);
00369     if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
00370         jb_xml_node_set_float (child, (const xmlChar *) LABEL_ABSOLUTE_MINIMUM,
00371                               input->variable[i].rangeminabs);
00372     jb_xml_node_set_float (child, (const xmlChar *) LABEL_MAXIMUM,
00373                           input->variable[i].rangemax);
00374     if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
00375         jb_xml_node_set_float (child, (const xmlChar *) LABEL_ABSOLUTE_MAXIMUM,
00376                               input->variable[i].rangemaxabs);
00377     if (input->variable[i].precision != DEFAULT_PRECISION)
00378         jb_xml_node_set_uint (child, (const xmlChar *) LABEL_PRECISION,
00379                              input->variable[i].precision);
00380     if (input->algorithm == ALGORITHM_SWEEP
00381         || input->algorithm == ALGORITHM_ORTHOGONAL)
00382         jb_xml_node_set_uint (child, (const xmlChar *) LABEL_NSWEEPS,
00383                              input->variable[i].nsweeps);
00384     else if (input->algorithm == ALGORITHM_GENETIC)
00385         jb_xml_node_set_uint (child, (const xmlChar *) LABEL_NBITS,
00386                              input->variable[i].nbits);
00387     if (input->nsteps)
00388         jb_xml_node_set_float (child, (const xmlChar *) LABEL_STEP,
00389                               input->variable[i].step);
00390 }
00391
00392 // Saving the error norm
00393 switch (input->norm)
00394 {
00395     case ERROR_NORM_MAXIMUM:
00396         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00397                     (const xmlChar *) LABEL_MAXIMUM);
00398         break;
00399     case ERROR_NORM_P:
00400         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00401                     (const xmlChar *) LABEL_P);
00402         jb_xml_node_set_float (node, (const xmlChar *) LABEL_P, input->p);

```

```

00403         break;
00404     case ERROR_NORM_TAXICAB:
00405         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00406             (const xmlChar *) LABEL_TAXICAB);
00407     }
00408
00409 #if DEBUG_INTERFACE
00410     fprintf (stderr, "input_save: end\n");
00411 #endif
00412 }
00413
00417 static inline void
00418 input_save_json (JsonGenerator * generator)
00419 {
00420     unsigned int i, j;
00421     char *buffer;
00422     JsonNode *node, *child;
00423     JsonObject *object;
00424     JsonArray *array;
00425     GFile *file, *file2;
00426
00427 #if DEBUG_INTERFACE
00428     fprintf (stderr, "input_save_json: start\n");
00429 #endif
00430
00431     // Setting root JSON node
00432     object = json_object_new ();
00433     node = json_node_new (JSON_NODE_OBJECT);
00434     json_node_set_object (node, object);
00435     json_generator_set_root (generator, node);
00436
00437     // Adding properties to the root JSON node
00438     if (strcmp (input->result, result_name))
00439         json_object_set_string_member (object, LABEL_RESULT_FILE, input->result);
00440     if (strcmp (input->variables, variables_name))
00441         json_object_set_string_member (object, LABEL_VARIABLES_FILE,
00442             input->variables);
00443     file = g_file_new_for_path (input->directory);
00444     file2 = g_file_new_for_path (input->simulator);
00445     buffer = g_file_get_relative_path (file, file2);
00446     g_object_unref (file2);
00447     json_object_set_string_member (object, LABEL_SIMULATOR, buffer);
00448     g_free (buffer);
00449     if (input->evaluator)
00450     {
00451         file2 = g_file_new_for_path (input->evaluator);
00452         buffer = g_file_get_relative_path (file, file2);
00453         g_object_unref (file2);
00454         if (strlen (buffer))
00455             json_object_set_string_member (object, LABEL_EVALUATOR, buffer);
00456         g_free (buffer);
00457     }
00458     if (input->seed != DEFAULT_RANDOM_SEED)
00459         json_object_set_uint (object, LABEL_SEED, input->seed);
00460
00461     // Setting the algorithm
00462     buffer = (char *) g_slice_alloc (64);
00463     switch (input->algorithm)
00464     {
00465     case ALGORITHM_MONTE_CARLO:
00466         json_object_set_string_member (object, LABEL_ALGORITHM,
00467             LABEL_MONTE_CARLO);
00468         snprintf (buffer, 64, "%u", input->nsimulations);
00469         json_object_set_string_member (object, LABEL_NSIMULATIONS, buffer);
00470         snprintf (buffer, 64, "%u", input->niterations);
00471         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);
00472         snprintf (buffer, 64, "%.3lg", input->tolerance);
00473         json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00474         snprintf (buffer, 64, "%u", input->nbest);
00475         json_object_set_string_member (object, LABEL_NBEST, buffer);
00476         input_save_climbing_json (node);
00477         break;
00478     case ALGORITHM_SWEEP:
00479         json_object_set_string_member (object, LABEL_ALGORITHM, LABEL_SWEEP);
00480         snprintf (buffer, 64, "%u", input->niterations);
00481         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);
00482         snprintf (buffer, 64, "%.3lg", input->tolerance);
00483         json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00484         snprintf (buffer, 64, "%u", input->nbest);
00485         json_object_set_string_member (object, LABEL_NBEST, buffer);
00486         input_save_climbing_json (node);
00487         break;
00488     case ALGORITHM_ORTHOGONAL:
00489         json_object_set_string_member (object, LABEL_ALGORITHM, LABEL_ORTHOGONAL);
00490         snprintf (buffer, 64, "%u", input->niterations);
00491         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);
00492         snprintf (buffer, 64, "%.3lg", input->tolerance);

```

```

00493     json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00494     snprintf (buffer, 64, "%u", input->nbest);
00495     json_object_set_string_member (object, LABEL_NBEST, buffer);
00496     input_save_climbing_json (node);
00497     break;
00498 default:
00499     json_object_set_string_member (object, LABEL_ALGORITHM, LABEL_GENETIC);
00500     snprintf (buffer, 64, "%u", input->nsimulations);
00501     json_object_set_string_member (object, LABEL_NPOPULATION, buffer);
00502     snprintf (buffer, 64, "%u", input->niterations);
00503     json_object_set_string_member (object, LABEL_NGENERATIONS, buffer);
00504     snprintf (buffer, 64, "%.3lg", input->mutation_ratio);
00505     json_object_set_string_member (object, LABEL_MUTATION, buffer);
00506     snprintf (buffer, 64, "%.3lg", input->reproduction_ratio);
00507     json_object_set_string_member (object, LABEL_REPRODUCTION, buffer);
00508     snprintf (buffer, 64, "%.3lg", input->adaptation_ratio);
00509     json_object_set_string_member (object, LABEL_ADAPTATION, buffer);
00510     break;
00511 }
00512 g_slice_free1 (64, buffer);
00513 if (input->threshold != 0.)
00514     jb_json_object_set_float (object, LABEL_THRESHOLD, input->threshold);
00515
00516 // Setting the experimental data
00517 array = json_array_new ();
00518 for (i = 0; i < input->nexperiments; ++i)
00519 {
00520     child = json_node_new (JSON_NODE_OBJECT);
00521     object = json_node_get_object (child);
00522     json_object_set_string_member (object, LABEL_NAME,
00523                                   input->experiment[i].name);
00524     if (input->experiment[i].weight != 1.)
00525         jb_json_object_set_float (object, LABEL_WEIGHT,
00526                                   input->experiment[i].weight);
00527     for (j = 0; j < input->experiment->ninputs; ++j)
00528         json_object_set_string_member (object, stencil[j],
00529                                       input->experiment[i].stencil[j]);
00530     json_array_add_element (array, child);
00531 }
00532 json_object_set_array_member (object, LABEL_EXPERIMENTS, array);
00533
00534 // Setting the variables data
00535 array = json_array_new ();
00536 for (i = 0; i < input->nvariables; ++i)
00537 {
00538     child = json_node_new (JSON_NODE_OBJECT);
00539     object = json_node_get_object (child);
00540     json_object_set_string_member (object, LABEL_NAME,
00541                                   input->variable[i].name);
00542     jb_json_object_set_float (object, LABEL_MINIMUM,
00543                               input->variable[i].rangemin);
00544     if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
00545         jb_json_object_set_float (object, LABEL_ABSOLUTE_MINIMUM,
00546                                   input->variable[i].rangeminabs);
00547     jb_json_object_set_float (object, LABEL_MAXIMUM,
00548                               input->variable[i].rangemax);
00549     if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
00550         jb_json_object_set_float (object, LABEL_ABSOLUTE_MAXIMUM,
00551                                   input->variable[i].rangemaxabs);
00552     if (input->variable[i].precision != DEFAULT_PRECISION)
00553         jb_json_object_set_uint (object, LABEL_PRECISION,
00554                                  input->variable[i].precision);
00555     if (input->algorithm == ALGORITHM_SWEEP
00556         || input->algorithm == ALGORITHM_ORTHOGONAL)
00557         jb_json_object_set_uint (object, LABEL_NSWEEPS,
00558                                   input->variable[i].nsweeps);
00559     else if (input->algorithm == ALGORITHM_GENETIC)
00560         jb_json_object_set_uint (object, LABEL_NBITS, input->variable[i].nbits);
00561     if (input->nsteps)
00562         jb_json_object_set_float (object, LABEL_STEP, input->variable[i].step);
00563     json_array_add_element (array, child);
00564 }
00565 json_object_set_array_member (object, LABEL_VARIABLES, array);
00566
00567 // Saving the error norm
00568 switch (input->norm)
00569 {
00570     case ERROR_NORM_MAXIMUM:
00571         json_object_set_string_member (object, LABEL_NORM, LABEL_MAXIMUM);
00572         break;
00573     case ERROR_NORM_P:
00574         json_object_set_string_member (object, LABEL_NORM, LABEL_P);
00575         jb_json_object_set_float (object, LABEL_P, input->p);
00576         break;
00577     case ERROR_NORM_TAXICAB:
00578         json_object_set_string_member (object, LABEL_NORM, LABEL_TAXICAB);
00579 }

```

```

00580
00581 #if DEBUG_INTERFACE
00582     fprintf (stderr, "input_save_json:  end\n");
00583 #endif
00584 }
00585
00586 static inline void
00587 input_save (char *filename)
00588 {
00589     xmlDoc *doc;
00590     JsonGenerator *generator;
00591
00592     #if DEBUG_INTERFACE
00593     fprintf (stderr, "input_save:  start\n");
00594     #endif
00595
00596     // Getting the input file directory
00597     input->name = g_path_get_basename (filename);
00598     input->directory = g_path_get_dirname (filename);
00599
00600     if (input->type == INPUT_TYPE_XML)
00601     {
00602         // Opening the input file
00603         doc = xmlNewDoc ((const xmlChar *) "1.0");
00604         input_save_xml (doc);
00605
00606         // Saving the XML file
00607         xmlSaveFormatFile (filename, doc, 1);
00608
00609         // Freeing memory
00610         xmlFreeDoc (doc);
00611     }
00612     else
00613     {
00614         // Opening the input file
00615         generator = json_generator_new ();
00616         json_generator_set_pretty (generator, TRUE);
00617         input_save_json (generator);
00618
00619         // Saving the JSON file
00620         json_generator_to_file (generator, filename, NULL);
00621
00622         // Freeing memory
00623         g_object_unref (generator);
00624     }
00625
00626     #if DEBUG_INTERFACE
00627     fprintf (stderr, "input_save:  end\n");
00628     #endif
00629 }
00630
00631 static void
00632 dialog_options_close (GtkDialog * dlg,
00633                      int response_id)
00634 {
00635     #if DEBUG_INTERFACE
00636     fprintf (stderr, "dialog_options_close:  start\n");
00637     #endif
00638
00639     if (response_id == GTK_RESPONSE_OK)
00640     {
00641         input->seed
00642         = (unsigned long int) gtk_spin_button_get_value (options->spin_seed);
00643         nthreads = gtk_spin_button_get_value_as_int (options->spin_threads);
00644         nthreads_climbing
00645         = gtk_spin_button_get_value_as_int (options->spin_climbing);
00646     }
00647     gtk_window_destroy (GTK_WINDOW (dlg));
00648
00649     #if DEBUG_INTERFACE
00650     fprintf (stderr, "dialog_options_close:  end\n");
00651     #endif
00652 }
00653
00654 static void
00655 options_new ()
00656 {
00657     #if DEBUG_INTERFACE
00658     fprintf (stderr, "options_new:  start\n");
00659     #endif
00660
00661     options->label_seed = (GtkLabel *)
00662     gtk_label_new (_("Pseudo-random numbers generator seed"));
00663     options->spin_seed = (GtkSpinButton *)
00664     gtk_spin_button_new_with_range (0., (gdouble) G_MAXULONG, 1.);
00665     gtk_widget_set_tooltip_text
00666     (GTK_WIDGET (options->spin_seed),
00667      _("Seed to init the pseudo-random numbers generator"));
00668     gtk_spin_button_set_value (options->spin_seed, (gdouble) input->seed);
00669     options->label_threads = (GtkLabel *)

```



```

00676     gtk_label_new (_("Threads number for the stochastic algorithm"));
00677     options->spin_threads
00678     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
00679     gtk_widget_set_tooltip_text
00680     (GTK_WIDGET (options->spin_threads),
00681      _("Number of threads to perform the calibration/optimization for "
00682       "the stochastic algorithm"));
00683     gtk_spin_button_set_value (options->spin_threads, (gdouble) nthreads);
00684     options->label_climbing = (GtkLabel *)
00685     gtk_label_new (_("Threads number for the hill climbing method"));
00686     options->spin_climbing =
00687     (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
00688     gtk_widget_set_tooltip_text
00689     (GTK_WIDGET (options->spin_climbing),
00690      _("Number of threads to perform the calibration/optimization for the "
00691       "hill climbing method"));
00692     gtk_spin_button_set_value (options->spin_climbing,
00693                               (gdouble) nthreads_climbing);
00694     options->grid = (GtkGrid *) gtk_grid_new ();
00695     gtk_grid_attach (options->grid, GTK_WIDGET (options->label_seed), 0, 0, 1, 1);
00696     gtk_grid_attach (options->grid, GTK_WIDGET (options->spin_seed), 1, 0, 1, 1);
00697     gtk_grid_attach (options->grid, GTK_WIDGET (options->label_threads),
00698                     0, 1, 1, 1);
00699     gtk_grid_attach (options->grid, GTK_WIDGET (options->spin_threads),
00700                     1, 1, 1, 1);
00701     gtk_grid_attach (options->grid, GTK_WIDGET (options->label_climbing), 0, 2, 1,
00702                     1);
00703     gtk_grid_attach (options->grid, GTK_WIDGET (options->spin_climbing), 1, 2, 1,
00704                     1);
00705     #if !GTK4
00706     gtk_widget_show_all (GTK_WIDGET (options->grid));
00707     #else
00708     gtk_widget_show (GTK_WIDGET (options->grid));
00709     #endif
00710     options->dialog = (GtkDialog *)
00711     gtk_dialog_new_with_buttons (_("Options"),
00712                                window->window,
00713                                GTK_DIALOG_MODAL,
00714                                _("_OK"), GTK_RESPONSE_OK,
00715                                _("_Cancel"), GTK_RESPONSE_CANCEL, NULL);
00716     gtk_box_append (GTK_BOX (gtk_dialog_get_content_area (options->dialog)),
00717                    GTK_WIDGET (options->grid));
00718     g_signal_connect (options->dialog, "response",
00719                      G_CALLBACK (dialog_options_close), NULL);
00720     gtk_window_present (GTK_WINDOW (options->dialog));
00721     #if DEBUG_INTERFACE
00722     fprintf (stderr, "options_new: end\n");
00723     #endif
00724 }
00725
00726 static inline void
00727 running_new ()
00728 {
00729     #if DEBUG_INTERFACE
00730     fprintf (stderr, "running_new: start\n");
00731     #endif
00732     running->label = (GtkLabel *) gtk_label_new (_("Calculating ..."));
00733     running->spinner = (GtkSpinner *) gtk_spinner_new ();
00734     running->grid = (GtkGrid *) gtk_grid_new ();
00735     gtk_grid_attach (running->grid, GTK_WIDGET (running->label), 0, 0, 1, 1);
00736     gtk_grid_attach (running->grid, GTK_WIDGET (running->spinner), 0, 1, 1, 1);
00737     running->dialog = (GtkDialog *)
00738     gtk_dialog_new_with_buttons (_("Calculating"),
00739                                window->window, GTK_DIALOG_MODAL, NULL, NULL);
00740     gtk_window_set_child (GTK_WINDOW
00741                          (gtk_dialog_get_content_area (running->dialog)),
00742                          GTK_WIDGET (running->grid));
00743     gtk_spinner_start (running->spinner);
00744     #if !GTK4
00745     gtk_widget_show_all (GTK_WIDGET (running->dialog));
00746     #else
00747     gtk_widget_show (GTK_WIDGET (running->dialog));
00748     #endif
00749     #if DEBUG_INTERFACE
00750     fprintf (stderr, "running_new: end\n");
00751     #endif
00752 }
00753
00754 static unsigned int
00755 window_get_algorithm ()
00756 {
00757     unsigned int i;
00758     #if DEBUG_INTERFACE
00759     fprintf (stderr, "window_get_algorithm: start\n");
00760     #endif
00761     i = gtk_array_get_active (window->button_algorithm, NALGORITHMS);
00762     #if DEBUG_INTERFACE

```

```

00771     fprintf (stderr, "window_get_algorithm: %u\n", i);
00772     fprintf (stderr, "window_get_algorithm: end\n");
00773 #endif
00774     return i;
00775 }
00776
00782 static unsigned int
00783 window_get_climbing ()
00784 {
00785     unsigned int i;
00786     #if DEBUG_INTERFACE
00787     fprintf (stderr, "window_get_climbing: start\n");
00788     #endif
00789     i = gtk_array_get_active (window->button_climbing, NCLIMBINGS);
00790     #if DEBUG_INTERFACE
00791     fprintf (stderr, "window_get_climbing: %u\n", i);
00792     fprintf (stderr, "window_get_climbing: end\n");
00793     #endif
00794     return i;
00795 }
00796
00802 static unsigned int
00803 window_get_norm ()
00804 {
00805     unsigned int i;
00806     #if DEBUG_INTERFACE
00807     fprintf (stderr, "window_get_norm: start\n");
00808     #endif
00809     i = gtk_array_get_active (window->button_norm, NNORMS);
00810     #if DEBUG_INTERFACE
00811     fprintf (stderr, "window_get_norm: %u\n", i);
00812     fprintf (stderr, "window_get_norm: end\n");
00813     #endif
00814     return i;
00815 }
00816
00820 static void
00821 window_save_climbing ()
00822 {
00823     #if DEBUG_INTERFACE
00824     fprintf (stderr, "window_save_climbing: start\n");
00825     #endif
00826     if (gtk_check_button_get_active (window->check_climbing))
00827     {
00828         input->nsteps = gtk_spin_button_get_value_as_int (window->spin_steps);
00829         input->relaxation = gtk_spin_button_get_value (window->spin_relaxation);
00830         switch (window_get_climbing ())
00831         {
00832             case CLIMBING_METHOD_COORDINATES:
00833                 input->climbing = CLIMBING_METHOD_COORDINATES;
00834                 break;
00835             default:
00836                 input->climbing = CLIMBING_METHOD_RANDOM;
00837                 input->nestimates
00838                     = gtk_spin_button_get_value_as_int (window->spin_estimates);
00839         }
00840     }
00841     else
00842         input->nsteps = 0;
00843     #if DEBUG_INTERFACE
00844     fprintf (stderr, "window_save_climbing: end\n");
00845     #endif
00846 }
00847
00851 static void
00852 dialog_save_close (GtkFileChooserDialog * dlg,
00853                    int response_id)
00854 {
00855     GtkFileFilter *filter1;
00856     char *buffer;
00857     #if DEBUG_INTERFACE
00858     fprintf (stderr, "dialog_save_close: start\n");
00859     #endif
00860     // If OK response then saving
00861     if (response_id == GTK_RESPONSE_OK)
00862     {
00863         // Setting input file type
00864         filter1 = gtk_file_chooser_get_filter (GTK_FILE_CHOOSER (dlg));
00865         buffer = (char *) gtk_file_filter_get_name (filter1);
00866         if (!strcmp (buffer, "XML"))
00867             input->type = INPUT_TYPE_XML;
00868         else
00869             input->type = INPUT_TYPE_JSON;
00870
00871         // Adding properties to the root XML node
00872         input->simulator
00873             = g_strdup (gtk_button_get_label (window->button_simulator));
00874     }

```

```

00875     if (gtk_check_button_get_active (window->check_evaluator))
00876         input->evaluator
00877         = g_strdup (gtk_button_get_label (window->button_evaluator));
00878     else
00879         input->evaluator = NULL;
00880     if (input->type == INPUT_TYPE_XML)
00881     {
00882         input->result
00883         = (char *) xmlStrdup ((const xmlChar *)
00884                               gtk_entry_get_text (window->entry_result));
00885         input->variables
00886         = (char *) xmlStrdup ((const xmlChar *)
00887                               gtk_entry_get_text (window->entry_variables));
00888     }
00889     else
00890     {
00891         input->result = g_strdup (gtk_entry_get_text (window->entry_result));
00892         input->variables =
00893         g_strdup (gtk_entry_get_text (window->entry_variables));
00894     }
00895
00896     // Setting the algorithm
00897     switch (window_get_algorithm ())
00898     {
00899     case ALGORITHM_MONTE_CARLO:
00900         input->algorithm = ALGORITHM_MONTE_CARLO;
00901         input->nsimulations
00902         = gtk_spin_button_get_value_as_int (window->spin_simulations);
00903         input->niterations
00904         = gtk_spin_button_get_value_as_int (window->spin_iterations);
00905         input->tolerance = gtk_spin_button_get_value (window->spin_tolerance);
00906         input->nbest = gtk_spin_button_get_value_as_int (window->spin_bests);
00907         window_save_climbing ();
00908         break;
00909     case ALGORITHM_SWEEP:
00910         input->algorithm = ALGORITHM_SWEEP;
00911         input->niterations
00912         = gtk_spin_button_get_value_as_int (window->spin_iterations);
00913         input->tolerance = gtk_spin_button_get_value (window->spin_tolerance);
00914         input->nbest = gtk_spin_button_get_value_as_int (window->spin_bests);
00915         window_save_climbing ();
00916         break;
00917     case ALGORITHM_ORTHOGONAL:
00918         input->algorithm = ALGORITHM_ORTHOGONAL;
00919         input->niterations
00920         = gtk_spin_button_get_value_as_int (window->spin_iterations);
00921         input->tolerance = gtk_spin_button_get_value (window->spin_tolerance);
00922         input->nbest = gtk_spin_button_get_value_as_int (window->spin_bests);
00923         window_save_climbing ();
00924         break;
00925     default:
00926         input->algorithm = ALGORITHM_GENETIC;
00927         input->nsimulations
00928         = gtk_spin_button_get_value_as_int (window->spin_population);
00929         input->niterations
00930         = gtk_spin_button_get_value_as_int (window->spin_generations);
00931         input->mutation_ratio
00932         = gtk_spin_button_get_value (window->spin_mutation);
00933         input->reproduction_ratio
00934         = gtk_spin_button_get_value (window->spin_reproduction);
00935         input->adaptation_ratio
00936         = gtk_spin_button_get_value (window->spin_adaptation);
00937     }
00938     input->norm = window_get_norm ();
00939     input->p = gtk_spin_button_get_value (window->spin_p);
00940     input->threshold = gtk_spin_button_get_value (window->spin_threshold);
00941
00942     // Saving the XML file
00943     buffer = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
00944     input_save (buffer);
00945
00946     // Closing and freeing memory
00947     g_free (buffer);
00948 }
00949 gtk_window_destroy (GTK_WINDOW (dlg));
00950 #if DEBUG_INTERFACE
00951 fprintf (stderr, "dialog_save_close: end\n");
00952 #endif
00953 }
00954
00955 static void
00956 window_save ()
00957 {
00958     GtkFileChooserDialog *dlg;
00959     GtkFileFilter *filter1, *filter2;
00960     char *buffer;

```

```

00965 #if DEBUG_INTERFACE
00966     fprintf (stderr, "window_save:  start\n");
00967 #endif
00968
00969     // Opening the saving dialog
00970     dlg = (GtkFileChooserDialog *)
00971         gtk_file_chooser_dialog_new (_("Save file"),
00972                                     window->window,
00973                                     GTK_FILE_CHOOSER_ACTION_SAVE,
00974                                     _("_Cancel"), GTK_RESPONSE_CANCEL,
00975                                     _("_OK"), GTK_RESPONSE_OK, NULL);
00976 #if !GTK4
00977     gtk_file_chooser_set_do_overwrite_confirmation (GTK_FILE_CHOOSER (dlg), TRUE);
00978 #endif
00979     buffer = g_build_filename (input->directory, input->name, NULL);
00980     gtk_file_chooser_set_current_name (GTK_FILE_CHOOSER (dlg), buffer);
00981     g_free (buffer);
00982
00983     // Adding XML filter
00984     filter1 = (GtkFileFilter *) gtk_file_filter_new ();
00985     gtk_file_filter_set_name (filter1, "XML");
00986     gtk_file_filter_add_pattern (filter1, "*.xml");
00987     gtk_file_filter_add_pattern (filter1, "*.XML");
00988     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter1);
00989
00990     // Adding JSON filter
00991     filter2 = (GtkFileFilter *) gtk_file_filter_new ();
00992     gtk_file_filter_set_name (filter2, "JSON");
00993     gtk_file_filter_add_pattern (filter2, "*.json");
00994     gtk_file_filter_add_pattern (filter2, "*.JSON");
00995     gtk_file_filter_add_pattern (filter2, "*.js");
00996     gtk_file_filter_add_pattern (filter2, "*.JS");
00997     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter2);
00998
00999     if (input->type == INPUT_TYPE_XML)
01000         gtk_file_chooser_set_filter (GTK_FILE_CHOOSER (dlg), filter1);
01001     else
01002         gtk_file_chooser_set_filter (GTK_FILE_CHOOSER (dlg), filter2);
01003
01004     // Connecting the close function
01005     g_signal_connect (dlg, "response", G_CALLBACK (dialog_save_close), NULL);
01006
01007     // Showing modal dialog
01008     gtk_window_present (GTK_WINDOW (dlg));
01009
01010 #if DEBUG_INTERFACE
01011     fprintf (stderr, "window_save:  end\n");
01012 #endif
01013 }
01014
01015 static void
01016 window_run ()
01017 {
01018     GMainContext *context;
01019     char *msg, *msg2, buffer[64], buffer2[64];
01020     unsigned int i;
01021     #if DEBUG_INTERFACE
01022     fprintf (stderr, "window_run:  start\n");
01023     #endif
01024     window_save ();
01025     running_new ();
01026     context = g_main_context_default ();
01027     while (g_main_context_pending (context))
01028         g_main_context_iteration (context, 0);
01029     optimize_open ();
01030     #if DEBUG_INTERFACE
01031     fprintf (stderr, "window_run:  closing running dialog\n");
01032     #endif
01033     gtk_spinner_stop (running->spinner);
01034     gtk_window_destroy (GTK_WINDOW (running->dialog));
01035     #if DEBUG_INTERFACE
01036     fprintf (stderr, "window_run:  displaying results\n");
01037     #endif
01038     snprintf (buffer, 64, "error = %.15le\n", optimize->error_old[0]);
01039     msg2 = g_strdup (buffer);
01040     for (i = 0; i < optimize->nvariables; ++i, msg2 = msg)
01041     {
01042         snprintf (buffer, 64, "%s = %s\n",
01043                 input->variable[i].name, format[input->variable[i].precision]);
01044         snprintf (buffer2, 64, buffer, optimize->value_old[i]);
01045         msg = g_strconcat (msg2, buffer2, NULL);
01046         g_free (msg2);
01047     }
01048     snprintf (buffer, 64, "%s = %.6lg s", _("Calculation time"),
01049             optimize->calculation_time);
01050     msg = g_strconcat (msg2, buffer, NULL);
01051     g_free (msg2);

```

```

01055     jbw_show_message (_("Best result"), msg, INFO_TYPE);
01056     g_free (msg);
01057 #if DEBUG_INTERFACE
01058     fprintf (stderr, "window_run: freeing memory\n");
01059 #endif
01060     optimize_free ();
01061 #if DEBUG_INTERFACE
01062     fprintf (stderr, "window_run: end\n");
01063 #endif
01064 }
01065
01069 static void
01070 window_help ()
01071 {
01072     char *buffer, *buffer2;
01073 #if DEBUG_INTERFACE
01074     fprintf (stderr, "window_help: start\n");
01075 #endif
01076     buffer2 = g_build_filename (window->application_directory, "..", "manuals",
01077                                _("user-manual.pdf"), NULL);
01078     buffer = g_filename_to_uri (buffer2, NULL, NULL);
01079     g_free (buffer2);
01080 #if !GTK4
01081 #if GTK_MINOR_VERSION >= 22
01082     gtk_show_uri_on_window (window->window, buffer, GDK_CURRENT_TIME, NULL);
01083 #else
01084     gtk_show_uri (NULL, buffer, GDK_CURRENT_TIME, NULL);
01085 #endif
01086 #else
01087     gtk_show_uri (window->window, buffer, GDK_CURRENT_TIME);
01088 #endif
01089 #if DEBUG_INTERFACE
01090     fprintf (stderr, "window_help: uri=%s\n", buffer);
01091 #endif
01092     g_free (buffer);
01093 #if DEBUG_INTERFACE
01094     fprintf (stderr, "window_help: end\n");
01095 #endif
01096 }
01097
01101 static void
01102 window_about ()
01103 {
01104     static const gchar *authors[] = {
01105         "Javier Burguete Tolosa <jburguete@eead.csic.es>",
01106         "Borja Latorre Garcés <borja.latorre@csic.es>",
01107         NULL
01108     };
01109 #if DEBUG_INTERFACE
01110     fprintf (stderr, "window_about: start\n");
01111 #endif
01112     gtk_show_about_dialog
01113     (window->window,
01114      "program_name", "MPCOTool",
01115      "comments",
01116      _("The Multi-Purposes Calibration and Optimization Tool.\n"
01117       "A software to perform calibrations or optimizations of empirical "
01118       "parameters"),
01119      "authors", authors,
01120      "translator-credits",
01121      "Javier Burguete Tolosa <jburguete@eead.csic.es> "
01122       "(english, french and spanish)\n"
01123       "Uğur Çayoğlu (german)",
01124      "version", "4.4.1",
01125      "copyright", "Copyright 2012-2023 Javier Burguete Tolosa",
01126      "logo", window->logo,
01127      "website", "https://github.com/jburguete/mpcotool",
01128      "license-type", GTK_LICENSE_BSD, NULL);
01129 #if DEBUG_INTERFACE
01130     fprintf (stderr, "window_about: end\n");
01131 #endif
01132 }
01133
01137 static void
01138 window_update_climbing ()
01139 {
01140 #if DEBUG_INTERFACE
01141     fprintf (stderr, "window_update_climbing: start\n");
01142 #endif
01143     gtk_widget_show (GTK_WIDGET (window->check_climbing));
01144     if (gtk_check_button_get_active (window->check_climbing))
01145     {
01146         gtk_widget_show (GTK_WIDGET (window->grid_climbing));
01147         gtk_widget_show (GTK_WIDGET (window->label_step));
01148         gtk_widget_show (GTK_WIDGET (window->spin_step));
01149     }
01150     switch (window_get_climbing ())

```

```

01151     {
01152     case CLIMBING_METHOD_COORDINATES:
01153         gtk_widget_hide (GTK_WIDGET (window->label_estimates));
01154         gtk_widget_hide (GTK_WIDGET (window->spin_estimates));
01155         break;
01156     default:
01157         gtk_widget_show (GTK_WIDGET (window->label_estimates));
01158         gtk_widget_show (GTK_WIDGET (window->spin_estimates));
01159     }
01160 #if DEBUG_INTERFACE
01161     fprintf (stderr, "window_update_climbing: end\n");
01162 #endif
01163 }
01164
01165 static void
01166 window_update ()
01167 {
01171     unsigned int i;
01172 #if DEBUG_INTERFACE
01173     fprintf (stderr, "window_update: start\n");
01174 #endif
01175     gtk_widget_set_sensitive
01176         (GTK_WIDGET (window->button_evaluator),
01177          gtk_check_button_get_active (window->check_evaluator));
01178     gtk_widget_hide (GTK_WIDGET (window->label_simulations));
01179     gtk_widget_hide (GTK_WIDGET (window->spin_simulations));
01180     gtk_widget_hide (GTK_WIDGET (window->label_iterations));
01181     gtk_widget_hide (GTK_WIDGET (window->spin_iterations));
01182     gtk_widget_hide (GTK_WIDGET (window->label_tolerance));
01183     gtk_widget_hide (GTK_WIDGET (window->spin_tolerance));
01184     gtk_widget_hide (GTK_WIDGET (window->label_bests));
01185     gtk_widget_hide (GTK_WIDGET (window->spin_bests));
01186     gtk_widget_hide (GTK_WIDGET (window->label_population));
01187     gtk_widget_hide (GTK_WIDGET (window->spin_population));
01188     gtk_widget_hide (GTK_WIDGET (window->label_generations));
01189     gtk_widget_hide (GTK_WIDGET (window->spin_generations));
01190     gtk_widget_hide (GTK_WIDGET (window->label_mutation));
01191     gtk_widget_hide (GTK_WIDGET (window->spin_mutation));
01192     gtk_widget_hide (GTK_WIDGET (window->label_reproduction));
01193     gtk_widget_hide (GTK_WIDGET (window->spin_reproduction));
01194     gtk_widget_hide (GTK_WIDGET (window->label_adaptation));
01195     gtk_widget_hide (GTK_WIDGET (window->spin_adaptation));
01196     gtk_widget_hide (GTK_WIDGET (window->label_sweeps));
01197     gtk_widget_hide (GTK_WIDGET (window->spin_sweeps));
01198     gtk_widget_hide (GTK_WIDGET (window->label_bits));
01199     gtk_widget_hide (GTK_WIDGET (window->spin_bits));
01200     gtk_widget_hide (GTK_WIDGET (window->check_climbing));
01201     gtk_widget_hide (GTK_WIDGET (window->grid_climbing));
01202     gtk_widget_hide (GTK_WIDGET (window->label_step));
01203     gtk_widget_hide (GTK_WIDGET (window->spin_step));
01204     gtk_widget_hide (GTK_WIDGET (window->label_p));
01205     gtk_widget_hide (GTK_WIDGET (window->spin_p));
01206     i = gtk_spin_button_get_value_as_int (window->spin_iterations);
01207     switch (window_get_algorithm ())
01208     {
01209     case ALGORITHM_MONTE_CARLO:
01210         gtk_widget_show (GTK_WIDGET (window->label_simulations));
01211         gtk_widget_show (GTK_WIDGET (window->spin_simulations));
01212         gtk_widget_show (GTK_WIDGET (window->label_iterations));
01213         gtk_widget_show (GTK_WIDGET (window->spin_iterations));
01214         if (i > 1)
01215         {
01216             gtk_widget_show (GTK_WIDGET (window->label_tolerance));
01217             gtk_widget_show (GTK_WIDGET (window->spin_tolerance));
01218             gtk_widget_show (GTK_WIDGET (window->label_bests));
01219             gtk_widget_show (GTK_WIDGET (window->spin_bests));
01220         }
01221         window_update_climbing ();
01222         break;
01223     case ALGORITHM_SWEEP:
01224     case ALGORITHM_ORTHOGONAL:
01225         gtk_widget_show (GTK_WIDGET (window->label_iterations));
01226         gtk_widget_show (GTK_WIDGET (window->spin_iterations));
01227         if (i > 1)
01228         {
01229             gtk_widget_show (GTK_WIDGET (window->label_tolerance));
01230             gtk_widget_show (GTK_WIDGET (window->spin_tolerance));
01231             gtk_widget_show (GTK_WIDGET (window->label_bests));
01232             gtk_widget_show (GTK_WIDGET (window->spin_bests));
01233         }
01234         gtk_widget_show (GTK_WIDGET (window->label_sweeps));
01235         gtk_widget_show (GTK_WIDGET (window->spin_sweeps));
01236         gtk_widget_show (GTK_WIDGET (window->check_climbing));
01237         window_update_climbing ();
01238         break;
01239     default:
01240         gtk_widget_show (GTK_WIDGET (window->label_population));

```

```

01241     gtk_widget_show (GTK_WIDGET (window->spin_population));
01242     gtk_widget_show (GTK_WIDGET (window->label_generations));
01243     gtk_widget_show (GTK_WIDGET (window->spin_generations));
01244     gtk_widget_show (GTK_WIDGET (window->label_mutation));
01245     gtk_widget_show (GTK_WIDGET (window->spin_mutation));
01246     gtk_widget_show (GTK_WIDGET (window->label_reproduction));
01247     gtk_widget_show (GTK_WIDGET (window->spin_reproduction));
01248     gtk_widget_show (GTK_WIDGET (window->label_adaptation));
01249     gtk_widget_show (GTK_WIDGET (window->spin_adaptation));
01250     gtk_widget_show (GTK_WIDGET (window->label_bits));
01251     gtk_widget_show (GTK_WIDGET (window->spin_bits));
01252 }
01253 gtk_widget_set_sensitive
01254 (GTK_WIDGET (window->button_remove_experiment), input->nexperiments > 1);
01255 gtk_widget_set_sensitive
01256 (GTK_WIDGET (window->button_remove_variable), input->nvariables > 1);
01257 for (i = 0; i < input->experiment->ninputs; ++i)
01258 {
01259     gtk_widget_show (GTK_WIDGET (window->check_template[i]));
01260     gtk_widget_show (GTK_WIDGET (window->button_template[i]));
01261     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i]), 0);
01262     gtk_widget_set_sensitive (GTK_WIDGET (window->button_template[i]), 1);
01263     g_signal_handler_block
01264         (window->check_template[i], window->id_template[i]);
01265     g_signal_handler_block (window->button_template[i], window->id_input[i]);
01266     gtk_check_button_set_active (window->check_template[i], 1);
01267     g_signal_handler_unblock (window->button_template[i],
01268                             window->id_input[i]);
01269     g_signal_handler_unblock (window->check_template[i],
01270                             window->id_template[i]);
01271 }
01272 if (i > 0)
01273 {
01274     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i - 1]), 1);
01275     gtk_widget_set_sensitive (GTK_WIDGET (window->button_template[i - 1]),
01276                             gtk_check_button_get_active
01277                             (window->check_template[i - 1]));
01278 }
01279 if (i < MAX_NINPUTS)
01280 {
01281     gtk_widget_show (GTK_WIDGET (window->check_template[i]));
01282     gtk_widget_show (GTK_WIDGET (window->button_template[i]));
01283     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i]), 1);
01284     gtk_widget_set_sensitive
01285         (GTK_WIDGET (window->button_template[i]),
01286         gtk_check_button_get_active (window->check_template[i]));
01287     g_signal_handler_block
01288         (window->check_template[i], window->id_template[i]);
01289     g_signal_handler_block (window->button_template[i], window->id_input[i]);
01290     gtk_check_button_set_active (window->check_template[i], 0);
01291     g_signal_handler_unblock (window->button_template[i],
01292                             window->id_input[i]);
01293     g_signal_handler_unblock (window->check_template[i],
01294                             window->id_template[i]);
01295 }
01296 while (++i < MAX_NINPUTS)
01297 {
01298     gtk_widget_hide (GTK_WIDGET (window->check_template[i]));
01299     gtk_widget_hide (GTK_WIDGET (window->button_template[i]));
01300 }
01301 gtk_widget_set_sensitive
01302 (GTK_WIDGET (window->spin_minabs),
01303  gtk_check_button_get_active (window->check_minabs));
01304 gtk_widget_set_sensitive
01305 (GTK_WIDGET (window->spin_maxabs),
01306  gtk_check_button_get_active (window->check_maxabs));
01307 if (window_get_norm () == ERROR_NORM_P)
01308 {
01309     gtk_widget_show (GTK_WIDGET (window->label_p));
01310     gtk_widget_show (GTK_WIDGET (window->spin_p));
01311 }
01312 #if DEBUG_INTERFACE
01313 fprintf (stderr, "window_update: end\n");
01314 #endif
01315 }
01316
01320 static void
01321 window_set_algorithm ()
01322 {
01323     int i;
01324     #if DEBUG_INTERFACE
01325     fprintf (stderr, "window_set_algorithm: start\n");
01326     #endif
01327     i = window_get_algorithm ();
01328     switch (i)
01329     {
01330     case ALGORITHM_SWEEP:

```

```

01331     case ALGORITHM_ORTHOGONAL:
01332         i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01333         if (i < 0)
01334             i = 0;
01335         gtk_spin_button_set_value (window->spin_sweeps,
01336                                   (gdouble) input->variable[i].nsweeps);
01337         break;
01338     case ALGORITHM_GENETIC:
01339         i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01340         if (i < 0)
01341             i = 0;
01342         gtk_spin_button_set_value (window->spin_bits,
01343                                   (gdouble) input->variable[i].nbits);
01344     }
01345     window_update ();
01346 #if DEBUG_INTERFACE
01347     fprintf (stderr, "window_set_algorithm: end\n");
01348 #endif
01349 }
01350
01354 static void
01355 window_set_experiment ()
01356 {
01357     unsigned int i, j;
01358     char *buffer1;
01359 #if DEBUG_INTERFACE
01360     fprintf (stderr, "window_set_experiment: start\n");
01361 #endif
01362     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01363     gtk_spin_button_set_value (window->spin_weight, input->experiment[i].weight);
01364     buffer1 = gtk_combo_box_text_get_active_text (window->combo_experiment);
01365     gtk_button_set_label (window->button_experiment, buffer1);
01366     g_free (buffer1);
01367     for (j = 0; j < input->experiment->ninputs; ++j)
01368     {
01369         g_signal_handler_block (window->button_template[j], window->id_input[j]);
01370         gtk_button_set_label (window->button_template[j],
01371                               input->experiment[i].stencil[j]);
01372         g_signal_handler_unblock
01373             (window->button_template[j], window->id_input[j]);
01374     }
01375 #if DEBUG_INTERFACE
01376     fprintf (stderr, "window_set_experiment: end\n");
01377 #endif
01378 }
01379
01383 static void
01384 window_remove_experiment ()
01385 {
01386     unsigned int i, j;
01387 #if DEBUG_INTERFACE
01388     fprintf (stderr, "window_remove_experiment: start\n");
01389 #endif
01390     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01391     g_signal_handler_block (window->combo_experiment, window->id_experiment);
01392     gtk_combo_box_text_remove (window->combo_experiment, i);
01393     g_signal_handler_unblock (window->combo_experiment, window->id_experiment);
01394     experiment_free (input->experiment + i, input->type);
01395     --input->nexperiments;
01396     for (j = i; j < input->nexperiments; ++j)
01397         memcpy (input->experiment + j, input->experiment + j + 1,
01398               sizeof (Experiment));
01399     j = input->nexperiments - 1;
01400     if (i > j)
01401         i = j;
01402     for (j = 0; j < input->experiment->ninputs; ++j)
01403         g_signal_handler_block (window->button_template[j], window->id_input[j]);
01404     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i);
01405     for (j = 0; j < input->experiment->ninputs; ++j)
01406         g_signal_handler_unblock (window->button_template[j], window->id_input[j]);
01407     window_update ();
01408 #if DEBUG_INTERFACE
01409     fprintf (stderr, "window_remove_experiment: end\n");
01410 #endif
01411 }
01412
01416 static void
01417 window_add_experiment ()
01418 {
01419     unsigned int i, j;
01420 #if DEBUG_INTERFACE
01421     fprintf (stderr, "window_add_experiment: start\n");
01422 #endif
01423     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01424     g_signal_handler_block (window->combo_experiment, window->id_experiment);
01425     gtk_combo_box_text_insert_text
01426         (window->combo_experiment, i, input->experiment[i].name);

```



```

01427 g_signal_handler_unblock (window->combo_experiment, window->id_experiment);
01428 input->experiment = (Experiment *) g_realloc
01429 (input->experiment, (input->nexperiments + 1) * sizeof (Experiment));
01430 for (j = input->nexperiments - 1; j > i; --j)
01431     memcpy (input->experiment + j + 1, input->experiment + j,
01432             sizeof (Experiment));
01433 input->experiment[j + 1].weight = input->experiment[j].weight;
01434 input->experiment[j + 1].ninputs = input->experiment[j].ninputs;
01435 if (input->type == INPUT_TYPE_XML)
01436 {
01437     input->experiment[j + 1].name
01438     = (char *) xmlStrdup ((xmlChar *) input->experiment[j].name);
01439     for (j = 0; j < input->experiment->ninputs; ++j)
01440         input->experiment[i + 1].stencil[j]
01441         = (char *) xmlStrdup ((xmlChar *) input->experiment[i].stencil[j]);
01442 }
01443 else
01444 {
01445     input->experiment[j + 1].name = g_strdup (input->experiment[j].name);
01446     for (j = 0; j < input->experiment->ninputs; ++j)
01447         input->experiment[i + 1].stencil[j]
01448         = g_strdup (input->experiment[i].stencil[j]);
01449 }
01450 ++input->nexperiments;
01451 for (j = 0; j < input->experiment->ninputs; ++j)
01452     g_signal_handler_block (window->button_template[j], window->id_input[j]);
01453 gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i + 1);
01454 for (j = 0; j < input->experiment->ninputs; ++j)
01455     g_signal_handler_unblock (window->button_template[j], window->id_input[j]);
01456 window_update ();
01457 #if DEBUG_INTERFACE
01458 fprintf (stderr, "window_add_experiment: end\n");
01459 #endif
01460 }
01461
01462 static void
01463 dialog_name_experiment_close (GtkFileChooserDialog * dlg,
01464                               int response_id,
01465                               void *data)
01466 {
01467     char *buffer;
01468     unsigned int i;
01469 #if DEBUG_INTERFACE
01470     fprintf (stderr, "window_name_experiment_close: start\n");
01471 #endif
01472 i = (size_t) data;
01473 if (response_id == GTK_RESPONSE_OK)
01474 {
01475     buffer = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
01476     g_signal_handler_block (window->combo_experiment, window->id_experiment);
01477     gtk_combo_box_text_remove (window->combo_experiment, i);
01478     gtk_combo_box_text_insert_text (window->combo_experiment, i, buffer);
01479     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i);
01480     g_signal_handler_unblock (window->combo_experiment,
01481                               window->id_experiment);
01482     g_free (buffer);
01483 }
01484 #if DEBUG_INTERFACE
01485 fprintf (stderr, "window_name_experiment_close: end\n");
01486 #endif
01487 }
01488
01489 static void
01490 window_name_experiment ()
01491 {
01492     GtkFileChooserDialog *dlg;
01493     GMainLoop *loop;
01494     const char *buffer;
01495     unsigned int i;
01496 #if DEBUG_INTERFACE
01497     fprintf (stderr, "window_name_experiment: start\n");
01498 #endif
01499 i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01500 buffer = gtk_button_get_label (window->button_experiment);
01501 dlg = (GtkFileChooserDialog *)
01502     gtk_file_chooser_dialog_new (_("Open experiment file"),
01503                                 window->window,
01504                                 GTK_FILE_CHOOSER_ACTION_OPEN,
01505                                 _("_Cancel"),
01506                                 GTK_RESPONSE_CANCEL,
01507                                 _("_Open"), GTK_RESPONSE_OK, NULL);
01508     gtk_file_chooser_set_current_name (GTK_FILE_CHOOSER (dlg), buffer);
01509     g_signal_connect (dlg, "response", G_CALLBACK (dialog_name_experiment_close),
01510                      (void *) (size_t) i);
01511     gtk_window_present (GTK_WINDOW (dlg));
01512     loop = g_main_loop_new (NULL, 0);
01513     g_signal_connect_swapped (dlg, "destroy", G_CALLBACK (g_main_loop_quit),
01514                               loop);

```

```

01521             loop);
01522     g_main_loop_run (loop);
01523     g_main_loop_unref (loop);
01524     #if DEBUG_INTERFACE
01525     fprintf (stderr, "window_name_experiment:  end\n");
01526     #endif
01527 }
01528
01532 static void
01533 window_weight_experiment ()
01534 {
01535     unsigned int i;
01536     #if DEBUG_INTERFACE
01537     fprintf (stderr, "window_weight_experiment:  start\n");
01538     #endif
01539     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01540     input->experiment[i].weight = gtk_spin_button_get_value (window->spin_weight);
01541     #if DEBUG_INTERFACE
01542     fprintf (stderr, "window_weight_experiment:  end\n");
01543     #endif
01544 }
01545
01549 static void
01550 window_inputs_experiment ()
01551 {
01552     unsigned int j;
01553     #if DEBUG_INTERFACE
01554     fprintf (stderr, "window_inputs_experiment:  start\n");
01555     #endif
01556     j = input->experiment->ninputs - 1;
01557     if (j && !gtk_check_button_get_active (window->check_template[j]))
01558         --input->experiment->ninputs;
01559     if (input->experiment->ninputs < MAX_NINPUTS
01560         && gtk_check_button_get_active (window->check_template[j]))
01561         ++input->experiment->ninputs;
01562     window_update ();
01563     #if DEBUG_INTERFACE
01564     fprintf (stderr, "window_inputs_experiment:  end\n");
01565     #endif
01566 }
01567
01571 static void
01572 window_template_experiment_close (GtkFileChooserDialog * dlg,
01573     int response_id,
01574     void *data)
01575 {
01576     GFile *file1, *file2;
01577     char *buffer1, *buffer2;
01578     unsigned int i, j;
01579     #if DEBUG_INTERFACE
01580     fprintf (stderr, "window_template_experiment_close:  start\n");
01581     #endif
01582     if (response_id == GTK_RESPONSE_OK)
01583     {
01584         i = (size_t) data;
01585         j = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01586         buffer1 = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
01587         file1 = g_file_new_for_path (buffer1);
01588         file2 = g_file_new_for_path (input->directory);
01589         buffer2 = g_file_get_relative_path (file2, file1);
01590         if (input->type == INPUT_TYPE_XML)
01591             input->experiment[j].stencil[i]
01592                 = (char *) xmlStrdup ((xmlChar *) buffer2);
01593         else
01594             input->experiment[j].stencil[i] = g_strdup (buffer2);
01595         g_free (buffer2);
01596         g_object_unref (file2);
01597         g_object_unref (file1);
01598         g_free (buffer1);
01599     }
01600     gtk_window_destroy (GTK_WINDOW (dlg));
01601     #if DEBUG_INTERFACE
01602     fprintf (stderr, "window_template_experiment_close:  end\n");
01603     #endif
01604 }
01605
01611 static void
01612 window_template_experiment (void *data)
01613 {
01614     GtkFileChooserDialog *dlg;
01615     GMainLoop *loop;
01616     const char *buffer;
01617     unsigned int i;
01618     #if DEBUG_INTERFACE
01619     fprintf (stderr, "window_template_experiment:  start\n");
01620     #endif
01621     i = (size_t) data;

```

```

01623     buffer = gtk_button_get_label (window->button_template[i]);
01624     dlg = (GtkFileChooserDialog *)
01625         gtk_file_chooser_dialog_new (_("Open template file"),
01626                                     window->window,
01627                                     GTK_FILE_CHOOSER_ACTION_OPEN,
01628                                     _("_Cancel"),
01629                                     GTK_RESPONSE_CANCEL,
01630                                     _("_Open"), GTK_RESPONSE_ACCEPT, NULL);
01631     gtk_file_chooser_set_current_name (GTK_FILE_CHOOSER (dlg), buffer);
01632     g_signal_connect (dlg, "response",
01633                     G_CALLBACK (window_template_experiment_close), data);
01634     gtk_window_present (GTK_WINDOW (dlg));
01635     loop = g_main_loop_new (NULL, 0);
01636     g_signal_connect_swapped (dlg, "destroy", G_CALLBACK (g_main_loop_quit),
01637                             loop);
01638     g_main_loop_run (loop);
01639     g_main_loop_unref (loop);
01640     #if DEBUG_INTERFACE
01641     fprintf (stderr, "window_template_experiment:  end\n");
01642     #endif
01643 }
01644
01645 static void
01646 window_set_variable ()
01647 {
01648     unsigned int i;
01649     #if DEBUG_INTERFACE
01650     fprintf (stderr, "window_set_variable:  start\n");
01651     #endif
01652     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01653     g_signal_handler_block (window->entry_variable, window->id_variable_label);
01654     gtk_entry_set_text (window->entry_variable, input->variable[i].name);
01655     g_signal_handler_unblock (window->entry_variable, window->id_variable_label);
01656     gtk_spin_button_set_value (window->spin_min, input->variable[i].rangemin);
01657     gtk_spin_button_set_value (window->spin_max, input->variable[i].rangemax);
01658     if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
01659     {
01660         gtk_spin_button_set_value (window->spin_minabs,
01661                                 input->variable[i].rangeminabs);
01662         gtk_check_button_set_active (window->check_minabs, 1);
01663     }
01664     else
01665     {
01666         gtk_spin_button_set_value (window->spin_minabs, -G_MAXDOUBLE);
01667         gtk_check_button_set_active (window->check_minabs, 0);
01668     }
01669     if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
01670     {
01671         gtk_spin_button_set_value (window->spin_maxabs,
01672                                 input->variable[i].rangemaxabs);
01673         gtk_check_button_set_active (window->check_maxabs, 1);
01674     }
01675     else
01676     {
01677         gtk_spin_button_set_value (window->spin_maxabs, G_MAXDOUBLE);
01678         gtk_check_button_set_active (window->check_maxabs, 0);
01679     }
01680     gtk_spin_button_set_value (window->spin_precision,
01681                             input->variable[i].precision);
01682     gtk_spin_button_set_value (window->spin_steps, (gdouble) input->nsteps);
01683     if (input->nsteps)
01684     {
01685         gtk_spin_button_set_value (window->spin_step, input->variable[i].step);
01686     }
01687     #if DEBUG_INTERFACE
01688     fprintf (stderr, "window_set_variable:  precision[%u]=%u\n", i,
01689             input->variable[i].precision);
01690     #endif
01691     switch (window_get_algorithm ())
01692     {
01693     case ALGORITHM_SWEEP:
01694     case ALGORITHM_ORTHOGONAL:
01695         gtk_spin_button_set_value (window->spin_sweeps,
01696                                 (gdouble) input->variable[i].nsweeps);
01697     #if DEBUG_INTERFACE
01698     fprintf (stderr, "window_set_variable:  nsweeps[%u]=%u\n", i,
01699             input->variable[i].nsweeps);
01700     #endif
01701     break;
01702     case ALGORITHM_GENETIC:
01703         gtk_spin_button_set_value (window->spin_bits,
01704                                 (gdouble) input->variable[i].nbits);
01705     #if DEBUG_INTERFACE
01706     fprintf (stderr, "window_set_variable:  nbits[%u]=%u\n", i,
01707             input->variable[i].nbits);
01708     #endif
01709     break;
01710     }
01711     window_update ();

```

```

01713 #if DEBUG_INTERFACE
01714     fprintf (stderr, "window_set_variable:  end\n");
01715 #endif
01716 }
01717
01721 static void
01722 window_remove_variable ()
01723 {
01724     unsigned int i, j;
01725 #if DEBUG_INTERFACE
01726     fprintf (stderr, "window_remove_variable:  start\n");
01727 #endif
01728     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01729     g_signal_handler_block (window->combo_variable, window->id_variable);
01730     gtk_combo_box_text_remove (window->combo_variable, i);
01731     g_signal_handler_unblock (window->combo_variable, window->id_variable);
01732     xmlFree (input->variable[i].name);
01733     --input->nvariables;
01734     for (j = i; j < input->nvariables; ++j)
01735         memcpy (input->variable + j, input->variable + j + 1, sizeof (Variable));
01736     j = input->nvariables - 1;
01737     if (i > j)
01738         i = j;
01739     g_signal_handler_block (window->entry_variable, window->id_variable_label);
01740     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i);
01741     g_signal_handler_unblock (window->entry_variable, window->id_variable_label);
01742     window_update ();
01743 #if DEBUG_INTERFACE
01744     fprintf (stderr, "window_remove_variable:  end\n");
01745 #endif
01746 }
01747
01751 static void
01752 window_add_variable ()
01753 {
01754     unsigned int i, j;
01755 #if DEBUG_INTERFACE
01756     fprintf (stderr, "window_add_variable:  start\n");
01757 #endif
01758     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01759     g_signal_handler_block (window->combo_variable, window->id_variable);
01760     gtk_combo_box_text_insert_text (window->combo_variable, i,
01761                                     input->variable[i].name);
01762     g_signal_handler_unblock (window->combo_variable, window->id_variable);
01763     input->variable = (Variable *) g_realloc
01764         (input->variable, (input->nvariables + 1) * sizeof (Variable));
01765     for (j = input->nvariables - 1; j > i; --j)
01766         memcpy (input->variable + j + 1, input->variable + j, sizeof (Variable));
01767     memcpy (input->variable + j + 1, input->variable + j, sizeof (Variable));
01768     if (input->type == INPUT_TYPE_XML)
01769         input->variable[j + 1].name
01770             = (char *) xmlStrdup ((xmlChar *) input->variable[j].name);
01771     else
01772         input->variable[j + 1].name = g_strdup (input->variable[j].name);
01773     ++input->nvariables;
01774     g_signal_handler_block (window->entry_variable, window->id_variable_label);
01775     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i + 1);
01776     g_signal_handler_unblock (window->entry_variable, window->id_variable_label);
01777     window_update ();
01778 #if DEBUG_INTERFACE
01779     fprintf (stderr, "window_add_variable:  end\n");
01780 #endif
01781 }
01782
01786 static void
01787 window_label_variable ()
01788 {
01789     unsigned int i;
01790     const char *buffer;
01791 #if DEBUG_INTERFACE
01792     fprintf (stderr, "window_label_variable:  start\n");
01793 #endif
01794     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01795     buffer = gtk_entry_get_text (window->entry_variable);
01796     g_signal_handler_block (window->combo_variable, window->id_variable);
01797     gtk_combo_box_text_remove (window->combo_variable, i);
01798     gtk_combo_box_text_insert_text (window->combo_variable, i, buffer);
01799     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i);
01800     g_signal_handler_unblock (window->combo_variable, window->id_variable);
01801 #if DEBUG_INTERFACE
01802     fprintf (stderr, "window_label_variable:  end\n");
01803 #endif
01804 }
01805
01809 static void
01810 window_precision_variable ()
01811 {

```

```

01812     unsigned int i;
01813     #if DEBUG_INTERFACE
01814     fprintf (stderr, "window_precision_variable:  start\n");
01815     #endif
01816     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01817     input->variable[i].precision
01818     = (unsigned int) gtk_spin_button_get_value_as_int (window->spin_precision);
01819     gtk_spin_button_set_digits (window->spin_min, input->variable[i].precision);
01820     gtk_spin_button_set_digits (window->spin_max, input->variable[i].precision);
01821     gtk_spin_button_set_digits (window->spin_minabs,
01822                                input->variable[i].precision);
01823     gtk_spin_button_set_digits (window->spin_maxabs,
01824                                input->variable[i].precision);
01825     #if DEBUG_INTERFACE
01826     fprintf (stderr, "window_precision_variable:  end\n");
01827     #endif
01828 }
01829
01833 static void
01834 window_rangemin_variable ()
01835 {
01836     unsigned int i;
01837     #if DEBUG_INTERFACE
01838     fprintf (stderr, "window_rangemin_variable:  start\n");
01839     #endif
01840     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01841     input->variable[i].rangemin = gtk_spin_button_get_value (window->spin_min);
01842     #if DEBUG_INTERFACE
01843     fprintf (stderr, "window_rangemin_variable:  end\n");
01844     #endif
01845 }
01846
01850 static void
01851 window_rangemax_variable ()
01852 {
01853     unsigned int i;
01854     #if DEBUG_INTERFACE
01855     fprintf (stderr, "window_rangemax_variable:  start\n");
01856     #endif
01857     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01858     input->variable[i].rangemax = gtk_spin_button_get_value (window->spin_max);
01859     #if DEBUG_INTERFACE
01860     fprintf (stderr, "window_rangemax_variable:  end\n");
01861     #endif
01862 }
01863
01867 static void
01868 window_rangeminabs_variable ()
01869 {
01870     unsigned int i;
01871     #if DEBUG_INTERFACE
01872     fprintf (stderr, "window_rangeminabs_variable:  start\n");
01873     #endif
01874     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01875     input->variable[i].rangeminabs
01876     = gtk_spin_button_get_value (window->spin_minabs);
01877     #if DEBUG_INTERFACE
01878     fprintf (stderr, "window_rangeminabs_variable:  end\n");
01879     #endif
01880 }
01881
01885 static void
01886 window_rangemaxabs_variable ()
01887 {
01888     unsigned int i;
01889     #if DEBUG_INTERFACE
01890     fprintf (stderr, "window_rangemaxabs_variable:  start\n");
01891     #endif
01892     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01893     input->variable[i].rangemaxabs
01894     = gtk_spin_button_get_value (window->spin_maxabs);
01895     #if DEBUG_INTERFACE
01896     fprintf (stderr, "window_rangemaxabs_variable:  end\n");
01897     #endif
01898 }
01899
01903 static void
01904 window_step_variable ()
01905 {
01906     unsigned int i;
01907     #if DEBUG_INTERFACE
01908     fprintf (stderr, "window_step_variable:  start\n");
01909     #endif
01910     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01911     input->variable[i].step = gtk_spin_button_get_value (window->spin_step);
01912     #if DEBUG_INTERFACE
01913     fprintf (stderr, "window_step_variable:  end\n");

```

```

01914 #endif
01915 }
01916
01920 static void
01921 window_update_variable ()
01922 {
01923     int i;
01924     #if DEBUG_INTERFACE
01925     fprintf (stderr, "window_update_variable:  start\n");
01926     #endif
01927     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01928     if (i < 0)
01929         i = 0;
01930     switch (window_get_algorithm ())
01931     {
01932         case ALGORITHM_SWEEP:
01933         case ALGORITHM_ORTHOGONAL:
01934             input->variable[i].nsweeps
01935                 = gtk_spin_button_get_value_as_int (window->spin_sweeps);
01936             #if DEBUG_INTERFACE
01937             fprintf (stderr, "window_update_variable:  nsweeps[%d]=%u\n", i,
01938                     input->variable[i].nsweeps);
01939             #endif
01940             break;
01941         case ALGORITHM_GENETIC:
01942             input->variable[i].nbits
01943                 = gtk_spin_button_get_value_as_int (window->spin_bits);
01944             #if DEBUG_INTERFACE
01945             fprintf (stderr, "window_update_variable:  nbits[%d]=%u\n", i,
01946                     input->variable[i].nbits);
01947             #endif
01948     }
01949     #if DEBUG_INTERFACE
01950     fprintf (stderr, "window_update_variable:  end\n");
01951     #endif
01952 }
01953
01959 static int
01960 window_read (char *filename)
01961 {
01962     unsigned int i;
01963     #if DEBUG_INTERFACE
01964     fprintf (stderr, "window_read:  start\n");
01965     #endif
01966     // Reading new input file
01967     input_free ();
01968     input->result = input->variables = NULL;
01969     if (!input_open (filename))
01970     {
01971         #if DEBUG_INTERFACE
01972         fprintf (stderr, "window_read:  end\n");
01973         #endif
01974         return 0;
01975     }
01976     // Setting GTK+ widgets data
01977     gtk_entry_set_text (window->entry_result, input->result);
01978     gtk_entry_set_text (window->entry_variables, input->variables);
01979     gtk_button_set_label (window->button_simulator, input->simulator);
01980     gtk_check_button_set_active (window->check_evaluator,
01981                                 (size_t) input->evaluator);
01982     if (input->evaluator)
01983         gtk_button_set_label (window->button_evaluator, input->evaluator);
01984     gtk_check_button_set_active (window->button_algorithm[input->algorithm],
01985                                 TRUE);
01986     switch (input->algorithm)
01987     {
01988         case ALGORITHM_MONTE_CARLO:
01989             gtk_spin_button_set_value (window->spin_simulations,
01990                                         (gdouble) input->nsimulations);
01991             // fallthrough
01992         case ALGORITHM_SWEEP:
01993         case ALGORITHM_ORTHOGONAL:
01994             gtk_spin_button_set_value (window->spin_iterations,
01995                                         (gdouble) input->niterations);
01996             gtk_spin_button_set_value (window->spin_bests, (gdouble) input->nbest);
01997             gtk_spin_button_set_value (window->spin_tolerance, input->tolerance);
01998             gtk_check_button_set_active (window->check_climbing, input->nsteps);
01999             if (input->nsteps)
02000             {
02001                 gtk_check_button_set_active
02002                     (window->button_climbing[input->climbing], TRUE);
02003                 gtk_spin_button_set_value (window->spin_steps,
02004                                             (gdouble) input->nsteps);
02005                 gtk_spin_button_set_value (window->spin_relaxation,
02006                                             (gdouble) input->relaxation);
02007             }
02008     }

```

```

02009         switch (input->climbing)
02010         {
02011             case CLIMBING_METHOD_RANDOM:
02012                 gtk_spin_button_set_value (window->spin_estimates,
02013                                             (gdouble) input->nestimates);
02014         }
02015     }
02016     break;
02017 default:
02018     gtk_spin_button_set_value (window->spin_population,
02019                               (gdouble) input->nsimulations);
02020     gtk_spin_button_set_value (window->spin_generations,
02021                               (gdouble) input->niterations);
02022     gtk_spin_button_set_value (window->spin_mutation, input->mutation_ratio);
02023     gtk_spin_button_set_value (window->spin_reproduction,
02024                               input->reproduction_ratio);
02025     gtk_spin_button_set_value (window->spin_adaptation,
02026                               input->adaptation_ratio);
02027 }
02028 gtk_check_button_set_active (window->button_norm[input->norm], TRUE);
02029 gtk_spin_button_set_value (window->spin_p, input->p);
02030 gtk_spin_button_set_value (window->spin_threshold, input->threshold);
02031 g_signal_handler_block (window->combo_experiment, window->id_experiment);
02032 gtk_combo_box_text_remove_all (window->combo_experiment);
02033 for (i = 0; i < input->nexperiments; ++i)
02034     gtk_combo_box_text_append_text (window->combo_experiment,
02035                                     input->experiment[i].name);
02036 g_signal_handler_unblock (window->combo_experiment, window->id_experiment);
02037 gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), 0);
02038 g_signal_handler_block (window->combo_variable, window->id_variable);
02039 g_signal_handler_block (window->entry_variable, window->id_variable_label);
02040 gtk_combo_box_text_remove_all (window->combo_variable);
02041 for (i = 0; i < input->nvariables; ++i)
02042     gtk_combo_box_text_append_text (window->combo_variable,
02043                                     input->variable[i].name);
02044 g_signal_handler_unblock (window->entry_variable, window->id_variable_label);
02045 g_signal_handler_unblock (window->combo_variable, window->id_variable);
02046 gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), 0);
02047 window_set_variable ();
02048 window_update ();
02049
02050 #if DEBUG_INTERFACE
02051 fprintf (stderr, "window_read: end\n");
02052 #endif
02053 return 1;
02054 }
02055
02056 static void
02060 dialog_open_close (GtkFileChooserDialog * dlg,
02062                   int response_id)
02063 {
02064     char *buffer, *directory, *name;
02065
02066     #if DEBUG_INTERFACE
02067     fprintf (stderr, "dialog_open_close: start\n");
02068     #endif
02069
02070     // Saving a backup of the current input file
02071     directory = g_strdup (input->directory);
02072     name = g_strdup (input->name);
02073
02074     // If OK saving
02075     if (response_id == GTK_RESPONSE_OK)
02076     {
02077
02078         // Traying to open the input file
02079         buffer = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
02080         if (!window_read (buffer))
02081         {
02082             #if DEBUG_INTERFACE
02083             fprintf (stderr, "dialog_open_close: error reading input file\n");
02084             #endif
02085             g_free (buffer);
02086
02087             // Reading backup file on error
02088             buffer = g_build_filename (directory, name, NULL);
02089             input->result = input->variables = NULL;
02090             if (!input_open (buffer))
02091             {
02092
02093                 // Closing on backup file reading error
02094                 #if DEBUG_INTERFACE
02095                 fprintf (stderr,
02096                         "dialog_open_close: error reading backup file\n");
02097                 #endif
02098             }
02099         }

```

```

02100     g_free (buffer);
02101 }
02102
02103 // Freeing and closing
02104 g_free (name);
02105 g_free (directory);
02106 gtk_window_destroy (GTK_WINDOW (dlg));
02107
02108 #if DEBUG_INTERFACE
02109 fprintf (stderr, "dialog_open_close: end\n");
02110 #endif
02111
02112 }
02113
02114 static void
02115 window_open ()
02116 {
02117     GtkFileChooserDialog *dlg;
02118     GtkFileFilter *filter;
02119
02120 #if DEBUG_INTERFACE
02121 fprintf (stderr, "window_open: start\n");
02122 #endif
02123
02124 // Opening dialog
02125 dlg = (GtkFileChooserDialog *)
02126     gtk_file_chooser_dialog_new (_("Open input file"),
02127                                window->window,
02128                                GTK_FILE_CHOOSER_ACTION_OPEN,
02129                                _("_Cancel"), GTK_RESPONSE_CANCEL,
02130                                _("_OK"), GTK_RESPONSE_OK, NULL);
02131
02132 // Adding XML filter
02133 filter = (GtkFileFilter *) gtk_file_filter_new ();
02134 gtk_file_filter_set_name (filter, "XML");
02135 gtk_file_filter_add_pattern (filter, "*.xml");
02136 gtk_file_filter_add_pattern (filter, "*.XML");
02137 gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter);
02138
02139 // Adding JSON filter
02140 filter = (GtkFileFilter *) gtk_file_filter_new ();
02141 gtk_file_filter_set_name (filter, "JSON");
02142 gtk_file_filter_add_pattern (filter, "*.json");
02143 gtk_file_filter_add_pattern (filter, "*.JSON");
02144 gtk_file_filter_add_pattern (filter, "*.js");
02145 gtk_file_filter_add_pattern (filter, "*.JS");
02146 gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter);
02147
02148 // Connecting the close function
02149 g_signal_connect (dlg, "response", G_CALLBACK (dialog_open_close), NULL);
02150
02151 // Showing modal dialog
02152 gtk_window_present (GTK_WINDOW (dlg));
02153
02154 #if DEBUG_INTERFACE
02155 fprintf (stderr, "window_open: end\n");
02156 #endif
02157
02158 static void
02159 dialog_simulator_close (GtkFileChooserDialog * dlg,
02160                        int response_id)
02161 {
02162     GFile *file1, *file2;
02163     char *buffer1, *buffer2;
02164
02165 #if DEBUG_INTERFACE
02166 fprintf (stderr, "dialog_simulator_close: start\n");
02167 #endif
02168
02169 if (response_id == GTK_RESPONSE_OK)
02170 {
02171     buffer1 = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
02172     file1 = g_file_new_for_path (buffer1);
02173     file2 = g_file_new_for_path (input->directory);
02174     buffer2 = g_file_get_relative_path (file2, file1);
02175     input->simulator = g_strdup (buffer2);
02176     g_free (buffer2);
02177     g_object_unref (file2);
02178     g_object_unref (file1);
02179     g_free (buffer1);
02180 }
02181
02182 gtk_window_destroy (GTK_WINDOW (dlg));
02183
02184 #if DEBUG_INTERFACE
02185 fprintf (stderr, "dialog_simulator_close: end\n");
02186 #endif
02187 }
02188
02189 static void

```



```

02197 dialog_simulator ()
02198 {
02199     GtkFileChooserDialog *dlg;
02200     #if DEBUG_INTERFACE
02201     fprintf (stderr, "dialog_simulator:  start\n");
02202     #endif
02203     dlg = (GtkFileChooserDialog *)
02204         gtk_file_chooser_dialog_new (_("Open simulator file"),
02205                                     window->window,
02206                                     GTK_FILE_CHOOSER_ACTION_OPEN,
02207                                     _("_Cancel"), GTK_RESPONSE_CANCEL,
02208                                     _("_Open"), GTK_RESPONSE_ACCEPT, NULL);
02209     g_signal_connect (dlg, "response", G_CALLBACK (dialog_simulator_close), NULL);
02210     gtk_window_present (GTK_WINDOW (dlg));
02211     #if DEBUG_INTERFACE
02212     fprintf (stderr, "dialog_simulator:  end\n");
02213     #endif
02214 }
02215
02219 static void
02220 dialog_evaluator_close (GtkFileChooserDialog * dlg,
02221                         int response_id)
02222 {
02223     GFile *file1, *file2;
02224     char *buffer1, *buffer2;
02225     #if DEBUG_INTERFACE
02226     fprintf (stderr, "dialog_evaluator_close:  start\n");
02227     #endif
02228     if (response_id == GTK_RESPONSE_OK)
02229     {
02230         buffer1 = gtk_file_chooser_get_current_name (GTK_FILE_CHOOSER (dlg));
02231         file1 = g_file_new_for_path (buffer1);
02232         file2 = g_file_new_for_path (input->directory);
02233         buffer2 = g_file_get_relative_path (file2, file1);
02234         input->evaluator = g_strdup (buffer2);
02235         g_free (buffer2);
02236         g_object_unref (file2);
02237         g_object_unref (file1);
02238         g_free (buffer1);
02239     }
02240     gtk_window_destroy (GTK_WINDOW (dlg));
02241     #if DEBUG_INTERFACE
02242     fprintf (stderr, "dialog_evaluator_close:  end\n");
02243     #endif
02244 }
02245
02250 static void
02251 dialog_evaluator ()
02252 {
02253     GtkFileChooserDialog *dlg;
02254     #if DEBUG_INTERFACE
02255     fprintf (stderr, "dialog_evaluator:  start\n");
02256     #endif
02257     dlg = (GtkFileChooserDialog *)
02258         gtk_file_chooser_dialog_new (_("Open evaluator file"),
02259                                     window->window,
02260                                     GTK_FILE_CHOOSER_ACTION_OPEN,
02261                                     _("_Cancel"), GTK_RESPONSE_CANCEL,
02262                                     _("_Open"), GTK_RESPONSE_ACCEPT, NULL);
02263     g_signal_connect (dlg, "response", G_CALLBACK (dialog_evaluator_close), NULL);
02264     gtk_window_present (GTK_WINDOW (dlg));
02265     #if DEBUG_INTERFACE
02266     fprintf (stderr, "dialog_evaluator:  end\n");
02267     #endif
02268 }
02269
02273 void
02274 window_new (GtkApplication * application)
02275 {
02276     unsigned int i;
02277     char *buffer, *buffer2, buffer3[64];
02278     const char *label_algorithm[NALGORITHMS] = {
02279         "_Monte-Carlo", _("_Sweep"), _("_Genetic"), _("_Orthogonal")
02280     };
02281     const char *tip_algorithm[NALGORITHMS] = {
02282         _("Monte-Carlo brute force algorithm"),
02283         _("Sweep brute force algorithm"),
02284         _("Genetic algorithm"),
02285         _("Orthogonal sampling brute force algorithm"),
02286     };
02287     const char *label_climbing[NCLIMBINGS] = {
02288         _("_Coordinates climbing"), _("_Random climbing")
02289     };
02290     const char *tip_climbing[NCLIMBINGS] = {
02291         _("Coordinates climbing estimate method"),
02292         _("Random climbing estimate method")
02293     };

```

```

02294     const char *label_norm[NNORMS] = { "L2", "L", "Lp", "L1" };
02295     const char *tip_norm[NNORMS] = {
02296         _("Euclidean error norm (L2)"),
02297         _("Maximum error norm (L)"),
02298         _("P error norm (Lp)"),
02299         _("Taxicab error norm (L1)")
02300     };
02301     #if !GTK4
02302     const char *close = "delete-event";
02303     #else
02304     const char *close = "close-request";
02305     #endif
02306
02307     #if DEBUG_INTERFACE
02308     fprintf(stderr, "window_new: start\n");
02309     #endif
02310
02311     // Creating the window
02312     window->window = main_window
02313         = (GtkWindow *) gtk_application_window_new (application);
02314
02315     // Finish when closing the window
02316     g_signal_connect_swapped (window->window, close,
02317         G_CALLBACK (g_application_quit),
02318         G_APPLICATION (application));
02319
02320     // Setting the window title
02321     gtk_window_set_title (window->window, "MPCOTool");
02322
02323     // Creating the open button
02324     window->button_open = (GtkButton *)
02325     #if !GTK4
02326         gtk_button_new_from_icon_name ("document-open", GTK_ICON_SIZE_BUTTON);
02327     #else
02328         gtk_button_new_from_icon_name ("document-open");
02329     #endif
02330     g_signal_connect (window->button_open, "clicked", window_open, NULL);
02331
02332     // Creating the save button
02333     window->button_save = (GtkButton *)
02334     #if !GTK4
02335         gtk_button_new_from_icon_name ("document-save", GTK_ICON_SIZE_BUTTON);
02336     #else
02337         gtk_button_new_from_icon_name ("document-save");
02338     #endif
02339     g_signal_connect (window->button_save, "clicked", (GCallback) window_save,
02340         NULL);
02341
02342     // Creating the run button
02343     window->button_run = (GtkButton *)
02344     #if !GTK4
02345         gtk_button_new_from_icon_name ("system-run", GTK_ICON_SIZE_BUTTON);
02346     #else
02347         gtk_button_new_from_icon_name ("system-run");
02348     #endif
02349     g_signal_connect (window->button_run, "clicked", window_run, NULL);
02350
02351     // Creating the options button
02352     window->button_options = (GtkButton *)
02353     #if !GTK4
02354         gtk_button_new_from_icon_name ("preferences-system", GTK_ICON_SIZE_BUTTON);
02355     #else
02356         gtk_button_new_from_icon_name ("preferences-system");
02357     #endif
02358     g_signal_connect (window->button_options, "clicked", options_new, NULL);
02359
02360     // Creating the help button
02361     window->button_help = (GtkButton *)
02362     #if !GTK4
02363         gtk_button_new_from_icon_name ("help-browser", GTK_ICON_SIZE_BUTTON);
02364     #else
02365         gtk_button_new_from_icon_name ("help-browser");
02366     #endif
02367     g_signal_connect (window->button_help, "clicked", window_help, NULL);
02368
02369     // Creating the about button
02370     window->button_about = (GtkButton *)
02371     #if !GTK4
02372         gtk_button_new_from_icon_name ("help-about", GTK_ICON_SIZE_BUTTON);
02373     #else
02374         gtk_button_new_from_icon_name ("help-about");
02375     #endif
02376     g_signal_connect (window->button_about, "clicked", window_about, NULL);
02377
02378     // Creating the exit button
02379     window->button_exit = (GtkButton *)
02380     #if !GTK4

```

```

02381     gtk_button_new_from_icon_name ("application-exit", GTK_ICON_SIZE_BUTTON);
02382 #else
02383     gtk_button_new_from_icon_name ("application-exit");
02384 #endif
02385     g_signal_connect_swapped (window->button_exit, "clicked",
02386                               G_CALLBACK (g_application_quit),
02387                               G_APPLICATION (application));
02388
02389     // Creating the buttons bar
02390     window->box_buttons = (GtkBox *) gtk_box_new (GTK_ORIENTATION_HORIZONTAL, 0);
02391     gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_open));
02392     gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_save));
02393     gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_run));
02394     gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_options));
02395     gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_help));
02396     gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_about));
02397     gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_exit));
02398
02399     // Creating the simulator program label and entry
02400     window->label_simulator = (GtkLabel *) gtk_label_new (_("Simulator program"));
02401     window->button_simulator = (GtkButton *)
02402         gtk_button_new_with_mnemonic (_("Simulator program"));
02403     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_simulator),
02404                                 _("Simulator program executable file"));
02405     gtk_widget_set_hexpand (GTK_WIDGET (window->button_simulator), TRUE);
02406     g_signal_connect (window->button_simulator, "clicked",
02407                       G_CALLBACK (dialog_simulator), NULL);
02408
02409     // Creating the evaluator program label and entry
02410     window->check_evaluator = (GtkCheckButton *)
02411         gtk_check_button_new_with_mnemonic (_("_Evaluator program"));
02412     g_signal_connect (window->check_evaluator, "toggled", window_update, NULL);
02413     window->button_evaluator = (GtkButton *)
02414         gtk_button_new_with_mnemonic (_("Evaluator program"));
02415     gtk_widget_set_tooltip_text
02416         (GTK_WIDGET (window->button_evaluator),
02417          _("Optional evaluator program executable file"));
02418     g_signal_connect (window->button_evaluator, "clicked",
02419                       G_CALLBACK (dialog_evaluator), NULL);
02420
02421     // Creating the results files labels and entries
02422     window->label_result = (GtkLabel *) gtk_label_new (_("Result file"));
02423     window->entry_result = (GtkEntry *) gtk_entry_new ();
02424     gtk_widget_set_tooltip_text
02425         (GTK_WIDGET (window->entry_result), _("Best results file"));
02426     window->label_variables = (GtkLabel *) gtk_label_new (_("Variables file"));
02427     window->entry_variables = (GtkEntry *) gtk_entry_new ();
02428     gtk_widget_set_tooltip_text
02429         (GTK_WIDGET (window->entry_variables), _("All simulated results file"));
02430
02431     // Creating the files grid and attaching widgets
02432     window->grid_files = (GtkGrid *) gtk_grid_new ();
02433     gtk_grid_attach (window->grid_files, GTK_WIDGET (window->label_simulator),
02434                     0, 0, 1, 1);
02435     gtk_grid_attach (window->grid_files, GTK_WIDGET (window->button_simulator),
02436                     1, 0, 1, 1);
02437     gtk_grid_attach (window->grid_files, GTK_WIDGET (window->check_evaluator),
02438                     0, 1, 1, 1);
02439     gtk_grid_attach (window->grid_files, GTK_WIDGET (window->button_evaluator),
02440                     1, 1, 1, 1);
02441     gtk_grid_attach (window->grid_files, GTK_WIDGET (window->label_result),
02442                     0, 2, 1, 1);
02443     gtk_grid_attach (window->grid_files, GTK_WIDGET (window->entry_result),
02444                     1, 2, 1, 1);
02445     gtk_grid_attach (window->grid_files, GTK_WIDGET (window->label_variables),
02446                     0, 3, 1, 1);
02447     gtk_grid_attach (window->grid_files, GTK_WIDGET (window->entry_variables),
02448                     1, 3, 1, 1);
02449
02450     // Creating the algorithm properties
02451     window->label_simulations = (GtkLabel *) gtk_label_new
02452         (_("Simulations number"));
02453     window->spin_simulations
02454         = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02455     gtk_widget_set_tooltip_text
02456         (GTK_WIDGET (window->spin_simulations),
02457          _("Number of simulations to perform for each iteration"));
02458     gtk_widget_set_hexpand (GTK_WIDGET (window->spin_simulations), TRUE);
02459     window->label_iterations = (GtkLabel *)
02460         gtk_label_new (_("Iterations number"));
02461     window->spin_iterations
02462         = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02463     gtk_widget_set_tooltip_text
02464         (GTK_WIDGET (window->spin_iterations), _("Number of iterations"));
02465     g_signal_connect
02466         (window->spin_iterations, "value-changed", window_update, NULL);
02467     gtk_widget_set_hexpand (GTK_WIDGET (window->spin_iterations), TRUE);

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02468 window->label_tolerance = (GtkLabel *) gtk_label_new (_("Tolerance"));
02469 window->spin_tolerance =
02470     (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02471 gtk_widget_set_tooltip_text
02472     (GTK_WIDGET (window->spin_tolerance),
02473      _("Tolerance to set the variable interval on the next iteration"));
02474 window->label_best = (GtkLabel *) gtk_label_new (_("Bests number"));
02475 window->spin_best =
02476     (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02477 gtk_widget_set_tooltip_text
02478     (GTK_WIDGET (window->spin_best),
02479      _("Number of best simulations used to set the variable interval "
02480        "on the next iteration"));
02481 window->label_population =
02482     (GtkLabel *) gtk_label_new (_("Population number"));
02483 window->spin_population =
02484     (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02485 gtk_widget_set_tooltip_text
02486     (GTK_WIDGET (window->spin_population),
02487      _("Number of population for the genetic algorithm"));
02488 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_population), TRUE);
02489 window->label_generations =
02490     (GtkLabel *) gtk_label_new (_("Generations number"));
02491 window->spin_generations =
02492     (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02493 gtk_widget_set_tooltip_text
02494     (GTK_WIDGET (window->spin_generations),
02495      _("Number of generations for the genetic algorithm"));
02496 window->label_mutation = (GtkLabel *) gtk_label_new (_("Mutation ratio"));
02497 window->spin_mutation =
02498     (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02499 gtk_widget_set_tooltip_text
02500     (GTK_WIDGET (window->spin_mutation),
02501      _("Ratio of mutation for the genetic algorithm"));
02502 window->label_reproduction =
02503     (GtkLabel *) gtk_label_new (_("Reproduction ratio"));
02504 window->spin_reproduction =
02505     (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02506 gtk_widget_set_tooltip_text
02507     (GTK_WIDGET (window->spin_reproduction),
02508      _("Ratio of reproduction for the genetic algorithm"));
02509 window->label_adaptation = (GtkLabel *) gtk_label_new (_("Adaptation ratio"));
02510 window->spin_adaptation =
02511     (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02512 gtk_widget_set_tooltip_text
02513     (GTK_WIDGET (window->spin_adaptation),
02514      _("Ratio of adaptation for the genetic algorithm"));
02515 window->label_threshold = (GtkLabel *) gtk_label_new (_("Threshold"));
02516 window->spin_threshold = (GtkSpinButton *)
02517     gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE,
02518                                     precision[DEFAULT_PRECISION]);
02519 gtk_widget_set_tooltip_text
02520     (GTK_WIDGET (window->spin_threshold),
02521      _("Threshold in the objective function to finish the simulations"));
02522 window->scrolled_threshold = (GtkScrolledWindow *)
02523 #if !GTK4
02524     gtk_scrolled_window_new (NULL, NULL);
02525 #else
02526     gtk_scrolled_window_new ();
02527 #endif
02528 gtk_scrolled_window_set_child (window->scrolled_threshold,
02529                                GTK_WIDGET (window->spin_threshold));
02530 // gtk_widget_set_hexpand (GTK_WIDGET (window->scrolled_threshold), TRUE);
02531 // gtk_widget_set_halign (GTK_WIDGET (window->scrolled_threshold),
02532 //                          GTK_ALIGN_FILL);
02533 // Creating the hill climbing method properties
02534 window->check_climbing = (GtkCheckButton *)
02535     gtk_check_button_new_with_mnemonic (_("Hill climbing method"));
02536 g_signal_connect (window->check_climbing, "toggled", window_update, NULL);
02537 window->grid_climbing = (GtkGrid *) gtk_grid_new ();
02538 #if !GTK4
02539 window->button_climbing[0] = (GtkRadioButton *)
02540     gtk_radio_button_new_with_mnemonic (NULL, label_climbing[0]);
02541 #else
02542 window->button_climbing[0] = (GtkCheckButton *)
02543     gtk_check_button_new_with_mnemonic (label_climbing[0]);
02544 #endif
02545 gtk_grid_attach (window->grid_climbing,
02546                 GTK_WIDGET (window->button_climbing[0]), 0, 0, 1, 1);
02547 g_signal_connect (window->button_climbing[0], "toggled", window_update, NULL);
02548 for (i = 0; ++i < NCLIMBINGS;)
02549 {
02550     #if !GTK4
02551     window->button_climbing[i] = (GtkRadioButton *)
02552         gtk_radio_button_new_with_mnemonic
02553         (gtk_radio_button_get_group (window->button_climbing[0]),

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02555         label_climbing[i]);
02556 #else
02557     window->button_climbing[i] = (GtkCheckButton *)
02558         gtk_check_button_new_with_mnemonic (label_climbing[i]);
02559     gtk_check_button_set_group (window->button_climbing[i],
02560         window->button_climbing[0]);
02561 #endif
02562     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_climbing[i]),
02563         tip_climbing[i]);
02564     gtk_grid_attach (window->grid_climbing,
02565         GTK_WIDGET (window->button_climbing[i]), 0, i, 1, 1);
02566     g_signal_connect (window->button_climbing[i], "toggled", window_update,
02567         NULL);
02568 }
02569 window->label_steps = (GtkLabel *) gtk_label_new (_("Steps number"));
02570 window->spin_steps = (GtkSpinButton *)
02571     gtk_spin_button_new_with_range (1., 1.e12, 1.);
02572 gtk_widget_set_hexexpand (GTK_WIDGET (window->spin_steps), TRUE);
02573 window->label_estimates
02574     = (GtkLabel *) gtk_label_new (_("Climbing estimates number"));
02575 window->spin_estimates = (GtkSpinButton *)
02576     gtk_spin_button_new_with_range (1., 1.e3, 1.);
02577 window->label_relaxation
02578     = (GtkLabel *) gtk_label_new (_("Relaxation parameter"));
02579 window->spin_relaxation = (GtkSpinButton *)
02580     gtk_spin_button_new_with_range (0., 2., 0.001);
02581 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->label_steps),
02582     0, NCLIMBINGS, 1, 1);
02583 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->spin_steps),
02584     1, NCLIMBINGS, 1, 1);
02585 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->label_estimates),
02586     0, NCLIMBINGS + 1, 1, 1);
02587 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->spin_estimates),
02588     1, NCLIMBINGS + 1, 1, 1);
02589 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->label_relaxation),
02590     0, NCLIMBINGS + 2, 1, 1);
02591 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->spin_relaxation),
02592     1, NCLIMBINGS + 2, 1, 1);
02593
02594 // Creating the array of algorithms
02595 window->grid_algorithm = (GtkGrid *) gtk_grid_new ();
02596 #if !GTK4
02597     window->button_algorithm[0] = (GtkRadioButton *)
02598         gtk_radio_button_new_with_mnemonic (NULL, label_algorithm[0]);
02599 #else
02600     window->button_algorithm[0] = (GtkCheckButton *)
02601         gtk_check_button_new_with_mnemonic (label_algorithm[0]);
02602 #endif
02603     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[0]),
02604         tip_algorithm[0]);
02605     gtk_grid_attach (window->grid_algorithm,
02606         GTK_WIDGET (window->button_algorithm[0]), 0, 0, 1, 1);
02607     g_signal_connect (window->button_algorithm[0], "toggled",
02608         window_set_algorithm, NULL);
02609     for (i = 0; ++i < NALGORITHMS;)
02610     {
02611         #if !GTK4
02612             window->button_algorithm[i] = (GtkRadioButton *)
02613                 gtk_radio_button_new_with_mnemonic
02614                     (gtk_radio_button_get_group (window->button_algorithm[0]),
02615                     label_algorithm[i]);
02616         #else
02617             window->button_algorithm[i] = (GtkCheckButton *)
02618                 gtk_check_button_new_with_mnemonic (label_algorithm[i]);
02619             gtk_check_button_set_group (window->button_algorithm[i],
02620                 window->button_algorithm[0]);
02621         #endif
02622         gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[i]),
02623             tip_algorithm[i]);
02624         gtk_grid_attach (window->grid_algorithm,
02625             GTK_WIDGET (window->button_algorithm[i]), 0, i, 1, 1);
02626         g_signal_connect (window->button_algorithm[i], "toggled",
02627             window_set_algorithm, NULL);
02628     }
02629     gtk_grid_attach (window->grid_algorithm,
02630         GTK_WIDGET (window->label_simulations),
02631         0, NALGORITHMS, 1, 1);
02632     gtk_grid_attach (window->grid_algorithm,
02633         GTK_WIDGET (window->spin_simulations), 1, NALGORITHMS, 1, 1);
02634     gtk_grid_attach (window->grid_algorithm,
02635         GTK_WIDGET (window->label_iterations),
02636         0, NALGORITHMS + 1, 1, 1);
02637     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_iterations),
02638         1, NALGORITHMS + 1, 1, 1);
02639     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_tolerance),
02640         0, NALGORITHMS + 2, 1, 1);
02641     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_tolerance),

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02642         1, NALGORITHMS + 2, 1, 1);
02643     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_bests),
02644         0, NALGORITHMS + 3, 1, 1);
02645     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_bests),
02646         1, NALGORITHMS + 3, 1, 1);
02647     gtk_grid_attach (window->grid_algorithm,
02648         GTK_WIDGET (window->label_population),
02649         0, NALGORITHMS + 4, 1, 1);
02650     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_population),
02651         1, NALGORITHMS + 4, 1, 1);
02652     gtk_grid_attach (window->grid_algorithm,
02653         GTK_WIDGET (window->label_generations),
02654         0, NALGORITHMS + 5, 1, 1);
02655     gtk_grid_attach (window->grid_algorithm,
02656         GTK_WIDGET (window->spin_generations),
02657         1, NALGORITHMS + 5, 1, 1);
02658     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_mutation),
02659         0, NALGORITHMS + 6, 1, 1);
02660     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_mutation),
02661         1, NALGORITHMS + 6, 1, 1);
02662     gtk_grid_attach (window->grid_algorithm,
02663         GTK_WIDGET (window->label_reproduction),
02664         0, NALGORITHMS + 7, 1, 1);
02665     gtk_grid_attach (window->grid_algorithm,
02666         GTK_WIDGET (window->spin_reproduction),
02667         1, NALGORITHMS + 7, 1, 1);
02668     gtk_grid_attach (window->grid_algorithm,
02669         GTK_WIDGET (window->label_adaptation),
02670         0, NALGORITHMS + 8, 1, 1);
02671     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_adaptation),
02672         1, NALGORITHMS + 8, 1, 1);
02673     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->check_climbing),
02674         0, NALGORITHMS + 9, 2, 1);
02675     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->grid_climbing),
02676         0, NALGORITHMS + 10, 2, 1);
02677     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_threshold),
02678         0, NALGORITHMS + 11, 1, 1);
02679     gtk_grid_attach (window->grid_algorithm,
02680         GTK_WIDGET (window->scrolled_threshold),
02681         1, NALGORITHMS + 11, 1, 1);
02682     window->frame_algorithm = (GtkFrame *) gtk_frame_new (_("Algorithm"));
02683     gtk_frame_set_child (window->frame_algorithm,
02684         GTK_WIDGET (window->grid_algorithm));
02685
02686     // Creating the variable widgets
02687     window->combo_variable = (GtkComboBoxText *) gtk_combo_box_text_new ();
02688     gtk_widget_set_tooltip_text
02689         (GTK_WIDGET (window->combo_variable), _("Variables selector"));
02690     window->id_variable = g_signal_connect
02691         (window->combo_variable, "changed", window_set_variable, NULL);
02692     #if !GTK4
02693     window->button_add_variable = (GtkButton *)
02694         gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);
02695     #else
02696     window->button_add_variable = (GtkButton *)
02697         gtk_button_new_from_icon_name ("list-add");
02698     #endif
02699     g_signal_connect (window->button_add_variable, "clicked", window_add_variable,
02700         NULL);
02701     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_variable),
02702         _("Add variable"));
02703     #if !GTK4
02704     window->button_remove_variable = (GtkButton *)
02705         gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02706     #else
02707     window->button_remove_variable = (GtkButton *)
02708         gtk_button_new_from_icon_name ("list-remove");
02709     #endif
02710     g_signal_connect (window->button_remove_variable, "clicked",
02711         window_remove_variable, NULL);
02712     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_remove_variable),
02713         _("Remove variable"));
02714     window->label_variable = (GtkLabel *) gtk_label_new (_("Name"));
02715     window->entry_variable = (GtkEntry *) gtk_entry_new ();
02716     gtk_widget_set_tooltip_text
02717         (GTK_WIDGET (window->entry_variable), _("Variable name"));
02718     gtk_widget_set_hexexpand (GTK_WIDGET (window->entry_variable), TRUE);
02719     window->id_variable_label = g_signal_connect
02720         (window->entry_variable, "changed", window_label_variable, NULL);
02721     window->label_min = (GtkLabel *) gtk_label_new (_("Minimum"));
02722     window->spin_min = (GtkSpinButton *) gtk_spin_button_new_with_range
02723         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02724     gtk_widget_set_tooltip_text
02725         (GTK_WIDGET (window->spin_min), _("Minimum initial value of the variable"));
02726     window->scrolled_min = (GtkScrolledWindow *)
02727     #if !GTK4
02728         gtk_scrolled_window_new (NULL, NULL);

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02729 #else
02730     gtk_scrolled_window_new ();
02731 #endif
02732     gtk_scrolled_window_set_child (window->scrolled_min,
02733                                     GTK_WIDGET (window->spin_min));
02734     g_signal_connect (window->spin_min, "value-changed",
02735                       window_rangemin_variable, NULL);
02736     window->label_max = (GtkLabel *) gtk_label_new (_("Maximum"));
02737     window->spin_max = (GtkSpinButton *) gtk_spin_button_new_with_range
02738         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02739     gtk_widget_set_tooltip_text
02740         (GTK_WIDGET (window->spin_max), _("Maximum initial value of the variable"));
02741     window->scrolled_max = (GtkScrolledWindow *)
02742 #if !GTK4
02743     gtk_scrolled_window_new (NULL, NULL);
02744 #else
02745     gtk_scrolled_window_new ();
02746 #endif
02747     gtk_scrolled_window_set_child (window->scrolled_max,
02748                                     GTK_WIDGET (window->spin_max));
02749     g_signal_connect (window->spin_max, "value-changed",
02750                       window_rangemax_variable, NULL);
02751     window->check_minabs = (GtkCheckButton *)
02752         gtk_check_button_new_with_mnemonic (_("Absolute minimum"));
02753     g_signal_connect (window->check_minabs, "toggled", window_update, NULL);
02754     window->spin_minabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02755         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02756     gtk_widget_set_tooltip_text
02757         (GTK_WIDGET (window->spin_minabs),
02758          _("Minimum allowed value of the variable"));
02759     window->scrolled_minabs = (GtkScrolledWindow *)
02760 #if !GTK4
02761     gtk_scrolled_window_new (NULL, NULL);
02762 #else
02763     gtk_scrolled_window_new ();
02764 #endif
02765     gtk_scrolled_window_set_child (window->scrolled_minabs,
02766                                     GTK_WIDGET (window->spin_minabs));
02767     g_signal_connect (window->spin_minabs, "value-changed",
02768                       window_rangeminabs_variable, NULL);
02769     window->check_maxabs = (GtkCheckButton *)
02770         gtk_check_button_new_with_mnemonic (_("Absolute maximum"));
02771     g_signal_connect (window->check_maxabs, "toggled", window_update, NULL);
02772     window->spin_maxabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02773         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02774     gtk_widget_set_tooltip_text
02775         (GTK_WIDGET (window->spin_maxabs),
02776          _("Maximum allowed value of the variable"));
02777     window->scrolled_maxabs = (GtkScrolledWindow *)
02778 #if !GTK4
02779     gtk_scrolled_window_new (NULL, NULL);
02780 #else
02781     gtk_scrolled_window_new ();
02782 #endif
02783     gtk_scrolled_window_set_child (window->scrolled_maxabs,
02784                                     GTK_WIDGET (window->spin_maxabs));
02785     g_signal_connect (window->spin_maxabs, "value-changed",
02786                       window_rangemaxabs_variable, NULL);
02787     window->label_precision = (GtkLabel *) gtk_label_new (_("Precision digits"));
02788     window->spin_precision = (GtkSpinButton *)
02789         gtk_spin_button_new_with_range (0., (gdouble) DEFAULT_PRECISION, 1.);
02790     gtk_widget_set_tooltip_text
02791         (GTK_WIDGET (window->spin_precision),
02792          _("Number of precision floating point digits\n"
02793            "0 is for integer numbers"));
02794     g_signal_connect (window->spin_precision, "value-changed",
02795                       window_precision_variable, NULL);
02796     window->label_sweeps = (GtkLabel *) gtk_label_new (_("Sweeps number"));
02797     window->spin_sweeps =
02798         (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02799     gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_sweeps),
02800         _("Number of steps sweeping the variable"));
02801     g_signal_connect (window->spin_sweeps, "value-changed",
02802                       window_update_variable, NULL);
02803     window->label_bits = (GtkLabel *) gtk_label_new (_("Bits number"));
02804     window->spin_bits
02805         = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
02806     gtk_widget_set_tooltip_text
02807         (GTK_WIDGET (window->spin_bits),
02808          _("Number of bits to encode the variable"));
02809     g_signal_connect
02810         (window->spin_bits, "value-changed", window_update_variable, NULL);
02811     window->label_step = (GtkLabel *) gtk_label_new (_("Step size"));
02812     window->spin_step = (GtkSpinButton *) gtk_spin_button_new_with_range
02813         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02814     gtk_widget_set_tooltip_text
02815         (GTK_WIDGET (window->spin_step),

```



```

02816     _("Initial step size for the hill climbing method"));
02817     window->scrolled_step = (GtkScrolledWindow *)
02818     #if !GTK4
02819     gtk_scrolled_window_new (NULL, NULL);
02820     #else
02821     gtk_scrolled_window_new ();
02822     #endif
02823     gtk_scrolled_window_set_child (window->scrolled_step,
02824     GTK_WIDGET (window->spin_step));
02825     g_signal_connect
02826     (window->spin_step, "value-changed", window_step_variable, NULL);
02827     window->grid_variable = (GtkGrid *) gtk_grid_new ();
02828     gtk_grid_attach (window->grid_variable,
02829     GTK_WIDGET (window->combo_variable), 0, 0, 2, 1);
02830     gtk_grid_attach (window->grid_variable,
02831     GTK_WIDGET (window->button_add_variable), 2, 0, 1, 1);
02832     gtk_grid_attach (window->grid_variable,
02833     GTK_WIDGET (window->button_remove_variable), 3, 0, 1, 1);
02834     gtk_grid_attach (window->grid_variable,
02835     GTK_WIDGET (window->label_variable), 0, 1, 1, 1);
02836     gtk_grid_attach (window->grid_variable,
02837     GTK_WIDGET (window->entry_variable), 1, 1, 3, 1);
02838     gtk_grid_attach (window->grid_variable,
02839     GTK_WIDGET (window->label_min), 0, 2, 1, 1);
02840     gtk_grid_attach (window->grid_variable,
02841     GTK_WIDGET (window->scrolled_min), 1, 2, 3, 1);
02842     gtk_grid_attach (window->grid_variable,
02843     GTK_WIDGET (window->label_max), 0, 3, 1, 1);
02844     gtk_grid_attach (window->grid_variable,
02845     GTK_WIDGET (window->scrolled_max), 1, 3, 3, 1);
02846     gtk_grid_attach (window->grid_variable,
02847     GTK_WIDGET (window->check_minabs), 0, 4, 1, 1);
02848     gtk_grid_attach (window->grid_variable,
02849     GTK_WIDGET (window->scrolled_minabs), 1, 4, 3, 1);
02850     gtk_grid_attach (window->grid_variable,
02851     GTK_WIDGET (window->check_maxabs), 0, 5, 1, 1);
02852     gtk_grid_attach (window->grid_variable,
02853     GTK_WIDGET (window->scrolled_maxabs), 1, 5, 3, 1);
02854     gtk_grid_attach (window->grid_variable,
02855     GTK_WIDGET (window->label_precision), 0, 6, 1, 1);
02856     gtk_grid_attach (window->grid_variable,
02857     GTK_WIDGET (window->spin_precision), 1, 6, 3, 1);
02858     gtk_grid_attach (window->grid_variable,
02859     GTK_WIDGET (window->label_sweeps), 0, 7, 1, 1);
02860     gtk_grid_attach (window->grid_variable,
02861     GTK_WIDGET (window->spin_sweeps), 1, 7, 3, 1);
02862     gtk_grid_attach (window->grid_variable,
02863     GTK_WIDGET (window->label_bits), 0, 8, 1, 1);
02864     gtk_grid_attach (window->grid_variable,
02865     GTK_WIDGET (window->spin_bits), 1, 8, 3, 1);
02866     gtk_grid_attach (window->grid_variable,
02867     GTK_WIDGET (window->label_step), 0, 9, 1, 1);
02868     gtk_grid_attach (window->grid_variable,
02869     GTK_WIDGET (window->scrolled_step), 1, 9, 3, 1);
02870     window->frame_variable = (GtkFrame *) gtk_frame_new (_("Variable"));
02871     gtk_frame_set_child (window->frame_variable,
02872     GTK_WIDGET (window->grid_variable));
02873
02874     // Creating the experiment widgets
02875     window->combo_experiment = (GtkComboBoxText *) gtk_combo_box_text_new ();
02876     gtk_widget_set_tooltip_text (GTK_WIDGET (window->combo_experiment),
02877     _("Experiment selector"));
02878     window->id_experiment = g_signal_connect
02879     (window->combo_experiment, "changed", window_set_experiment, NULL);
02880     #if !GTK4
02881     window->button_add_experiment = (GtkButton *)
02882     gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);
02883     #else
02884     window->button_add_experiment = (GtkButton *)
02885     gtk_button_new_from_icon_name ("list-add");
02886     #endif
02887     g_signal_connect
02888     (window->button_add_experiment, "clicked", window_add_experiment, NULL);
02889     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_experiment),
02890     _("Add experiment"));
02891     #if !GTK4
02892     window->button_remove_experiment = (GtkButton *)
02893     gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02894     #else
02895     window->button_remove_experiment = (GtkButton *)
02896     gtk_button_new_from_icon_name ("list-remove");
02897     #endif
02898     g_signal_connect (window->button_remove_experiment, "clicked",
02899     window_remove_experiment, NULL);
02900     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_remove_experiment),
02901     _("Remove experiment"));
02902     window->label_experiment

```



```

02903     = (GtkLabel *) gtk_label_new (_("Experimental data file"));
02904     window->button_experiment = (GtkButton *)
02905     gtk_button_new_with_mnemonic (_("Experimental data file"));
02906     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_experiment),
02907     _("Experimental data file"));
02908     g_signal_connect (window->button_experiment, "clicked",
02909     window_name_experiment, NULL);
02910     gtk_widget_set_hexpand (GTK_WIDGET (window->button_experiment), TRUE);
02911     window->label_weight = (GtkLabel *) gtk_label_new (_("Weight"));
02912     window->spin_weight
02913     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02914     gtk_widget_set_tooltip_text
02915     (GTK_WIDGET (window->spin_weight),
02916     _("Weight factor to build the objective function"));
02917     g_signal_connect
02918     (window->spin_weight, "value-changed", window_weight_experiment, NULL);
02919     window->grid_experiment = (GtkGrid *) gtk_grid_new ();
02920     gtk_grid_attach (window->grid_experiment,
02921     GTK_WIDGET (window->combo_experiment), 0, 0, 2, 1);
02922     gtk_grid_attach (window->grid_experiment,
02923     GTK_WIDGET (window->button_add_experiment), 2, 0, 1, 1);
02924     gtk_grid_attach (window->grid_experiment,
02925     GTK_WIDGET (window->button_remove_experiment), 3, 0, 1, 1);
02926     gtk_grid_attach (window->grid_experiment,
02927     GTK_WIDGET (window->label_experiment), 0, 1, 1, 1);
02928     gtk_grid_attach (window->grid_experiment,
02929     GTK_WIDGET (window->button_experiment), 1, 1, 3, 1);
02930     gtk_grid_attach (window->grid_experiment,
02931     GTK_WIDGET (window->label_weight), 0, 2, 1, 1);
02932     gtk_grid_attach (window->grid_experiment,
02933     GTK_WIDGET (window->spin_weight), 1, 2, 3, 1);
02934     for (i = 0; i < MAX_NINPITS; ++i)
02935     {
02936         snprintf (buffer3, 64, "%s %u", _("Input template"), i + 1);
02937         window->check_template[i] = (GtkCheckButton *)
02938         gtk_check_button_new_with_label (buffer3);
02939         window->id_template[i]
02940         = g_signal_connect (window->check_template[i], "toggled",
02941         window_inputs_experiment, NULL);
02942         gtk_grid_attach (window->grid_experiment,
02943         GTK_WIDGET (window->check_template[i]), 0, 3 + i, 1, 1);
02944         window->button_template[i] = (GtkButton *)
02945         gtk_button_new_with_mnemonic (_("Input template"));
02946         gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_template[i]),
02947         _("Experimental input template file"));
02948         window->id_input[i] =
02949         g_signal_connect_swapped (window->button_template[i], "clicked",
02950         (GCallback) window_template_experiment,
02951         (void *) (size_t) i);
02952         gtk_grid_attach (window->grid_experiment,
02953         GTK_WIDGET (window->button_template[i]), 1, 3 + i, 3, 1);
02954     }
02955     window->frame_experiment = (GtkFrame *) gtk_frame_new (_("Experiment"));
02956     gtk_frame_set_child (window->frame_experiment,
02957     GTK_WIDGET (window->grid_experiment));
02958
02959     // Creating the error norm widgets
02960     window->frame_norm = (GtkFrame *) gtk_frame_new (_("Error norm"));
02961     window->grid_norm = (GtkGrid *) gtk_grid_new ();
02962     gtk_frame_set_child (window->frame_norm, GTK_WIDGET (window->grid_norm));
02963     #if !GTK4
02964     window->button_norm[0] = (GtkRadioButton *)
02965     gtk_radio_button_new_with_mnemonic (NULL, label_norm[0]);
02966     #else
02967     window->button_norm[0] = (GtkCheckButton *)
02968     gtk_check_button_new_with_mnemonic (label_norm[0]);
02969     #endif
02970     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[0]),
02971     tip_norm[0]);
02972     gtk_grid_attach (window->grid_norm,
02973     GTK_WIDGET (window->button_norm[0]), 0, 0, 1, 1);
02974     g_signal_connect (window->button_norm[0], "toggled", window_update, NULL);
02975     for (i = 0; ++i < NNORMS;)
02976     {
02977         #if !GTK4
02978         window->button_norm[i] = (GtkRadioButton *)
02979         gtk_radio_button_new_with_mnemonic
02980         (gtk_radio_button_get_group (window->button_norm[0]), label_norm[i]);
02981         #else
02982         window->button_norm[i] = (GtkCheckButton *)
02983         gtk_check_button_new_with_mnemonic (label_norm[i]);
02984         gtk_check_button_set_group (window->button_norm[i],
02985         window->button_norm[0]);
02986         #endif
02987         gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[i]),
02988         tip_norm[i]);
02989     }

```

```

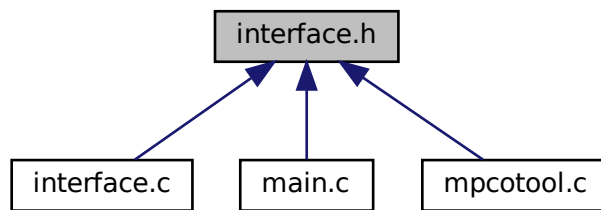
02990     gtk_grid_attach (window->grid_norm,
02991                     GTK_WIDGET (window->button_norm[i]), 0, i, 1, 1);
02992     g_signal_connect (window->button_norm[i], "toggled", window_update, NULL);
02993 }
02994 window->label_p = (GtkLabel *) gtk_label_new (_("P parameter"));
02995 gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->label_p), 1, 1, 1, 1);
02996 window->spin_p = (GtkSpinButton *)
02997     gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE, 0.01);
02998 gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_p),
02999                             _("P parameter for the P error norm"));
03000 window->scrolled_p = (GtkScrolledWindow *)
03001 #if !GTK4
03002     gtk_scrolled_window_new (NULL, NULL);
03003 #else
03004     gtk_scrolled_window_new ();
03005 #endif
03006 gtk_scrolled_window_set_child (window->scrolled_p,
03007                               GTK_WIDGET (window->spin_p));
03008 gtk_widget_set_hexpand (GTK_WIDGET (window->scrolled_p), TRUE);
03009 gtk_widget_set_halign (GTK_WIDGET (window->scrolled_p), GTK_ALIGN_FILL);
03010 gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->scrolled_p),
03011                 1, 2, 1, 2);
03012
03013 // Creating the grid and attaching the widgets to the grid
03014 window->grid = (GtkGrid *) gtk_grid_new ();
03015 gtk_grid_attach (window->grid, GTK_WIDGET (window->box_buttons), 0, 0, 3, 1);
03016 gtk_grid_attach (window->grid, GTK_WIDGET (window->grid_files), 0, 1, 1, 1);
03017 gtk_grid_attach (window->grid,
03018                 GTK_WIDGET (window->frame_algorithm), 0, 2, 1, 1);
03019 gtk_grid_attach (window->grid,
03020                 GTK_WIDGET (window->frame_variable), 1, 2, 1, 1);
03021 gtk_grid_attach (window->grid,
03022                 GTK_WIDGET (window->frame_experiment), 2, 2, 1, 1);
03023 gtk_grid_attach (window->grid, GTK_WIDGET (window->frame_norm), 1, 1, 2, 1);
03024 gtk_window_set_child (window->window, GTK_WIDGET (window->grid));
03025
03026 // Setting the window logo
03027 window->logo = gdk_pixbuf_new_from_xpm_data (logo);
03028 #if !GTK4
03029     gtk_window_set_icon (window->window, window->logo);
03030 #endif
03031
03032 // Showing the window
03033 #if !GTK4
03034     gtk_widget_show_all (GTK_WIDGET (window->window));
03035 #else
03036     gtk_widget_show (GTK_WIDGET (window->window));
03037 #endif
03038
03039 // In GTK+ 3.16 and 3.18 the default scrolled size is wrong
03040 #if GTK_MINOR_VERSION >= 16
03041     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_min), -1, 40);
03042     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_max), -1, 40);
03043     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_minabs), -1, 40);
03044     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_maxabs), -1, 40);
03045     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_step), -1, 40);
03046     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_p), -1, 40);
03047     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_threshold), -1, 40);
03048 #endif
03049
03050 // Reading initial example
03051 input_new ();
03052 buffer2 = g_get_current_dir ();
03053 buffer = g_build_filename (buffer2, "..", "tests", "test1", INPUT_FILE, NULL);
03054 g_free (buffer2);
03055 window_read (buffer);
03056 g_free (buffer);
03057
03058 #if DEBUG_INTERFACE
03059     fprintf (stderr, "window_new: start\n");
03060 #endif
03061 }

```

5.13 interface.h File Reference

Header file to define the graphical interface functions.

This graph shows which files directly or indirectly include this file:



Data Structures

- struct [Options](#)
Struct to define the options dialog.
- struct [Running](#)
Struct to define the running dialog.
- struct [Window](#)
Struct to define the main window.

Macros

- #define [MAX_LENGTH](#) ([DEFAULT_PRECISION](#) + 8)
Max length of texts allowed in GtkSpinButtons.

Functions

- void [window_new](#) (GtkApplication *application)

Variables

- [Window window](#) [1]
[Window](#) struct to define the main interface window.

5.13.1 Detailed Description

Header file to define the graphical interface functions.

Authors

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Copyright

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Definition in file [interface.h](#).

5.13.2 Macro Definition Documentation

5.13.2.1 MAX_LENGTH

```
#define MAX_LENGTH (DEFAULT_PRECISION + 8)
```

Max length of texts allowed in GtkSpinButtons.

Definition at line 42 of file [interface.h](#).

5.13.3 Function Documentation

5.13.3.1 window_new()

```
void window_new (
    GtkApplication * application )
```

Function to open the main window.

Parameters

<i>application</i>	GtkApplication struct.
--------------------	------------------------

Definition at line 2274 of file [interface.c](#).

```
02275 {
02276     unsigned int i;
02277     char *buffer, *buffer2, buffer3[64];
02278     const char *label_algorithm[NALGORITHMS] = {
02279         "_Monte-Carlo", _("_Sweep"), _("_Genetic"), _("_Orthogonal")
02280     };
02281     const char *tip_algorithm[NALGORITHMS] = {
02282         _("Monte-Carlo brute force algorithm"),
02283         _("Sweep brute force algorithm"),
02284         _("Genetic algorithm"),
02285         _("Orthogonal sampling brute force algorithm"),
02286     };
02287     const char *label_climbing[NCLIMBINGS] = {
02288         _("_Coordinates climbing"), _("_Random climbing")
02289     };
02290     const char *tip_climbing[NCLIMBINGS] = {
02291         _("Coordinates climbing estimate method"),
02292         _("Random climbing estimate method")
02293     };
02294     const char *label_norm[NNORMS] = { "L2", "L", "Lp", "L1" };
02295     const char *tip_norm[NNORMS] = {
02296         _("Euclidean error norm (L2)"),
02297         _("Maximum error norm (L)"),
02298         _("P error norm (Lp)"),
02299         _("Taxicab error norm (L1)")
02300     };
02301     #if !GTK4
02302     const char *close = "delete-event";
02303     #else
02304     const char *close = "close-request";
02305     #endif
02306
02307     #if DEBUG_INTERFACE
```

```
02308     fprintf (stderr, "window_new: start\n");
02309 #endif
02310
02311     // Creating the window
02312     window->window = main_window
02313     = (GtkWindow *) gtk_application_window_new (application);
02314
02315     // Finish when closing the window
02316     g_signal_connect_swapped (window->window, close,
02317                               G_CALLBACK (g_application_quit),
02318                               G_APPLICATION (application));
02319
02320     // Setting the window title
02321     gtk_window_set_title (window->window, "MPCOTool");
02322
02323     // Creating the open button
02324     window->button_open = (GtkButton *)
02325 #if !GTK4
02326     gtk_button_new_from_icon_name ("document-open", GTK_ICON_SIZE_BUTTON);
02327 #else
02328     gtk_button_new_from_icon_name ("document-open");
02329 #endif
02330     g_signal_connect (window->button_open, "clicked", window_open, NULL);
02331
02332     // Creating the save button
02333     window->button_save = (GtkButton *)
02334 #if !GTK4
02335     gtk_button_new_from_icon_name ("document-save", GTK_ICON_SIZE_BUTTON);
02336 #else
02337     gtk_button_new_from_icon_name ("document-save");
02338 #endif
02339     g_signal_connect (window->button_save, "clicked", (GCallback) window_save,
02340                       NULL);
02341
02342     // Creating the run button
02343     window->button_run = (GtkButton *)
02344 #if !GTK4
02345     gtk_button_new_from_icon_name ("system-run", GTK_ICON_SIZE_BUTTON);
02346 #else
02347     gtk_button_new_from_icon_name ("system-run");
02348 #endif
02349     g_signal_connect (window->button_run, "clicked", window_run, NULL);
02350
02351     // Creating the options button
02352     window->button_options = (GtkButton *)
02353 #if !GTK4
02354     gtk_button_new_from_icon_name ("preferences-system", GTK_ICON_SIZE_BUTTON);
02355 #else
02356     gtk_button_new_from_icon_name ("preferences-system");
02357 #endif
02358     g_signal_connect (window->button_options, "clicked", options_new, NULL);
02359
02360     // Creating the help button
02361     window->button_help = (GtkButton *)
02362 #if !GTK4
02363     gtk_button_new_from_icon_name ("help-browser", GTK_ICON_SIZE_BUTTON);
02364 #else
02365     gtk_button_new_from_icon_name ("help-browser");
02366 #endif
02367     g_signal_connect (window->button_help, "clicked", window_help, NULL);
02368
02369     // Creating the about button
02370     window->button_about = (GtkButton *)
02371 #if !GTK4
02372     gtk_button_new_from_icon_name ("help-about", GTK_ICON_SIZE_BUTTON);
02373 #else
02374     gtk_button_new_from_icon_name ("help-about");
02375 #endif
02376     g_signal_connect (window->button_about, "clicked", window_about, NULL);
02377
02378     // Creating the exit button
02379     window->button_exit = (GtkButton *)
02380 #if !GTK4
02381     gtk_button_new_from_icon_name ("application-exit", GTK_ICON_SIZE_BUTTON);
02382 #else
02383     gtk_button_new_from_icon_name ("application-exit");
02384 #endif
02385     g_signal_connect_swapped (window->button_exit, "clicked",
02386                               G_CALLBACK (g_application_quit),
02387                               G_APPLICATION (application));
02388
02389     // Creating the buttons bar
02390     window->box_buttons = (GtkBox *) gtk_box_new (GTK_ORIENTATION_HORIZONTAL, 0);
02391     gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_open));
02392     gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_save));
02393     gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_run));
02394     gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_options));
```

```

02395 gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_help));
02396 gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_about));
02397 gtk_box_append (window->box_buttons, GTK_WIDGET (window->button_exit));
02398
02399 // Creating the simulator program label and entry
02400 window->label_simulator = (GtkLabel *) gtk_label_new (_("Simulator program"));
02401 window->button_simulator = (GtkButton *)
02402     gtk_button_new_with_mnemonic (_("Simulator program"));
02403 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_simulator),
02404     _("Simulator program executable file"));
02405 gtk_widget_set_hexexpand (GTK_WIDGET (window->button_simulator), TRUE);
02406 g_signal_connect (window->button_simulator, "clicked",
02407     G_CALLBACK (dialog_simulator), NULL);
02408
02409 // Creating the evaluator program label and entry
02410 window->check_evaluator = (GtkCheckButton *)
02411     gtk_check_button_new_with_mnemonic (_("Evaluator program"));
02412 g_signal_connect (window->check_evaluator, "toggled", window_update, NULL);
02413 window->button_evaluator = (GtkButton *)
02414     gtk_button_new_with_mnemonic (_("Evaluator program"));
02415 gtk_widget_set_tooltip_text
02416     (GTK_WIDGET (window->button_evaluator),
02417     _("Optional evaluator program executable file"));
02418 g_signal_connect (window->button_evaluator, "clicked",
02419     G_CALLBACK (dialog_evaluator), NULL);
02420
02421 // Creating the results files labels and entries
02422 window->label_result = (GtkLabel *) gtk_label_new (_("Result file"));
02423 window->entry_result = (GtkEntry *) gtk_entry_new ();
02424 gtk_widget_set_tooltip_text
02425     (GTK_WIDGET (window->entry_result), _("Best results file"));
02426 window->label_variables = (GtkLabel *) gtk_label_new (_("Variables file"));
02427 window->entry_variables = (GtkEntry *) gtk_entry_new ();
02428 gtk_widget_set_tooltip_text
02429     (GTK_WIDGET (window->entry_variables), _("All simulated results file"));
02430
02431 // Creating the files grid and attaching widgets
02432 window->grid_files = (GtkGrid *) gtk_grid_new ();
02433 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->label_simulator),
02434     0, 0, 1, 1);
02435 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->button_simulator),
02436     1, 0, 1, 1);
02437 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->check_evaluator),
02438     0, 1, 1, 1);
02439 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->button_evaluator),
02440     1, 1, 1, 1);
02441 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->label_result),
02442     0, 2, 1, 1);
02443 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->entry_result),
02444     1, 2, 1, 1);
02445 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->label_variables),
02446     0, 3, 1, 1);
02447 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->entry_variables),
02448     1, 3, 1, 1);
02449
02450 // Creating the algorithm properties
02451 window->label_simulations = (GtkLabel *) gtk_label_new
02452     (_("Simulations number"));
02453 window->spin_simulations
02454     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02455 gtk_widget_set_tooltip_text
02456     (GTK_WIDGET (window->spin_simulations),
02457     _("Number of simulations to perform for each iteration"));
02458 gtk_widget_set_hexexpand (GTK_WIDGET (window->spin_simulations), TRUE);
02459 window->label_iterations = (GtkLabel *)
02460     gtk_label_new (_("Iterations number"));
02461 window->spin_iterations
02462     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02463 gtk_widget_set_tooltip_text
02464     (GTK_WIDGET (window->spin_iterations), _("Number of iterations"));
02465 g_signal_connect
02466     (window->spin_iterations, "value-changed", window_update, NULL);
02467 gtk_widget_set_hexexpand (GTK_WIDGET (window->spin_iterations), TRUE);
02468 window->label_tolerance = (GtkLabel *) gtk_label_new (_("Tolerance"));
02469 window->spin_tolerance =
02470     (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02471 gtk_widget_set_tooltip_text
02472     (GTK_WIDGET (window->spin_tolerance),
02473     _("Tolerance to set the variable interval on the next iteration"));
02474 window->label_bests = (GtkLabel *) gtk_label_new (_("Bests number"));
02475 window->spin_bests
02476     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02477 gtk_widget_set_tooltip_text
02478     (GTK_WIDGET (window->spin_bests),
02479     _("Number of best simulations used to set the variable interval "
02480     "on the next iteration"));
02481 window->label_population

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02482     = (GtkLabel *) gtk_label_new (_("Population number"));
02483 window->spin_population
02484     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02485 gtk_widget_set_tooltip_text
02486     (GTK_WIDGET (window->spin_population),
02487      _("Number of population for the genetic algorithm"));
02488 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_population), TRUE);
02489 window->label_generations
02490     = (GtkLabel *) gtk_label_new (_("Generations number"));
02491 window->spin_generations
02492     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02493 gtk_widget_set_tooltip_text
02494     (GTK_WIDGET (window->spin_generations),
02495      _("Number of generations for the genetic algorithm"));
02496 window->label_mutation = (GtkLabel *) gtk_label_new (_("Mutation ratio"));
02497 window->spin_mutation
02498     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02499 gtk_widget_set_tooltip_text
02500     (GTK_WIDGET (window->spin_mutation),
02501      _("Ratio of mutation for the genetic algorithm"));
02502 window->label_reproduction
02503     = (GtkLabel *) gtk_label_new (_("Reproduction ratio"));
02504 window->spin_reproduction
02505     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02506 gtk_widget_set_tooltip_text
02507     (GTK_WIDGET (window->spin_reproduction),
02508      _("Ratio of reproduction for the genetic algorithm"));
02509 window->label_adaptation = (GtkLabel *) gtk_label_new (_("Adaptation ratio"));
02510 window->spin_adaptation
02511     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02512 gtk_widget_set_tooltip_text
02513     (GTK_WIDGET (window->spin_adaptation),
02514      _("Ratio of adaptation for the genetic algorithm"));
02515 window->label_threshold = (GtkLabel *) gtk_label_new (_("Threshold"));
02516 window->spin_threshold = (GtkSpinButton *)
02517     gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE,
02518                                     precision[DEFAULT_PRECISION]);
02519 gtk_widget_set_tooltip_text
02520     (GTK_WIDGET (window->spin_threshold),
02521      _("Threshold in the objective function to finish the simulations"));
02522 window->scrolled_threshold = (GtkScrolledWindow *)
02523 #if !GTK4
02524     gtk_scrolled_window_new (NULL, NULL);
02525 #else
02526     gtk_scrolled_window_new ();
02527 #endif
02528 gtk_scrolled_window_set_child (window->scrolled_threshold,
02529                                GTK_WIDGET (window->spin_threshold));
02530 // gtk_widget_set_hexpand (GTK_WIDGET (window->scrolled_threshold), TRUE);
02531 // gtk_widget_set_halign (GTK_WIDGET (window->scrolled_threshold),
02532 //                          GTK_ALIGN_FILL);
02533
02534 // Creating the hill climbing method properties
02535 window->check_climbing = (GtkCheckButton *)
02536     gtk_check_button_new_with_mnemonic (_("_Hill climbing method"));
02537 g_signal_connect (window->check_climbing, "toggled", window_update, NULL);
02538 window->grid_climbing = (GtkGrid *) gtk_grid_new ();
02539 #if !GTK4
02540 window->button_climbing[0] = (GtkRadioButton *)
02541     gtk_radio_button_new_with_mnemonic (NULL, label_climbing[0]);
02542 #else
02543 window->button_climbing[0] = (GtkCheckButton *)
02544     gtk_check_button_new_with_mnemonic (label_climbing[0]);
02545 #endif
02546 gtk_grid_attach (window->grid_climbing,
02547                 GTK_WIDGET (window->button_climbing[0]), 0, 0, 1, 1);
02548 g_signal_connect (window->button_climbing[0], "toggled", window_update, NULL);
02549 for (i = 0; ++i < NCLIMBINGS;)
02550 {
02551 #if !GTK4
02552     window->button_climbing[i] = (GtkRadioButton *)
02553         gtk_radio_button_new_with_mnemonic
02554             (gtk_radio_button_get_group (window->button_climbing[0]),
02555              label_climbing[i]);
02556 #else
02557     window->button_climbing[i] = (GtkCheckButton *)
02558         gtk_check_button_new_with_mnemonic (label_climbing[i]);
02559     gtk_check_button_set_group (window->button_climbing[i],
02560                                window->button_climbing[0]);
02561 #endif
02562     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_climbing[i]),
02563                                 tip_climbing[i]);
02564     gtk_grid_attach (window->grid_climbing,
02565                     GTK_WIDGET (window->button_climbing[i]), 0, i, 1, 1);
02566     g_signal_connect (window->button_climbing[i], "toggled", window_update,
02567                       NULL);
02568 }

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02569 window->label_steps = (GtkLabel *) gtk_label_new (_("Steps number"));
02570 window->spin_steps = (GtkSpinButton *)
02571     gtk_spin_button_new_with_range (1., 1.e12, 1.);
02572 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_steps), TRUE);
02573 window->label_estimates
02574     = (GtkLabel *) gtk_label_new (_("Climbing estimates number"));
02575 window->spin_estimates = (GtkSpinButton *)
02576     gtk_spin_button_new_with_range (1., 1.e3, 1.);
02577 window->label_relaxation
02578     = (GtkLabel *) gtk_label_new (_("Relaxation parameter"));
02579 window->spin_relaxation = (GtkSpinButton *)
02580     gtk_spin_button_new_with_range (0., 2., 0.001);
02581 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->label_steps),
02582     0, NCLIMBINGS, 1, 1);
02583 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->spin_steps),
02584     1, NCLIMBINGS, 1, 1);
02585 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->label_estimates),
02586     0, NCLIMBINGS + 1, 1, 1);
02587 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->spin_estimates),
02588     1, NCLIMBINGS + 1, 1, 1);
02589 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->label_relaxation),
02590     0, NCLIMBINGS + 2, 1, 1);
02591 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->spin_relaxation),
02592     1, NCLIMBINGS + 2, 1, 1);
02593
02594 // Creating the array of algorithms
02595 window->grid_algorithm = (GtkGrid *) gtk_grid_new ();
02596 #if !GTK4
02597     window->button_algorithm[0] = (GtkRadioButton *)
02598         gtk_radio_button_new_with_mnemonic (NULL, label_algorithm[0]);
02599 #else
02600     window->button_algorithm[0] = (GtkCheckButton *)
02601         gtk_check_button_new_with_mnemonic (label_algorithm[0]);
02602 #endif
02603 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[0]),
02604     tip_algorithm[0]);
02605 gtk_grid_attach (window->grid_algorithm,
02606     GTK_WIDGET (window->button_algorithm[0]), 0, 0, 1, 1);
02607 g_signal_connect (window->button_algorithm[0], "toggled",
02608     window_set_algorithm, NULL);
02609 for (i = 0; ++i < NALGORITHMS;)
02610 {
02611     #if !GTK4
02612         window->button_algorithm[i] = (GtkRadioButton *)
02613             gtk_radio_button_new_with_mnemonic
02614                 (gtk_radio_button_get_group (window->button_algorithm[0]),
02615                 label_algorithm[i]);
02616     #else
02617         window->button_algorithm[i] = (GtkCheckButton *)
02618             gtk_check_button_new_with_mnemonic (label_algorithm[i]);
02619         gtk_check_button_set_group (window->button_algorithm[i],
02620             window->button_algorithm[0]);
02621     #endif
02622     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[i]),
02623         tip_algorithm[i]);
02624     gtk_grid_attach (window->grid_algorithm,
02625         GTK_WIDGET (window->button_algorithm[i]), 0, i, 1, 1);
02626     g_signal_connect (window->button_algorithm[i], "toggled",
02627         window_set_algorithm, NULL);
02628 }
02629 gtk_grid_attach (window->grid_algorithm,
02630     GTK_WIDGET (window->label_simulations),
02631     0, NALGORITHMS, 1, 1);
02632 gtk_grid_attach (window->grid_algorithm,
02633     GTK_WIDGET (window->spin_simulations), 1, NALGORITHMS, 1, 1);
02634 gtk_grid_attach (window->grid_algorithm,
02635     GTK_WIDGET (window->label_iterations),
02636     0, NALGORITHMS + 1, 1, 1);
02637 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_iterations),
02638     1, NALGORITHMS + 1, 1, 1);
02639 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_tolerance),
02640     0, NALGORITHMS + 2, 1, 1);
02641 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_tolerance),
02642     1, NALGORITHMS + 2, 1, 1);
02643 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_bests),
02644     0, NALGORITHMS + 3, 1, 1);
02645 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_bests),
02646     1, NALGORITHMS + 3, 1, 1);
02647 gtk_grid_attach (window->grid_algorithm,
02648     GTK_WIDGET (window->label_population),
02649     0, NALGORITHMS + 4, 1, 1);
02650 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_population),
02651     1, NALGORITHMS + 4, 1, 1);
02652 gtk_grid_attach (window->grid_algorithm,
02653     GTK_WIDGET (window->label_generations),
02654     0, NALGORITHMS + 5, 1, 1);
02655 gtk_grid_attach (window->grid_algorithm,

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02656         GTK_WIDGET (window->spin_generations),
02657         1, NALGORITHMS + 5, 1, 1);
02658     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_mutation),
02659         0, NALGORITHMS + 6, 1, 1);
02660     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_mutation),
02661         1, NALGORITHMS + 6, 1, 1);
02662     gtk_grid_attach (window->grid_algorithm,
02663         GTK_WIDGET (window->label_reproduction),
02664         0, NALGORITHMS + 7, 1, 1);
02665     gtk_grid_attach (window->grid_algorithm,
02666         GTK_WIDGET (window->spin_reproduction),
02667         1, NALGORITHMS + 7, 1, 1);
02668     gtk_grid_attach (window->grid_algorithm,
02669         GTK_WIDGET (window->label_adaptation),
02670         0, NALGORITHMS + 8, 1, 1);
02671     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->spin_adaptation),
02672         1, NALGORITHMS + 8, 1, 1);
02673     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->check_climbing),
02674         0, NALGORITHMS + 9, 2, 1);
02675     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->grid_climbing),
02676         0, NALGORITHMS + 10, 2, 1);
02677     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->label_threshold),
02678         0, NALGORITHMS + 11, 1, 1);
02679     gtk_grid_attach (window->grid_algorithm,
02680         GTK_WIDGET (window->scrolled_threshold),
02681         1, NALGORITHMS + 11, 1, 1);
02682     window->frame_algorithm = (GtkFrame *) gtk_frame_new (_("Algorithm"));
02683     gtk_frame_set_child (window->frame_algorithm,
02684         GTK_WIDGET (window->grid_algorithm));
02685
02686     // Creating the variable widgets
02687     window->combo_variable = (GtkComboBoxText *) gtk_combo_box_text_new ();
02688     gtk_widget_set_tooltip_text
02689         (GTK_WIDGET (window->combo_variable), _("Variables selector"));
02690     window->id_variable = g_signal_connect
02691         (window->combo_variable, "changed", window_set_variable, NULL);
02692     #if !GTK4
02693         window->button_add_variable = (GtkButton *)
02694             gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);
02695     #else
02696         window->button_add_variable = (GtkButton *)
02697             gtk_button_new_from_icon_name ("list-add");
02698     #endif
02699     g_signal_connect (window->button_add_variable, "clicked", window_add_variable,
02700         NULL);
02701     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_variable),
02702         _("Add variable"));
02703     #if !GTK4
02704         window->button_remove_variable = (GtkButton *)
02705             gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02706     #else
02707         window->button_remove_variable = (GtkButton *)
02708             gtk_button_new_from_icon_name ("list-remove");
02709     #endif
02710     g_signal_connect (window->button_remove_variable, "clicked",
02711         window_remove_variable, NULL);
02712     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_remove_variable),
02713         _("Remove variable"));
02714     window->label_variable = (GtkLabel *) gtk_label_new (_("Name"));
02715     window->entry_variable = (GtkEntry *) gtk_entry_new ();
02716     gtk_widget_set_tooltip_text
02717         (GTK_WIDGET (window->entry_variable), _("Variable name"));
02718     gtk_widget_set_expand (GTK_WIDGET (window->entry_variable), TRUE);
02719     window->id_variable_label = g_signal_connect
02720         (window->entry_variable, "changed", window_label_variable, NULL);
02721     window->label_min = (GtkLabel *) gtk_label_new (_("Minimum"));
02722     window->spin_min = (GtkSpinButton *) gtk_spin_button_new_with_range
02723         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02724     gtk_widget_set_tooltip_text
02725         (GTK_WIDGET (window->spin_min), _("Minimum initial value of the variable"));
02726     window->scrolled_min = (GtkScrolledWindow *)
02727     #if !GTK4
02728         gtk_scrolled_window_new (NULL, NULL);
02729     #else
02730         gtk_scrolled_window_new ();
02731     #endif
02732     gtk_scrolled_window_set_child (window->scrolled_min,
02733         GTK_WIDGET (window->spin_min));
02734     g_signal_connect (window->spin_min, "value-changed",
02735         window_rangemin_variable, NULL);
02736     window->label_max = (GtkLabel *) gtk_label_new (_("Maximum"));
02737     window->spin_max = (GtkSpinButton *) gtk_spin_button_new_with_range
02738         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02739     gtk_widget_set_tooltip_text
02740         (GTK_WIDGET (window->spin_max), _("Maximum initial value of the variable"));
02741     window->scrolled_max = (GtkScrolledWindow *)
02742     #if !GTK4

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02743     gtk_scrolled_window_new (NULL, NULL);
02744 #else
02745     gtk_scrolled_window_new ();
02746 #endif
02747     gtk_scrolled_window_set_child (window->scrolled_max,
02748                                   GTK_WIDGET (window->spin_max));
02749     g_signal_connect (window->spin_max, "value-changed",
02750                      window_rangemax_variable, NULL);
02751     window->check_minabs = (GtkCheckButton *)
02752     gtk_check_button_new_with_mnemonic (_("_Absolute minimum"));
02753     g_signal_connect (window->check_minabs, "toggled", window_update, NULL);
02754     window->spin_minabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02755     (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02756     gtk_widget_set_tooltip_text
02757     (GTK_WIDGET (window->spin_minabs),
02758      _("Minimum allowed value of the variable"));
02759     window->scrolled_minabs = (GtkScrolledWindow *)
02760 #if !GTK4
02761     gtk_scrolled_window_new (NULL, NULL);
02762 #else
02763     gtk_scrolled_window_new ();
02764 #endif
02765     gtk_scrolled_window_set_child (window->scrolled_minabs,
02766                                   GTK_WIDGET (window->spin_minabs));
02767     g_signal_connect (window->spin_minabs, "value-changed",
02768                      window_rangeminabs_variable, NULL);
02769     window->check_maxabs = (GtkCheckButton *)
02770     gtk_check_button_new_with_mnemonic (_("_Absolute maximum"));
02771     g_signal_connect (window->check_maxabs, "toggled", window_update, NULL);
02772     window->spin_maxabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02773     (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02774     gtk_widget_set_tooltip_text
02775     (GTK_WIDGET (window->spin_maxabs),
02776      _("Maximum allowed value of the variable"));
02777     window->scrolled_maxabs = (GtkScrolledWindow *)
02778 #if !GTK4
02779     gtk_scrolled_window_new (NULL, NULL);
02780 #else
02781     gtk_scrolled_window_new ();
02782 #endif
02783     gtk_scrolled_window_set_child (window->scrolled_maxabs,
02784                                   GTK_WIDGET (window->spin_maxabs));
02785     g_signal_connect (window->spin_maxabs, "value-changed",
02786                      window_rangemaxabs_variable, NULL);
02787     window->label_precision = (GtkLabel *) gtk_label_new (_("Precision digits"));
02788     window->spin_precision = (GtkSpinButton *)
02789     gtk_spin_button_new_with_range (0., (gdouble) DEFAULT_PRECISION, 1.);
02790     gtk_widget_set_tooltip_text
02791     (GTK_WIDGET (window->spin_precision),
02792      _("Number of precision floating point digits\n"
02793        "0 is for integer numbers"));
02794     g_signal_connect (window->spin_precision, "value-changed",
02795                      window_precision_variable, NULL);
02796     window->label_sweeps = (GtkLabel *) gtk_label_new (_("Sweeps number"));
02797     window->spin_sweeps =
02798     (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02799     gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_sweeps),
02800      _("Number of steps sweeping the variable"));
02801     g_signal_connect (window->spin_sweeps, "value-changed",
02802                      window_update_variable, NULL);
02803     window->label_bits = (GtkLabel *) gtk_label_new (_("Bits number"));
02804     window->spin_bits
02805     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
02806     gtk_widget_set_tooltip_text
02807     (GTK_WIDGET (window->spin_bits),
02808      _("Number of bits to encode the variable"));
02809     g_signal_connect
02810     (window->spin_bits, "value-changed", window_update_variable, NULL);
02811     window->label_step = (GtkLabel *) gtk_label_new (_("Step size"));
02812     window->spin_step = (GtkSpinButton *) gtk_spin_button_new_with_range
02813     (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02814     gtk_widget_set_tooltip_text
02815     (GTK_WIDGET (window->spin_step),
02816      _("Initial step size for the hill climbing method"));
02817     window->scrolled_step = (GtkScrolledWindow *)
02818 #if !GTK4
02819     gtk_scrolled_window_new (NULL, NULL);
02820 #else
02821     gtk_scrolled_window_new ();
02822 #endif
02823     gtk_scrolled_window_set_child (window->scrolled_step,
02824                                   GTK_WIDGET (window->spin_step));
02825     g_signal_connect
02826     (window->spin_step, "value-changed", window_step_variable, NULL);
02827     window->grid_variable = (GtkGrid *) gtk_grid_new ();
02828     gtk_grid_attach (window->grid_variable,
02829                     GTK_WIDGET (window->combo_variable), 0, 0, 2, 1);

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02830 gtk_grid_attach (window->grid_variable,
02831                 GTK_WIDGET (window->button_add_variable), 2, 0, 1, 1);
02832 gtk_grid_attach (window->grid_variable,
02833                 GTK_WIDGET (window->button_remove_variable), 3, 0, 1, 1);
02834 gtk_grid_attach (window->grid_variable,
02835                 GTK_WIDGET (window->label_variable), 0, 1, 1, 1);
02836 gtk_grid_attach (window->grid_variable,
02837                 GTK_WIDGET (window->entry_variable), 1, 1, 3, 1);
02838 gtk_grid_attach (window->grid_variable,
02839                 GTK_WIDGET (window->label_min), 0, 2, 1, 1);
02840 gtk_grid_attach (window->grid_variable,
02841                 GTK_WIDGET (window->scrolled_min), 1, 2, 3, 1);
02842 gtk_grid_attach (window->grid_variable,
02843                 GTK_WIDGET (window->label_max), 0, 3, 1, 1);
02844 gtk_grid_attach (window->grid_variable,
02845                 GTK_WIDGET (window->scrolled_max), 1, 3, 3, 1);
02846 gtk_grid_attach (window->grid_variable,
02847                 GTK_WIDGET (window->check_minabs), 0, 4, 1, 1);
02848 gtk_grid_attach (window->grid_variable,
02849                 GTK_WIDGET (window->scrolled_minabs), 1, 4, 3, 1);
02850 gtk_grid_attach (window->grid_variable,
02851                 GTK_WIDGET (window->check_maxabs), 0, 5, 1, 1);
02852 gtk_grid_attach (window->grid_variable,
02853                 GTK_WIDGET (window->scrolled_maxabs), 1, 5, 3, 1);
02854 gtk_grid_attach (window->grid_variable,
02855                 GTK_WIDGET (window->label_precision), 0, 6, 1, 1);
02856 gtk_grid_attach (window->grid_variable,
02857                 GTK_WIDGET (window->spin_precision), 1, 6, 3, 1);
02858 gtk_grid_attach (window->grid_variable,
02859                 GTK_WIDGET (window->label_sweeps), 0, 7, 1, 1);
02860 gtk_grid_attach (window->grid_variable,
02861                 GTK_WIDGET (window->spin_sweeps), 1, 7, 3, 1);
02862 gtk_grid_attach (window->grid_variable,
02863                 GTK_WIDGET (window->label_bits), 0, 8, 1, 1);
02864 gtk_grid_attach (window->grid_variable,
02865                 GTK_WIDGET (window->spin_bits), 1, 8, 3, 1);
02866 gtk_grid_attach (window->grid_variable,
02867                 GTK_WIDGET (window->label_step), 0, 9, 1, 1);
02868 gtk_grid_attach (window->grid_variable,
02869                 GTK_WIDGET (window->scrolled_step), 1, 9, 3, 1);
02870 window->frame_variable = (GtkFrame *) gtk_frame_new (_("Variable"));
02871 gtk_frame_set_child (window->frame_variable,
02872                     GTK_WIDGET (window->grid_variable));
02873
02874 // Creating the experiment widgets
02875 window->combo_experiment = (GtkComboBoxText *) gtk_combo_box_text_new ();
02876 gtk_widget_set_tooltip_text (GTK_WIDGET (window->combo_experiment),
02877                             _("Experiment selector"));
02878 window->id_experiment = g_signal_connect
02879     (window->combo_experiment, "changed", window_set_experiment, NULL);
02880 #if !GTK4
02881 window->button_add_experiment = (GtkButton *)
02882     gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);
02883 #else
02884 window->button_add_experiment = (GtkButton *)
02885     gtk_button_new_from_icon_name ("list-add");
02886 #endif
02887 g_signal_connect
02888     (window->button_add_experiment, "clicked", window_add_experiment, NULL);
02889 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_experiment),
02890                             _("Add experiment"));
02891 #if !GTK4
02892 window->button_remove_experiment = (GtkButton *)
02893     gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02894 #else
02895 window->button_remove_experiment = (GtkButton *)
02896     gtk_button_new_from_icon_name ("list-remove");
02897 #endif
02898 g_signal_connect (window->button_remove_experiment, "clicked",
02899                 window_remove_experiment, NULL);
02900 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_remove_experiment),
02901                             _("Remove experiment"));
02902 window->label_experiment
02903     = (GtkLabel *) gtk_label_new (_("Experimental data file"));
02904 window->button_experiment = (GtkButton *)
02905     gtk_button_new_with_mnemonic (_("Experimental data file"));
02906 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_experiment),
02907                             _("Experimental data file"));
02908 g_signal_connect (window->button_experiment, "clicked",
02909                 window_name_experiment, NULL);
02910 gtk_widget_set_hexpend (GTK_WIDGET (window->button_experiment), TRUE);
02911 window->label_weight = (GtkLabel *) gtk_label_new (_("Weight"));
02912 window->spin_weight
02913     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02914 gtk_widget_set_tooltip_text
02915     (GTK_WIDGET (window->spin_weight),
02916     _("Weight factor to build the objective function"));

```

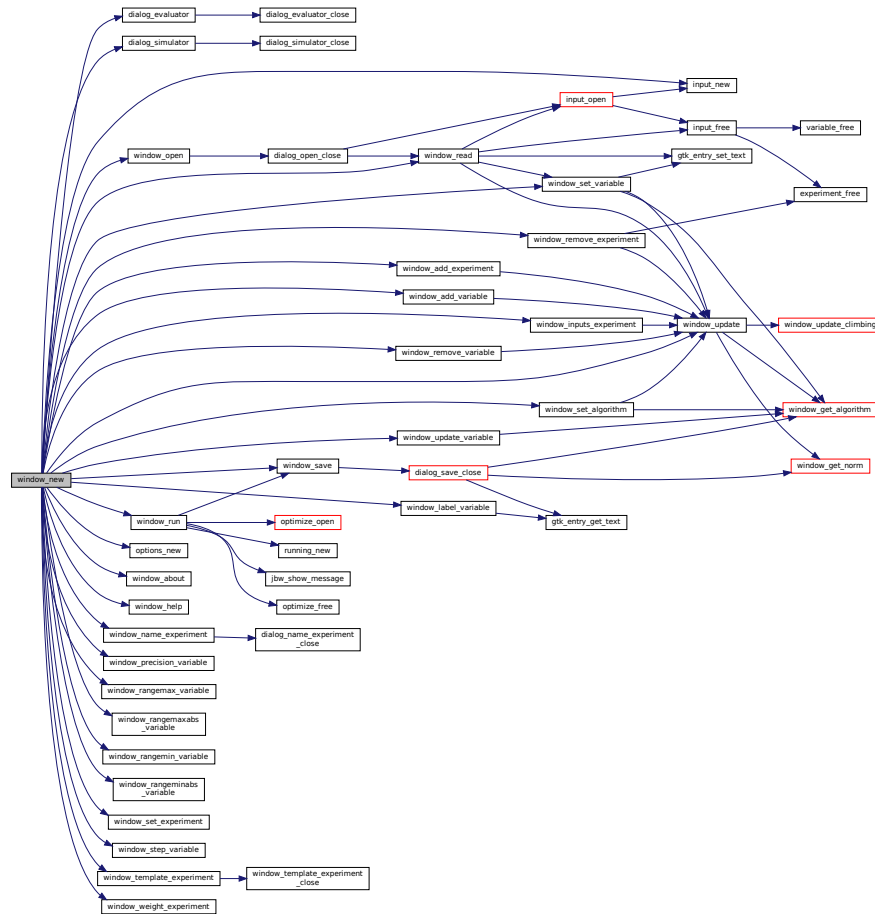
```

02917 g_signal_connect
02918     (window->spin_weight, "value-changed", window_weight_experiment, NULL);
02919 window->grid_experiment = (GtkGrid *) gtk_grid_new ();
02920 gtk_grid_attach (window->grid_experiment,
02921     GTK_WIDGET (window->combo_experiment), 0, 0, 2, 1);
02922 gtk_grid_attach (window->grid_experiment,
02923     GTK_WIDGET (window->button_add_experiment), 2, 0, 1, 1);
02924 gtk_grid_attach (window->grid_experiment,
02925     GTK_WIDGET (window->button_remove_experiment), 3, 0, 1, 1);
02926 gtk_grid_attach (window->grid_experiment,
02927     GTK_WIDGET (window->label_experiment), 0, 1, 1, 1);
02928 gtk_grid_attach (window->grid_experiment,
02929     GTK_WIDGET (window->button_experiment), 1, 1, 3, 1);
02930 gtk_grid_attach (window->grid_experiment,
02931     GTK_WIDGET (window->label_weight), 0, 2, 1, 1);
02932 gtk_grid_attach (window->grid_experiment,
02933     GTK_WIDGET (window->spin_weight), 1, 2, 3, 1);
02934 for (i = 0; i < MAX_NINPUS; ++i)
02935 {
02936     snprintf (buffer3, 64, "%s %u", _("Input template"), i + 1);
02937     window->check_template[i] = (GtkCheckButton *)
02938         gtk_check_button_new_with_label (buffer3);
02939     window->id_template[i]
02940         = g_signal_connect (window->check_template[i], "toggled",
02941         window_inputs_experiment, NULL);
02942     gtk_grid_attach (window->grid_experiment,
02943         GTK_WIDGET (window->check_template[i]), 0, 3 + i, 1, 1);
02944     window->button_template[i] = (GtkButton *)
02945         gtk_button_new_with_mnemonic (_("Input template"));
02946
02947     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_template[i]),
02948         _("Experimental input template file"));
02949     window->id_input[i] =
02950         g_signal_connect_swapped (window->button_template[i], "clicked",
02951         (GCallback) window_template_experiment,
02952         (void *) (size_t) i);
02953     gtk_grid_attach (window->grid_experiment,
02954         GTK_WIDGET (window->button_template[i]), 1, 3 + i, 3, 1);
02955 }
02956 window->frame_experiment = (GtkFrame *) gtk_frame_new (_("Experiment"));
02957 gtk_frame_set_child (window->frame_experiment,
02958     GTK_WIDGET (window->grid_experiment));
02959
02960 // Creating the error norm widgets
02961 window->frame_norm = (GtkFrame *) gtk_frame_new (_("Error norm"));
02962 window->grid_norm = (GtkGrid *) gtk_grid_new ();
02963 gtk_frame_set_child (window->frame_norm, GTK_WIDGET (window->grid_norm));
02964 #if !GTK4
02965 window->button_norm[0] = (GtkRadioButton *)
02966     gtk_radio_button_new_with_mnemonic (NULL, label_norm[0]);
02967 #else
02968 window->button_norm[0] = (GtkCheckButton *)
02969     gtk_check_button_new_with_mnemonic (label_norm[0]);
02970 #endif
02971 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[0]),
02972     tip_norm[0]);
02973 gtk_grid_attach (window->grid_norm,
02974     GTK_WIDGET (window->button_norm[0]), 0, 0, 1, 1);
02975 g_signal_connect (window->button_norm[0], "toggled", window_update, NULL);
02976 for (i = 0; ++i < NNORMS;)
02977 {
02978     #if !GTK4
02979         window->button_norm[i] = (GtkRadioButton *)
02980             gtk_radio_button_new_with_mnemonic
02981             (gtk_radio_button_get_group (window->button_norm[0]), label_norm[i]);
02982     #else
02983         window->button_norm[i] = (GtkCheckButton *)
02984             gtk_check_button_new_with_mnemonic (label_norm[i]);
02985         gtk_check_button_set_group (window->button_norm[i],
02986             window->button_norm[0]);
02987     #endif
02988     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[i]),
02989         tip_norm[i]);
02990     gtk_grid_attach (window->grid_norm,
02991         GTK_WIDGET (window->button_norm[i]), 0, i, 1, 1);
02992     g_signal_connect (window->button_norm[i], "toggled", window_update, NULL);
02993 }
02994 window->label_p = (GtkLabel *) gtk_label_new (_("P parameter"));
02995 gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->label_p), 1, 1, 1, 1);
02996 window->spin_p = (GtkSpinButton *)
02997     gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE, 0.01);
02998 gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_p),
02999     _("P parameter for the P error norm"));
03000 window->scrolled_p = (GtkScrolledWindow *)
03001 #if !GTK4
03002     gtk_scrolled_window_new (NULL, NULL);
03003 #else

```

```
03004     gtk_scrolled_window_new ();
03005 #endif
03006     gtk_scrolled_window_set_child (window->scrolled_p,
03007                                   GTK_WIDGET (window->spin_p));
03008     gtk_widget_set_hexpand (GTK_WIDGET (window->scrolled_p), TRUE);
03009     gtk_widget_set_halign (GTK_WIDGET (window->scrolled_p), GTK_ALIGN_FILL);
03010     gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->scrolled_p),
03011                     1, 2, 1, 2);
03012
03013     // Creating the grid and attaching the widgets to the grid
03014     window->grid = (GtkGrid *) gtk_grid_new ();
03015     gtk_grid_attach (window->grid, GTK_WIDGET (window->box_buttons), 0, 0, 3, 1);
03016     gtk_grid_attach (window->grid, GTK_WIDGET (window->grid_files), 0, 1, 1, 1);
03017     gtk_grid_attach (window->grid,
03018                     GTK_WIDGET (window->frame_algorithm), 0, 2, 1, 1);
03019     gtk_grid_attach (window->grid,
03020                     GTK_WIDGET (window->frame_variable), 1, 2, 1, 1);
03021     gtk_grid_attach (window->grid,
03022                     GTK_WIDGET (window->frame_experiment), 2, 2, 1, 1);
03023     gtk_grid_attach (window->grid, GTK_WIDGET (window->frame_norm), 1, 1, 2, 1);
03024     gtk_window_set_child (window->window, GTK_WIDGET (window->grid));
03025
03026     // Setting the window logo
03027     window->logo = gdk_pixbuf_new_from_xpm_data (logo);
03028     #if !GTK4
03029     gtk_window_set_icon (window->window, window->logo);
03030 #endif
03031
03032     // Showing the window
03033     #if !GTK4
03034     gtk_widget_show_all (GTK_WIDGET (window->window));
03035     #else
03036     gtk_widget_show (GTK_WIDGET (window->window));
03037 #endif
03038
03039     // In GTK+ 3.16 and 3.18 the default scrolled size is wrong
03040     #if GTK_MINOR_VERSION >= 16
03041     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_min), -1, 40);
03042     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_max), -1, 40);
03043     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_minabs), -1, 40);
03044     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_maxabs), -1, 40);
03045     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_step), -1, 40);
03046     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_p), -1, 40);
03047     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_threshold), -1, 40);
03048 #endif
03049
03050     // Reading initial example
03051     input_new ();
03052     buffer2 = g_get_current_dir ();
03053     buffer = g_build_filename (buffer2, "..", "tests", "test1", INPUT_FILE, NULL);
03054     g_free (buffer2);
03055     window_read (buffer);
03056     g_free (buffer);
03057
03058     #if DEBUG_INTERFACE
03059     fprintf (stderr, "window_new: start\n");
03060 #endif
03061 }
```

Here is the call graph for this function:



5.13.4 Variable Documentation

5.13.4.1 window

```
Window window[1] [extern]
```

Window struct to define the main interface window.

Definition at line 81 of file [interface.c](#).

5.14 interface.h

[Go to the documentation of this file.](#)

```
00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
```

```

00005
00006 AUTHORS: Javier Burguete and Borja Latorre.
00007
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00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #ifndef INTERFACE__H
00033 #define INTERFACE__H 1
00034
00035 #define MAX_LENGTH (DEFAULT_PRECISION + 8)
00036
00037 typedef struct
00038 {
00039     GtkWidget *dialog;
00040     GtkWidget *grid;
00041     GtkWidget *label_seed;
00042     GtkWidget *spin_seed;
00043     GtkWidget *label_threads;
00044     GtkWidget *spin_threads;
00045     GtkWidget *label_climbing;
00046     GtkWidget *spin_climbing;
00047 } Options;
00048
00049 typedef struct
00050 {
00051     GtkWidget *dialog;
00052     GtkWidget *label;
00053     GtkWidget *spinner;
00054     GtkWidget *grid;
00055 } Running;
00056
00057 typedef struct
00058 {
00059     GtkWidget *window;
00060     GtkWidget *grid;
00061     GtkWidget *box_buttons;
00062     GtkWidget *button_open;
00063     GtkWidget *button_save;
00064     GtkWidget *button_run;
00065     GtkWidget *button_options;
00066     GtkWidget *button_help;
00067     GtkWidget *button_about;
00068     GtkWidget *button_exit;
00069     GtkWidget *grid_files;
00070     GtkWidget *label_simulator;
00071     GtkWidget *button_simulator;
00072     GtkWidget *checkbox_evaluator;
00073     GtkWidget *button_evaluator;
00074     GtkWidget *label_result;
00075     GtkWidget *entry_result;
00076     GtkWidget *label_variables;
00077     GtkWidget *entry_variables;
00078     GtkWidget *frame_norm;
00079     GtkWidget *grid_norm;
00080     #if !GTK4
00081     GtkWidget *button_norm[NNORMS];
00082     #else
00083     GtkWidget *checkbox_norm[NNORMS];
00084     #endif
00085     GtkWidget *label_p;
00086     GtkWidget *spin_p;
00087     GtkWidget *scrolled_p;
00088     GtkWidget *frame_algorithm;
00089     GtkWidget *grid_algorithm;
00090     #if !GTK4
00091     GtkWidget *button_algorithm[NALGORITHMS];

```

```

00117 #else
00118     GtkCheckBox *button_algorithm[NALGORITHMS];
00120 #endif
00121     GtkLabel *label_simulations;
00122     GtkSpinButton *spin_simulations;
00124     GtkLabel *label_iterations;
00125     GtkSpinButton *spin_iterations;
00127     GtkLabel *label_tolerance;
00128     GtkSpinButton *spin_tolerance;
00129     GtkLabel *label_bests;
00130     GtkSpinButton *spin_bests;
00131     GtkLabel *label_population;
00132     GtkSpinButton *spin_population;
00134     GtkLabel *label_generations;
00135     GtkSpinButton *spin_generations;
00137     GtkLabel *label_mutation;
00138     GtkSpinButton *spin_mutation;
00139     GtkLabel *label_reproduction;
00140     GtkSpinButton *spin_reproduction;
00142     GtkLabel *label_adaptation;
00143     GtkSpinButton *spin_adaptation;
00145     GtkCheckBox *check_climbing;
00147     GtkGrid *grid_climbing;
00149 #if !GTK4
00150     GtkRadioButton *button_climbing[NCLIMBINGS];
00152 #else
00153     GtkCheckBox *button_climbing[NCLIMBINGS];
00155 #endif
00156     GtkLabel *label_steps;
00157     GtkSpinButton *spin_steps;
00158     GtkLabel *label_estimates;
00159     GtkSpinButton *spin_estimates;
00161     GtkLabel *label_relaxation;
00163     GtkSpinButton *spin_relaxation;
00165     GtkLabel *label_threshold;
00166     GtkSpinButton *spin_threshold;
00167     GtkScrolledWindow *scrolled_threshold;
00169     GtkFrame *frame_variable;
00170     GtkGrid *grid_variable;
00171     GtkComboBoxText *combo_variable;
00173     GtkButton *button_add_variable;
00174     GtkButton *button_remove_variable;
00175     GtkLabel *label_variable;
00176     GtkEntry *entry_variable;
00177     GtkLabel *label_min;
00178     GtkSpinButton *spin_min;
00179     GtkScrolledWindow *scrolled_min;
00180     GtkLabel *label_max;
00181     GtkSpinButton *spin_max;
00182     GtkScrolledWindow *scrolled_max;
00183     GtkCheckBox *check_minabs;
00184     GtkSpinButton *spin_minabs;
00185     GtkScrolledWindow *scrolled_minabs;
00186     GtkCheckBox *check_maxabs;
00187     GtkSpinButton *spin_maxabs;
00188     GtkScrolledWindow *scrolled_maxabs;
00189     GtkLabel *label_precision;
00190     GtkSpinButton *spin_precision;
00191     GtkLabel *label_sweeps;
00192     GtkSpinButton *spin_sweeps;
00193     GtkLabel *label_bits;
00194     GtkSpinButton *spin_bits;
00195     GtkLabel *label_step;
00196     GtkSpinButton *spin_step;
00197     GtkScrolledWindow *scrolled_step;
00198     GtkFrame *frame_experiment;
00199     GtkGrid *grid_experiment;
00200     GtkComboBoxText *combo_experiment;
00201     GtkButton *button_add_experiment;
00202     GtkButton *button_remove_experiment;
00203     GtkLabel *label_experiment;
00204     GtkButton *button_experiment;
00206     GtkLabel *label_weight;
00207     GtkSpinButton *spin_weight;
00208     GtkCheckBox *check_template[MAX_NINPUTS];
00210     GtkButton *button_template[MAX_NINPUTS];
00212     GdkPixbuf *logo;
00213     Experiment *experiment;
00214     Variable *variable;
00215     char *application_directory;
00216     gulong id_experiment;
00217     gulong id_experiment_name;
00218     gulong id_variable;
00219     gulong id_variable_label;
00220     gulong id_template[MAX_NINPUTS];
00222     gulong id_input[MAX_NINPUTS];
00224     unsigned int nexperiments;

```



```

00225 unsigned int nvariables;
00226 } Window;
00227
00228 // Global variables
00229 extern Window window[1];
00230
00231 // Public functions
00232 void window_new (GtkApplication * application);
00233
00234 #endif

```

5.15 main.c File Reference

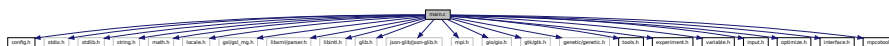
Main source file.

```

#include "config.h"
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <math.h>
#include <locale.h>
#include <gsl/gsl_rng.h>
#include <libxml/parser.h>
#include <libintl.h>
#include <glib.h>
#include <json-glib/json-glib.h>
#include <mpi.h>
#include <gio/gio.h>
#include <gtk/gtk.h>
#include "genetic/genetic.h"
#include "tools.h"
#include "experiment.h"
#include "variable.h"
#include "input.h"
#include "optimize.h"
#include "interface.h"
#include "mpcotool.h"

```

Include dependency graph for main.c:



Functions

- int [main](#) (int argn, char **argc)

5.15.1 Detailed Description

Main source file.

Authors

Javier Burguete and Borja Latorre.

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Definition in file [main.c](#).

5.15.2 Function Documentation

5.15.2.1 main()

```
int main (
    int argn,
    char ** argc )
```

Main function

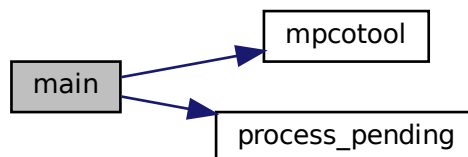
Returns

0 on succes, error code (>0) on error.

Definition at line 77 of file [main.c](#).

```
00078 {
00079     #if HAVE_GTK
00080         show_pending = process_pending;
00081     #endif
00082     return mpcotool (argn, argc);
00083 }
```

Here is the call graph for this function:



5.16 main.c

[Go to the documentation of this file.](#)

```
00001 /*
00002  MPCOTool:
00003  The Multi-Purposes Calibration and Optimization Tool.  A software to perform
00004  calibrations or optimizations of empirical parameters.
00005
00006  AUTHORS: Javier Burquete and Borja Latorre.
00007
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00019
```

```

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00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #define _GNU_SOURCE
00033 #include "config.h"
00034 #include <stdio.h>
00035 #include <stdlib.h>
00036 #include <string.h>
00037 #include <math.h>
00038 #include <locale.h>
00039 #include <gsl/gsl_rng.h>
00040 #include <libxml/parser.h>
00041 #include <libintl.h>
00042 #include <glib.h>
00043 #include <json-glib/json-glib.h>
00044 #ifdef G_OS_WIN32
00045 #include <windows.h>
00046 #endif
00047 #if HAVE_MPI
00048 #include <mpi.h>
00049 #endif
00050 #if HAVE_GTK
00051 #include <gio/gio.h>
00052 #include <gtk/gtk.h>
00053 #endif
00054 #include "genetic/genetic.h"
00055 #include "tools.h"
00056 #include "experiment.h"
00057 #include "variable.h"
00058 #include "input.h"
00059 #include "optimize.h"
00060 #if HAVE_GTK
00061 #include "interface.h"
00062 #endif
00063 #include "mpcotool.h"
00064
00065 int
00066 main (int argn, char **argc)
00067 {
00068     #if HAVE_GTK
00069         show_pending = process_pending;
00070     #endif
00071     return mpcotool (argn, argc);
00072 }

```

5.17 mpcotool.c File Reference

Main function source file.

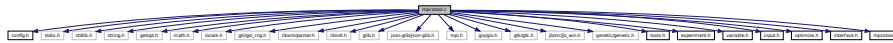
```

#include "config.h"
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <getopt.h>
#include <math.h>
#include <locale.h>
#include <gsl/gsl_rng.h>
#include <libxml/parser.h>
#include <libintl.h>
#include <glib.h>
#include <json-glib/json-glib.h>
#include <mpi.h>
#include <gio/gio.h>
#include <gtk/gtk.h>

```

```
#include "jb/src/jb_win.h"
#include "genetic/genetic.h"
#include "tools.h"
#include "experiment.h"
#include "variable.h"
#include "input.h"
#include "optimize.h"
#include "interface.h"
#include "mpcotool.h"
```

Include dependency graph for mpcotool.c:



Macros

- `#define` [DEBUG_MPCOTOOL](#) 1
Macro to debug main functions.

Functions

- `int` [mpcotool](#) (int argn, char **argc)

5.17.1 Detailed Description

Main function source file.

Authors

Javier Burguete and Borja Latorre.

Copyright

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Definition in file [mpcotool.c](#).

5.17.2 Macro Definition Documentation

5.17.2.1 DEBUG_MPCOTOOL

```
#define DEBUG_MPCOTOOL 1
```

Macro to debug main functions.

Definition at line 73 of file [mpcotool.c](#).

5.17.3 Function Documentation

5.17.3.1 mpcotool()

```
int mpcotool (
    int argn,
    char ** argc )
```

Main function.

Returns

0 on success, >0 on error.

Parameters

<i>argn</i>	Arguments number.
<i>argc</i>	Arguments pointer.

Definition at line 81 of file [mpcotool.c](#).

```
00083 {
00084     const struct option options[] = {
00085         {"seed", required_argument, NULL, 's'},
00086         {"nthreads", required_argument, NULL, 't'},
00087         {NULL, 0, NULL, 0}
00088     };
00089     #if HAVE_GTK
00090     GtkApplication *application;
00091     char *buffer;
00092     #endif
00093     int o, option_index;
00094
00095     // Starting pseudo-random numbers generator
00096     #if DEBUG_MPCOTOOL
00097     fprintf (stderr, "mpcotool: starting pseudo-random numbers generator\n");
00098     #endif
00099     optimize->rng = gsl_rng_alloc (gsl_rng_taus2);
00100
00101     // Allowing spaces in the XML data file
00102     #if DEBUG_MPCOTOOL
00103     fprintf (stderr, "mpcotool: allowing spaces in the XML data file\n");
00104     #endif
00105     xmlKeepBlanksDefault (0);
00106
00107     // Starting MPI
00108     #if HAVE_MPI
00109     #if DEBUG_MPCOTOOL
00110     fprintf (stderr, "mpcotool: starting MPI\n");
00111     #endif
00112     MPI_Init (&argn, &argc);
00113     MPI_Comm_size (MPI_COMM_WORLD, &ntasks);
00114     MPI_Comm_rank (MPI_COMM_WORLD, &optimize->mpi_rank);
00115     printf ("rank=%d tasks=%d\n", optimize->mpi_rank, ntasks);
00116     #else
00117     ntasks = 1;
00118     #endif
00119
00120     // Getting threads number and pseudo-random numbers generator seed
00121     nthreads_climbing = nthreads = jb_get_ncores ();
00122     optimize->seed = DEFAULT_RANDOM_SEED;
00123
00124     // Parsing command line arguments
00125     while (1)
00126     {
00127         o = getopt_long (argn, argc, "s:t:", options, &option_index);
00128         if (o == -1)
00129             break;
```

```

00130     switch (o)
00131     {
00132         case 's':
00133             optimize->seed = atol (optarg);
00134             break;
00135         case 't':
00136             nthreads_climbing = nthreads = atoi (optarg);
00137             break;
00138         default:
00139             printf ("%s\n%s\n", _("ERROR!"), _("Unknown option"));
00140             return 1;
00141     }
00142 }
00143 argn -= optind;
00144
00145 // Resetting result and variables file names
00146 #if DEBUG_MPCOTOOL
00147 fprintf (stderr, "mpcotool: resetting result and variables file names\n");
00148 #endif
00149 input->result = input->variables = NULL;
00150
00151 #if HAVE_GTK
00152
00153 // Setting local language and international floating point numbers notation
00154 setlocale (LC_ALL, "");
00155 setlocale (LC_NUMERIC, "C");
00156 window->application_directory = g_get_current_dir ();
00157 buffer = g_build_filename (window->application_directory, LOCALE_DIR, NULL);
00158 bindtextdomain (PROGRAM_INTERFACE, buffer);
00159 bind_textdomain_codeset (PROGRAM_INTERFACE, "UTF-8");
00160 textdomain (PROGRAM_INTERFACE);
00161
00162 // Initing GTK+
00163 gtk_disable_setlocale ();
00164 application = gtk_application_new ("es.csic.eead.auladei.sprinkler",
00165                                   G_APPLICATION_DEFAULT_FLAGS);
00166 g_signal_connect (application, "activate", G_CALLBACK (window_new), NULL);
00167
00168 // Opening the main window
00169 g_application_run (G_APPLICATION (application), 0, NULL);
00170
00171 // Freeing memory
00172 input_free ();
00173 g_free (buffer);
00174 gtk_window_destroy (window->window);
00175 g_object_unref (application);
00176 g_free (window->application_directory);
00177
00178 #else
00179
00180 // Checking syntax
00181 if (argn < 1 || argn > 3)
00182 {
00183     printf ("The syntax is:\n"
00184            "  ./mpcotoolbin [-nthreads x] [-seed s] data_file [result_file] "
00185            "[variables_file]\n");
00186     return 2;
00187 }
00188 if (argn > 1)
00189     input->result = (char *) xmlStrdup ((xmlChar *) argc[optind + 1]);
00190 if (argn == 2)
00191     input->variables = (char *) xmlStrdup ((xmlChar *) argc[optind + 2]);
00192
00193 // Making optimization
00194 #if DEBUG_MPCOTOOL
00195 fprintf (stderr, "mpcotool: making optimization\n");
00196 #endif
00197 if (input_open (argc[optind]))
00198     optimize_open ();
00199
00200 // Freeing memory
00201 #if DEBUG_MPCOTOOL
00202 fprintf (stderr, "mpcotool: freeing memory and closing\n");
00203 #endif
00204 optimize_free ();
00205
00206 #endif
00207
00208 // Closing MPI
00209 #if HAVE_MPI
00210 MPI_Finalize ();
00211 #endif
00212
00213 // Freeing memory
00214 gsl_rng_free (optimize->rng);
00215
00216 // Closing

```

```
00217     return 0;
00218 }
```

5.18 mpcotool.c

[Go to the documentation of this file.](#)

```
00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burguete and Borja Latorre.
00007
00008 Copyright 2012-2023, AUTHORS.
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00019
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00022 MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
00023 SHALL AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
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00025 PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
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00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #define _GNU_SOURCE
00033 #include "config.h"
00034 #include <stdio.h>
00035 #include <stdlib.h>
00036 #include <string.h>
00037 #include <getopt.h>
00038 #include <math.h>
00039 #include <locale.h>
00040 #include <gsl/gsl_rng.h>
00041 #include <libxml/parser.h>
00042 #include <libintl.h>
00043 #include <glib.h>
00044 #include <json-glib/json-glib.h>
00045 #ifdef G_OS_WIN32
00046 #include <windows.h>
00047 #endif
00048 #if HAVE_MPI
00049 #include <mpi.h>
00050 #endif
00051 #if HAVE_GTK
00052 #include <gio/gio.h>
00053 #include <gtk/gtk.h>
00054 #endif
00055 #include "jb/src/jb_win.h"
00056 #include "genetic/genetic.h"
00057 #include "tools.h"
00058 #include "experiment.h"
00059 #include "variable.h"
00060 #include "input.h"
00061 #include "optimize.h"
00062 #if HAVE_GTK
00063 #include "interface.h"
00064 #endif
00065 #include "mpcotool.h"
00066
00067 #define DEBUG_MPCOTOL 1
00068
00069 int
00070 mpcotool (int argn,
00071          char **argc)
00072 {
00073     const struct option options[] = {
00074         {"seed", required_argument, NULL, 's'},
00075         {"nthreads", required_argument, NULL, 't'},
00076     };
00077 }
```

```

00087     {NULL, 0, NULL, 0}
00088 };
00089 #if HAVE_GTK
00090 GtkApplication *application;
00091 char *buffer;
00092 #endif
00093 int o, option_index;
00094
00095 // Starting pseudo-random numbers generator
00096 #if DEBUG_MPCOTOOL
00097 fprintf (stderr, "mpcotool: starting pseudo-random numbers generator\n");
00098 #endif
00099 optimize->rng = gsl_rng_alloc (gsl_rng_taus2);
00100
00101 // Allowing spaces in the XML data file
00102 #if DEBUG_MPCOTOOL
00103 fprintf (stderr, "mpcotool: allowing spaces in the XML data file\n");
00104 #endif
00105 xmlKeepBlanksDefault (0);
00106
00107 // Starting MPI
00108 #if HAVE_MPI
00109 #if DEBUG_MPCOTOOL
00110 fprintf (stderr, "mpcotool: starting MPI\n");
00111 #endif
00112 MPI_Init (&argn, &argc);
00113 MPI_Comm_size (MPI_COMM_WORLD, &ntasks);
00114 MPI_Comm_rank (MPI_COMM_WORLD, &optimize->mpi_rank);
00115 printf ("rank=%d tasks=%d\n", optimize->mpi_rank, ntasks);
00116 #else
00117 ntasks = 1;
00118 #endif
00119
00120 // Getting threads number and pseudo-random numbers generator seed
00121 nthreads_climbing = nthreads = jb_get_ncores ();
00122 optimize->seed = DEFAULT_RANDOM_SEED;
00123
00124 // Parsing command line arguments
00125 while (1)
00126 {
00127     o = getopt_long (argn, argc, "s:t:", options, &option_index);
00128     if (o == -1)
00129         break;
00130     switch (o)
00131     {
00132         case 's':
00133             optimize->seed = atol (optarg);
00134             break;
00135         case 't':
00136             nthreads_climbing = nthreads = atoi (optarg);
00137             break;
00138         default:
00139             printf ("%s\n%s\n", _("ERROR!"), _("Unknown option"));
00140             return 1;
00141     }
00142 }
00143 argn -= optind;
00144
00145 // Resetting result and variables file names
00146 #if DEBUG_MPCOTOOL
00147 fprintf (stderr, "mpcotool: resetting result and variables file names\n");
00148 #endif
00149 input->result = input->variables = NULL;
00150
00151 #if HAVE_GTK
00152
00153 // Setting local language and international floating point numbers notation
00154 setlocale (LC_ALL, "");
00155 setlocale (LC_NUMERIC, "C");
00156 window->application_directory = g_get_current_dir ();
00157 buffer = g_build_filename (window->application_directory, LOCALE_DIR, NULL);
00158 bindtextdomain (PROGRAM_INTERFACE, buffer);
00159 bind_textdomain_codeset (PROGRAM_INTERFACE, "UTF-8");
00160 textdomain (PROGRAM_INTERFACE);
00161
00162 // Initing GTK+
00163 gtk_disable_setlocale ();
00164 application = gtk_application_new ("es.csic.eead.auladei.sprinkler",
00165                                     G_APPLICATION_DEFAULT_FLAGS);
00166 g_signal_connect (application, "activate", G_CALLBACK (window_new), NULL);
00167
00168 // Opening the main window
00169 g_application_run (G_APPLICATION (application), 0, NULL);
00170
00171 // Freeing memory
00172 input_free ();
00173 g_free (buffer);

```



```

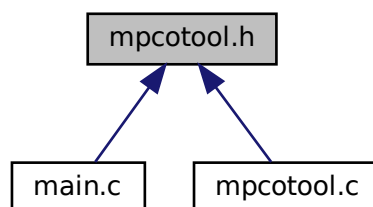
00174  gtk_window_destroy (window->window);
00175  g_object_unref (application);
00176  g_free (window->application_directory);
00177
00178  #else
00179
00180  // Checking syntax
00181  if (argn < 1 || argn > 3)
00182  {
00183      printf ("The syntax is:\n"
00184              "../mpcotoolbin [-nthreads x] [-seed s] data_file [result_file] "
00185              "[variables_file]\n");
00186      return 2;
00187  }
00188  if (argn > 1)
00189      input->result = (char *) xmlStrdup ((xmlChar *) argc[optind + 1]);
00190  if (argn == 2)
00191      input->variables = (char *) xmlStrdup ((xmlChar *) argc[optind + 2]);
00192
00193  // Making optimization
00194  #if DEBUG_MPCOTOOL
00195  fprintf (stderr, "mpcotool: making optimization\n");
00196  #endif
00197  if (input_open (argc[optind]))
00198      optimize_open ();
00199
00200  // Freeing memory
00201  #if DEBUG_MPCOTOOL
00202  fprintf (stderr, "mpcotool: freeing memory and closing\n");
00203  #endif
00204  optimize_free ();
00205
00206  #endif
00207
00208  // Closing MPI
00209  #if HAVE_MPI
00210  MPI_Finalize ();
00211  #endif
00212
00213  // Freeing memory
00214  gsl_rng_free (optimize->rng);
00215
00216  // Closing
00217  return 0;
00218 }

```

5.19 mpcotool.h File Reference

Main function header file.

This graph shows which files directly or indirectly include this file:



Functions

- int [mpcotool](#) (int argn, char **argc)

5.19.1 Detailed Description

Main function header file.

Authors

Javier Burguete and Borja Latorre.

Copyright

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Definition in file [mpcotoool.h](#).

5.19.2 Function Documentation

5.19.2.1 mpcotoool()

```
int mpcotoool (
    int argn,
    char ** argc )
```

Main function.

Returns

0 on success, >0 on error.

Parameters

<i>argn</i>	Arguments number.
<i>argc</i>	Arguments pointer.

Definition at line 81 of file [mpcotoool.c](#).

```
00083 {
00084     const struct option options[] = {
00085         {"seed", required_argument, NULL, 's'},
00086         {"nthreads", required_argument, NULL, 't'},
00087         {NULL, 0, NULL, 0}
00088     };
00089     #if HAVE_GTK
00090     GtkApplication *application;
00091     char *buffer;
00092     #endif
00093     int o, option_index;
00094
00095     // Starting pseudo-random numbers generator
00096     #if DEBUG_MPCOTOOL
00097     fprintf (stderr, "mpcotoool: starting pseudo-random numbers generator\n");
00098     #endif
00099     optimize->rng = gsl_rng_alloc (gsl_rng_taus2);
00100
00101     // Allowing spaces in the XML data file
00102     #if DEBUG_MPCOTOOL
```

```

00103     fprintf (stderr, "mpcotool: allowing spaces in the XML data file\n");
00104 #endif
00105     xmlKeepBlanksDefault (0);
00106
00107     // Starting MPI
00108 #if HAVE_MPI
00109 #if DEBUG_MPCOTOOL
00110     fprintf (stderr, "mpcotool: starting MPI\n");
00111 #endif
00112     MPI_Init (&argn, &argc);
00113     MPI_Comm_size (MPI_COMM_WORLD, &ntasks);
00114     MPI_Comm_rank (MPI_COMM_WORLD, &optimize->mpi_rank);
00115     printf ("rank=%d tasks=%d\n", optimize->mpi_rank, ntasks);
00116 #else
00117     ntasks = 1;
00118 #endif
00119
00120     // Getting threads number and pseudo-random numbers generator seed
00121     nthreads_climbing = nthreads = jb_get_ncores ();
00122     optimize->seed = DEFAULT_RANDOM_SEED;
00123
00124     // Parsing command line arguments
00125     while (1)
00126     {
00127         o = getopt_long (argn, argc, "s:t:", options, &option_index);
00128         if (o == -1)
00129             break;
00130         switch (o)
00131         {
00132             case 's':
00133                 optimize->seed = atol (optarg);
00134                 break;
00135             case 't':
00136                 nthreads_climbing = nthreads = atoi (optarg);
00137                 break;
00138             default:
00139                 printf ("%s\n%s\n", _("ERROR!"), _("Unknown option"));
00140                 return 1;
00141         }
00142     }
00143     argn -= optind;
00144
00145     // Resetting result and variables file names
00146 #if DEBUG_MPCOTOOL
00147     fprintf (stderr, "mpcotool: resetting result and variables file names\n");
00148 #endif
00149     input->result = input->variables = NULL;
00150
00151 #if HAVE_GTK
00152
00153     // Setting local language and international floating point numbers notation
00154     setlocale (LC_ALL, "");
00155     setlocale (LC_NUMERIC, "C");
00156     window->application_directory = g_get_current_dir ();
00157     buffer = g_build_filename (window->application_directory, LOCALE_DIR, NULL);
00158     bindtextdomain (PROGRAM_INTERFACE, buffer);
00159     bind_textdomain_codeset (PROGRAM_INTERFACE, "UTF-8");
00160     textdomain (PROGRAM_INTERFACE);
00161
00162     // Initing GTK+
00163     gtk_disable_setlocale ();
00164     application = gtk_application_new ("es.csic.eead.auladei.sprinkler",
00165                                     G_APPLICATION_DEFAULT_FLAGS);
00166     g_signal_connect (application, "activate", G_CALLBACK (window_new), NULL);
00167
00168     // Opening the main window
00169     g_application_run (G_APPLICATION (application), 0, NULL);
00170
00171     // Freeing memory
00172     input_free ();
00173     g_free (buffer);
00174     gtk_window_destroy (window->window);
00175     g_object_unref (application);
00176     g_free (window->application_directory);
00177 #else
00178 #else
00179
00180     // Checking syntax
00181     if (argn < 1 || argn > 3)
00182     {
00183         printf ("The syntax is:\n"
00184                "  ./mpcotoolbin [-nthreads x] [-seed s] data_file [result_file] "
00185                "[variables_file]\n");
00186         return 2;
00187     }
00188     if (argn > 1)
00189         input->result = (char *) xmlStrdup ((xmlChar *) argc[optind + 1]);

```

```

00190     if (argn == 2)
00191         input->variables = (char *) xmlStrdup ((xmlChar *) argc[optind + 2]);
00192
00193     // Making optimization
00194     #if DEBUG_MPCOTOOL
00195         fprintf (stderr, "mpcotool: making optimization\n");
00196     #endif
00197     if (input_open (argc[optind]))
00198         optimize_open ();
00199
00200     // Freeing memory
00201     #if DEBUG_MPCOTOOL
00202         fprintf (stderr, "mpcotool: freeing memory and closing\n");
00203     #endif
00204     optimize_free ();
00205
00206 #endif
00207
00208     // Closing MPI
00209     #if HAVE_MPI
00210         MPI_Finalize ();
00211     #endif
00212
00213     // Freeing memory
00214     gsl_rng_free (optimize->rng);
00215
00216     // Closing
00217     return 0;
00218 }

```

5.20 mpcotool.h

[Go to the documentation of this file.](#)

```

00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burguete and Borja Latorre.
00007
00008 Copyright 2012-2023, AUTHORS.
00009
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00011 are permitted provided that the following conditions are met:
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00014 this list of conditions and the following disclaimer.
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00016 2. Redistributions in binary form must reproduce the above copyright notice,
00017 this list of conditions and the following disclaimer in the
00018 documentation and/or other materials provided with the distribution.
00019
00020 THIS SOFTWARE IS PROVIDED BY AUTHORS "AS IS" AND ANY EXPRESS OR IMPLIED
00021 WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
00022 MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
00023 SHALL AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
00024 SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
00025 PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
00026 BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #ifndef MPCOTOOL__H
00033 #define MPCOTOOL__H 1
00034
00035 extern int mpcotool (int argn, char **argc);
00036
00037 #endif

```

5.21 optimize.c File Reference

Source file to define the optimization functions.

```

#include "config.h"
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <math.h>
#include <sys/param.h>
#include <gsl/gsl_rng.h>
#include <libxml/parser.h>
#include <libintl.h>
#include <glib.h>
#include <glib/gstdio.h>
#include <json-glib/json-glib.h>
#include <alloca.h>
#include <mpi.h>
#include "jb/src/jb_win.h"
#include "genetic/genetic.h"
#include "tools.h"
#include "experiment.h"
#include "variable.h"
#include "input.h"
#include "optimize.h"

```

Include dependency graph for optimize.c:



Macros

- `#define` [DEBUG_OPTIMIZE](#) 0
Macro to debug optimize functions.
- `#define` [RM](#) "rm"
Macro to define the shell remove command.

Functions

- static void [optimize_input](#) (unsigned int simulation, char *[input](#), GMappedFile *[stencil](#))
- static double [optimize_parse](#) (unsigned int simulation, unsigned int experiment)
- static double [optimize_norm_euclidian](#) (unsigned int simulation)
- static double [optimize_norm_maximum](#) (unsigned int simulation)
- static double [optimize_norm_p](#) (unsigned int simulation)
- static double [optimize_norm_taxicab](#) (unsigned int simulation)
- static void [optimize_print](#) ()
- static void [optimize_save_variables](#) (unsigned int simulation, double error)
- static void [optimize_best](#) (unsigned int simulation, double value)
- static void [optimize_sequential](#) ()
- static void * [optimize_thread](#) ([ParallelData](#) *data)
- static void [optimize_merge](#) (unsigned int nsaveds, unsigned int *simulation_best, double *error_best)
- static void [optimize_synchronise](#) ()
- static void [optimize_sweep](#) ()
- static void [optimize_MonteCarlo](#) ()
- static void [optimize_orthogonal](#) ()
- static void [optimize_best_climbing](#) (unsigned int simulation, double value)

- static void [optimize_climbing_sequential](#) (unsigned int simulation)
- static void * [optimize_climbing_thread](#) ([ParallelData](#) *data)
- static double [optimize_estimate_climbing_random](#) (unsigned int variable, unsigned int estimate)
- static double [optimize_estimate_climbing_coordinates](#) (unsigned int variable, unsigned int estimate)
- static void [optimize_step_climbing](#) (unsigned int simulation)
- static void [optimize_climbing](#) ()
- static double [optimize_genetic_objective](#) (**Entity** *entity)
- static void [optimize_genetic](#) ()
- static void [optimize_save_old](#) ()
- static void [optimize_merge_old](#) ()
- static void [optimize_refine](#) ()
- static void [optimize_step](#) ()
- static void [optimize_iterate](#) ()
- void [optimize_free](#) ()
- void [optimize_open](#) ()

Variables

- [Optimize optimize](#) [1]
Optimization data.
- unsigned int [nthreads_climbing](#)
Number of threads for the hill climbing method.
- static void(* [optimize_algorithm](#))()
Pointer to the function to perform a optimization algorithm step.
- static double(* [optimize_estimate_climbing](#))(unsigned int variable, unsigned int estimate)
Pointer to the function to estimate the climbing.
- static double(* [optimize_norm](#))(unsigned int simulation)
Pointer to the error norm function.

5.21.1 Detailed Description

Source file to define the optimization functions.

Authors

Javier Burguete and Borja Latorre.

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Definition in file [optimize.c](#).

5.21.2 Macro Definition Documentation

5.21.2.1 DEBUG_OPTIMIZE

```
#define DEBUG_OPTIMIZE 0
```

Macro to debug optimize functions.

Definition at line 67 of file [optimize.c](#).

5.21.2.2 RM

```
#define RM "rm"
```

Macro to define the shell remove command.

Definition at line 76 of file [optimize.c](#).

5.21.3 Function Documentation

5.21.3.1 optimize_best()

```
static void optimize_best (
    unsigned int simulation,
    double value ) [static]
```

Function to save the best simulations.

Parameters

<i>simulation</i>	Simulation number.
<i>value</i>	Objective function value.

Definition at line 450 of file [optimize.c](#).

```
00452 {
00453     unsigned int i, j;
00454     double e;
00455     #if DEBUG_OPTIMIZE
00456         fprintf (stderr, "optimize_best: start\n");
00457         fprintf (stderr, "optimize_best: nsaveds=%u nbest=%u\n",
00458                 optimize->nsaveds, optimize->nbest);
00459     #endif
00460     if (optimize->nsaveds < optimize->nbest
00461         || value < optimize->error_best[optimize->nsaveds - 1])
00462     {
00463         if (optimize->nsaveds < optimize->nbest)
00464             ++optimize->nsaveds;
00465         optimize->error_best[optimize->nsaveds - 1] = value;
00466         optimize->simulation_best[optimize->nsaveds - 1] = simulation;
00467         for (i = optimize->nsaveds; --i;)
00468         {
00469             if (optimize->error_best[i] < optimize->error_best[i - 1])
00470             {
00471                 j = optimize->simulation_best[i];
00472                 e = optimize->error_best[i];
```

```

00473         optimize->simulation_best[i] = optimize->simulation_best[i - 1];
00474         optimize->error_best[i] = optimize->error_best[i - 1];
00475         optimize->simulation_best[i - 1] = j;
00476         optimize->error_best[i - 1] = e;
00477     }
00478     else
00479         break;
00480 }
00481 }
00482 #if DEBUG_OPTIMIZE
00483 fprintf (stderr, "optimize_best: end\n");
00484 #endif
00485 }

```

5.21.3.2 optimize_best_climbing()

```

static void optimize_best_climbing (
    unsigned int simulation,
    double value ) [static]

```

Function to save the best simulation in a hill climbing method.

Parameters

<i>simulation</i>	Simulation number.
<i>value</i>	Objective function value.

Definition at line 812 of file [optimize.c](#).

```

00814 {
00815     #if DEBUG_OPTIMIZE
00816         fprintf (stderr, "optimize_best_climbing: start\n");
00817         fprintf (stderr,
00818             "optimize_best_climbing: simulation=%u value=%.14le best=%.14le\n",
00819             simulation, value, optimize->error_best[0]);
00820     #endif
00821     if (value < optimize->error_best[0])
00822     {
00823         optimize->error_best[0] = value;
00824         optimize->simulation_best[0] = simulation;
00825     #if DEBUG_OPTIMIZE
00826         fprintf (stderr,
00827             "optimize_best_climbing: BEST simulation=%u value=%.14le\n",
00828             simulation, value);
00829     #endif
00830     }
00831     #if DEBUG_OPTIMIZE
00832     fprintf (stderr, "optimize_best_climbing: end\n");
00833     #endif
00834 }

```

5.21.3.3 optimize_climbing()

```

static void optimize_climbing ( ) [inline], [static]

```

Function to optimize with a hill climbing method.

Definition at line 1040 of file [optimize.c](#).

```

01041 {
01042     unsigned int i, j, k, b, s, adjust;
01043     #if DEBUG_OPTIMIZE
01044     fprintf (stderr, "optimize_climbing: start\n");
01045     #endif

```

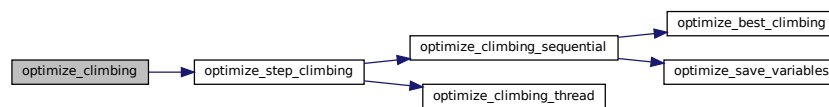


```

01046     for (i = 0; i < optimize->nvariables; ++i)
01047         optimize->climbing[i] = 0.;
01048     b = optimize->simulation_best[0] * optimize->nvariables;
01049     s = optimize->nsimulations;
01050     adjust = 1;
01051     for (i = 0; i < optimize->nsteps; ++i, s += optimize->nestimates, b = k)
01052     {
01053         #if DEBUG_OPTIMIZE
01054             fprintf (stderr, "optimize_climbing: step=%u old_best=%u\n",
01055                     i, optimize->simulation_best[0]);
01056         #endif
01057         optimize_step_climbing (s);
01058         k = optimize->simulation_best[0] * optimize->nvariables;
01059         #if DEBUG_OPTIMIZE
01060             fprintf (stderr, "optimize_climbing: step=%u best=%u\n",
01061                     i, optimize->simulation_best[0]);
01062         #endif
01063         if (k == b)
01064         {
01065             if (adjust)
01066                 for (j = 0; j < optimize->nvariables; ++j)
01067                     optimize->step[j] *= 0.5;
01068             for (j = 0; j < optimize->nvariables; ++j)
01069                 optimize->climbing[j] = 0.;
01070             adjust = 1;
01071         }
01072         else
01073         {
01074             for (j = 0; j < optimize->nvariables; ++j)
01075             {
01076                 #if DEBUG_OPTIMIZE
01077                     fprintf (stderr,
01078                             "optimize_climbing: best=%u old=%u\n",
01079                             j, optimize->value[k + j], j, optimize->value[b + j]);
01080                 #endif
01081                 optimize->climbing[j]
01082                     = (1. - optimize->relaxation) * optimize->climbing[j]
01083                     + optimize->relaxation
01084                     * (optimize->value[k + j] - optimize->value[b + j]);
01085                 #if DEBUG_OPTIMIZE
01086                     fprintf (stderr, "optimize_climbing: climbing=%u\n",
01087                             j, optimize->climbing[j]);
01088                 #endif
01089             }
01090             adjust = 0;
01091         }
01092     }
01093     #if DEBUG_OPTIMIZE
01094         fprintf (stderr, "optimize_climbing: end\n");
01095     #endif
01096 }

```

Here is the call graph for this function:



5.21.3.4 optimize_climbing_sequential()

```

static void optimize_climbing_sequential (
    unsigned int simulation ) [inline], [static]

```

Function to estimate the hill climbing sequentially.

Parameters

<i>simulation</i>	Simulation number.
-------------------	--------------------

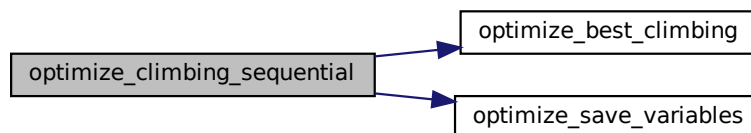
Definition at line 840 of file [optimize.c](#).

```

00841 {
00842     double e;
00843     unsigned int i, j;
00844     #if DEBUG_OPTIMIZE
00845     fprintf (stderr, "optimize_climbing_sequential: start\n");
00846     fprintf (stderr, "optimize_climbing_sequential: nstart_climbing=%u "
00847             "nend_climbing=%u\n",
00848             optimize->nstart_climbing, optimize->nend_climbing);
00849     #endif
00850     for (i = optimize->nstart_climbing; i < optimize->nend_climbing; ++i)
00851     {
00852         j = simulation + i;
00853         e = optimize_norm (j);
00854         optimize_best_climbing (j, e);
00855         optimize_save_variables (j, e);
00856         if (e < optimize->threshold)
00857         {
00858             optimize->stop = 1;
00859             break;
00860         }
00861     #if DEBUG_OPTIMIZE
00862     fprintf (stderr, "optimize_climbing_sequential: i=%u e=%lg\n", i, e);
00863     #endif
00864     }
00865     #if DEBUG_OPTIMIZE
00866     fprintf (stderr, "optimize_climbing_sequential: end\n");
00867     #endif
00868 }

```

Here is the call graph for this function:



5.21.3.5 optimize_climbing_thread()

```

static void * optimize_climbing_thread (
    ParallelData * data ) [static]

```

Function to estimate the hill climbing on a thread.

Returns

NULL

Parameters

<i>data</i>	Function data.
-------------	----------------

Definition at line 876 of file `optimize.c`.

```

00877 {
00878     unsigned int i, thread;
00879     double e;
00880     #if DEBUG_OPTIMIZE
00881     fprintf (stderr, "optimize_climbing_thread:  start\n");
00882     #endif
00883     thread = data->thread;
00884     #if DEBUG_OPTIMIZE
00885     fprintf (stderr, "optimize_climbing_thread:  thread=%u start=%u end=%u\n",
00886             thread,
00887             optimize->thread_climbing[thread],
00888             optimize->thread_climbing[thread + 1]);
00889     #endif
00890     for (i = optimize->thread_climbing[thread];
00891          i < optimize->thread_climbing[thread + 1]; ++i)
00892     {
00893         e = optimize_norm (i);
00894         g_mutex_lock (mutex);
00895         optimize_best_climbing (i, e);
00896         optimize_save_variables (i, e);
00897         if (e < optimize->threshold)
00898             optimize->stop = 1;
00899         g_mutex_unlock (mutex);
00900         if (optimize->stop)
00901             break;
00902     #if DEBUG_OPTIMIZE
00903     fprintf (stderr, "optimize_climbing_thread:  i=%u e=%lg\n", i, e);
00904     #endif
00905     }
00906     #if DEBUG_OPTIMIZE
00907     fprintf (stderr, "optimize_climbing_thread:  end\n");
00908     #endif
00909     g_thread_exit (NULL);
00910     return NULL;
00911 }

```

5.21.3.6 optimize_estimate_climbing_coordinates()

```

static double optimize_estimate_climbing_coordinates (
    unsigned int variable,
    unsigned int estimate ) [static]

```

Function to estimate a component of the hill climbing vector.

Parameters

<i>variable</i>	Variable number.
<i>estimate</i>	Estimate number.

Definition at line 941 of file `optimize.c`.

```

00945 {
00946     double x;
00947     #if DEBUG_OPTIMIZE
00948     fprintf (stderr, "optimize_estimate_climbing_coordinates:  start\n");
00949     #endif
00950     x = optimize->climbing[variable];
00951     if (estimate >= (2 * variable) && estimate < (2 * variable + 2))
00952     {
00953         if (estimate & 1)
00954             x += optimize->step[variable];
00955         else
00956             x -= optimize->step[variable];
00957     }

```

```

00958 #if DEBUG_OPTIMIZE
00959     fprintf (stderr,
00960             "optimize_estimate_climbing_coordinates:  climbing%u=%lg\n",
00961             variable, x);
00962     fprintf (stderr, "optimize_estimate_climbing_coordinates:  end\n");
00963 #endif
00964     return x;
00965 }

```

5.21.3.7 optimize_estimate_climbing_random()

```

static double optimize_estimate_climbing_random (
    unsigned int variable,
    unsigned int estimate ) [static]

```

Function to estimate a component of the hill climbing vector.

Parameters

<i>variable</i>	Variable number.
<i>estimate</i>	Estimate number.

Definition at line 917 of file [optimize.c](#).

```

00922 {
00923     double x;
00924     #if DEBUG_OPTIMIZE
00925     fprintf (stderr, "optimize_estimate_climbing_random:  start\n");
00926     #endif
00927     x = optimize->climbing[variable]
00928         + (1. - 2. * gsl_rng_uniform (optimize->rng)) * optimize->step[variable];
00929     #if DEBUG_OPTIMIZE
00930     fprintf (stderr, "optimize_estimate_climbing_random:  climbing%u=%lg\n",
00931             variable, x);
00932     fprintf (stderr, "optimize_estimate_climbing_random:  end\n");
00933     #endif
00934     return x;
00935 }

```

5.21.3.8 optimize_free()

```

void optimize_free ( )

```

Function to free the memory used by the [Optimize](#) struct.

Definition at line 1397 of file [optimize.c](#).

```

01398 {
01399     unsigned int i, j;
01400     #if DEBUG_OPTIMIZE
01401     fprintf (stderr, "optimize_free:  start\n");
01402     #endif
01403     for (j = 0; j < optimize->ninputs; ++j)
01404     {
01405         for (i = 0; i < optimize->nexperiments; ++i)
01406             g_mapped_file_unref (optimize->file[j][i]);
01407         g_free (optimize->file[j]);
01408     }
01409     g_free (optimize->error_old);
01410     g_free (optimize->value_old);
01411     g_free (optimize->value);
01412     g_free (optimize->genetic_variable);
01413     #if DEBUG_OPTIMIZE
01414     fprintf (stderr, "optimize_free:  end\n");
01415     #endif
01416 }

```

5.21.3.9 optimize_genetic()

```
static void optimize_genetic ( ) [static]
```

Function to optimize with the genetic algorithm.

Definition at line 1137 of file [optimize.c](#).

```
01138 {
01139     double *best_variable = NULL;
01140     char *best_genome = NULL;
01141     double best_objective = 0.;
01142     #if DEBUG_OPTIMIZE
01143     fprintf (stderr, "optimize_genetic: start\n");
01144     fprintf (stderr, "optimize_genetic: ntasks=%u nthreads=%u\n", ntasks,
01145             nthreads);
01146     fprintf (stderr,
01147             "optimize_genetic: nvariables=%u population=%u generations=%u\n",
01148             optimize->nvariables, optimize->nsimulations, optimize->niterations);
01149     fprintf (stderr,
01150             "optimize_genetic: mutation=%lg reproduction=%lg adaptation=%lg\n",
01151             optimize->mutation_ratio, optimize->reproduction_ratio,
01152             optimize->adaptation_ratio);
01153     #endif
01154     genetic_algorithm_default (optimize->nvariables,
01155                               optimize->genetic_variable,
01156                               optimize->nsimulations,
01157                               optimize->niterations,
01158                               optimize->mutation_ratio,
01159                               optimize->reproduction_ratio,
01160                               optimize->adaptation_ratio,
01161                               optimize->seed,
01162                               optimize->threshold,
01163                               &optimize_genetic_objective,
01164                               &best_genome, &best_variable, &best_objective);
01165     #if DEBUG_OPTIMIZE
01166     fprintf (stderr, "optimize_genetic: the best\n");
01167     #endif
01168     optimize->error_old = (double *) g_malloc (sizeof (double));
01169     optimize->value_old
01170     = (double *) g_malloc (optimize->nvariables * sizeof (double));
01171     optimize->error_old[0] = best_objective;
01172     memcpy (optimize->value_old, best_variable,
01173            optimize->nvariables * sizeof (double));
01174     g_free (best_genome);
01175     g_free (best_variable);
01176     optimize_print ();
01177     #if DEBUG_OPTIMIZE
01178     fprintf (stderr, "optimize_genetic: end\n");
01179     #endif
01180 }
```

5.21.3.10 optimize_genetic_objective()

```
static double optimize_genetic_objective (
    Entity * entity ) [static]
```

Function to calculate the objective function of an entity.

Returns

objective function value.

Parameters

<i>entity</i>	entity data.
---------------	--------------

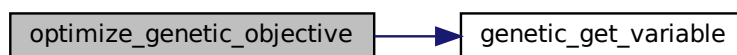
Definition at line 1104 of file [optimize.c](#).

```

01105 {
01106     unsigned int j;
01107     double objective;
01108     char buffer[64];
01109     #if DEBUG_OPTIMIZE
01110     fprintf (stderr, "optimize_genetic_objective:  start\n");
01111     #endif
01112     for (j = 0; j < optimize->nvariables; ++j)
01113     {
01114         optimize->value[entity->id * optimize->nvariables + j]
01115         = genetic_get_variable (entity, optimize->genetic_variable + j);
01116     }
01117     objective = optimize_norm (entity->id);
01118     g_mutex_lock (mutex);
01119     for (j = 0; j < optimize->nvariables; ++j)
01120     {
01121         snprintf (buffer, 64, "%s ", format[optimize->precision[j]]);
01122         fprintf (optimize->file_variables, buffer,
01123                 genetic_get_variable (entity, optimize->genetic_variable + j));
01124     }
01125     fprintf (optimize->file_variables, "%.14le\n", objective);
01126     g_mutex_unlock (mutex);
01127     #if DEBUG_OPTIMIZE
01128     fprintf (stderr, "optimize_genetic_objective:  end\n");
01129     #endif
01130     return objective;
01131 }

```

Here is the call graph for this function:



5.21.3.11 optimize_input()

```

static void optimize_input (
    unsigned int simulation,
    char * input,
    GMappedFile * stencil ) [inline], [static]

```

Function to write the simulation input file.

Parameters

<i>simulation</i>	Simulation number.
<i>input</i>	Input file name.
<i>stencil</i>	Template of the input file name.

Definition at line 95 of file [optimize.c](#).

```

00098 {
00099     char buffer[32], value[32];
00100     GRegex *regex;
00101     FILE *file;
00102     char *buffer2, *buffer3 = NULL, *content;
00103     gsize length;

```

```

00104 unsigned int i;
00105
00106 #if DEBUG_OPTIMIZE
00107     fprintf (stderr, "optimize_input: start\n");
00108 #endif
00109
00110 // Checking the file
00111 if (!stencil)
00112     goto optimize_input_end;
00113
00114 // Opening stencil
00115 content = g_mapped_file_get_contents (stencil);
00116 length = g_mapped_file_get_length (stencil);
00117 #if DEBUG_OPTIMIZE
00118     fprintf (stderr, "optimize_input: length=%lu\ncontent:\n%s", length, content);
00119 #endif
00120 file = g_fopen (input, "w");
00121
00122 // Parsing stencil
00123 for (i = 0; i < optimize->nvariables; ++i)
00124 {
00125     #if DEBUG_OPTIMIZE
00126         fprintf (stderr, "optimize_input: variable=%u\n", i);
00127     #endif
00128     snprintf (buffer, 32, "@variable%u@", i + 1);
00129     regex = g_regex_new (buffer, (GRegexCompileFlags) 0, (GRegexMatchFlags) 0,
00130                          NULL);
00131     if (i == 0)
00132     {
00133         buffer2 = g_regex_replace_literal (regex, content, length, 0,
00134                                           optimize->label[i],
00135                                           (GRegexMatchFlags) 0, NULL);
00136     #if DEBUG_OPTIMIZE
00137         fprintf (stderr, "optimize_input: buffer2\n%s", buffer2);
00138     #endif
00139     }
00140     else
00141     {
00142         length = strlen (buffer3);
00143         buffer2 = g_regex_replace_literal (regex, buffer3, length, 0,
00144                                           optimize->label[i],
00145                                           (GRegexMatchFlags) 0, NULL);
00146         g_free (buffer3);
00147     }
00148     g_regex_unref (regex);
00149     length = strlen (buffer2);
00150     snprintf (buffer, 32, "@value%u@", i + 1);
00151     regex = g_regex_new (buffer, (GRegexCompileFlags) 0, (GRegexMatchFlags) 0,
00152                          NULL);
00153     snprintf (value, 32, format[optimize->precision[i]],
00154              optimize->value[simulation * optimize->nvariables + i]);
00155     #if DEBUG_OPTIMIZE
00156         fprintf (stderr, "optimize_input: value=%s\n", value);
00157     #endif
00158     buffer3 = g_regex_replace_literal (regex, buffer2, length, 0, value,
00159                                       (GRegexMatchFlags) 0, NULL);
00160     g_free (buffer2);
00161     g_regex_unref (regex);
00162 }
00163
00164 // Saving input file
00165 fwrite (buffer3, strlen (buffer3), sizeof (char), file);
00166 g_free (buffer3);
00167 fclose (file);
00168
00169 optimize_input_end:
00170 #if DEBUG_OPTIMIZE
00171     fprintf (stderr, "optimize_input: end\n");
00172 #endif
00173 return;
00174 }

```

5.21.3.12 optimize_iterate()

```
static void optimize_iterate ( ) [inline], [static]
```

Function to iterate the algorithm.

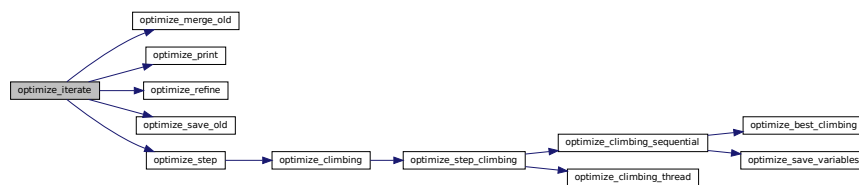
Definition at line 1367 of file [optimize.c](#).

```

01368 {
01369     unsigned int i;
01370     #if DEBUG_OPTIMIZE
01371     fprintf (stderr, "optimize_iterate: start\n");
01372     #endif
01373     optimize->error_old = (double *) g_malloc (optimize->nbest * sizeof (double));
01374     optimize->value_old =
01375         (double *) g_malloc (optimize->nbest * optimize->nvariables *
01376                             sizeof (double));
01377     optimize_step ();
01378     optimize_save_old ();
01379     optimize_refine ();
01380     optimize_print ();
01381     for (i = 1; i < optimize->niterations && !optimize->stop; ++i)
01382     {
01383         optimize_step ();
01384         optimize_merge_old ();
01385         optimize_refine ();
01386         optimize_print ();
01387     }
01388     #if DEBUG_OPTIMIZE
01389     fprintf (stderr, "optimize_iterate: end\n");
01390     #endif
01391 }

```

Here is the call graph for this function:



5.21.3.13 optimize_merge()

```

static void optimize_merge (
    unsigned int nsaveds,
    unsigned int * simulation_best,
    double * error_best ) [inline], [static]

```

Function to merge the 2 optimization results.

Parameters

<i>nsaveds</i>	Number of saved results.
<i>simulation_best</i>	Array of best simulation numbers.
<i>error_best</i>	Array of best objective function values.

Definition at line 563 of file [optimize.c](#).

```

00568 {
00569     unsigned int i, j, k, s[optimize->nbest];
00570     double e[optimize->nbest];
00571     #if DEBUG_OPTIMIZE
00572     fprintf (stderr, "optimize_merge: start\n");
00573     #endif
00574     i = j = k = 0;
00575     do
00576     {

```



```

00577     if (i == optimize->nsaveds)
00578     {
00579         s[k] = simulation_best[j];
00580         e[k] = error_best[j];
00581         ++j;
00582         ++k;
00583         if (j == nsaveds)
00584             break;
00585     }
00586     else if (j == nsaveds)
00587     {
00588         s[k] = optimize->simulation_best[i];
00589         e[k] = optimize->error_best[i];
00590         ++i;
00591         ++k;
00592         if (i == optimize->nsaveds)
00593             break;
00594     }
00595     else if (optimize->error_best[i] > error_best[j])
00596     {
00597         s[k] = simulation_best[j];
00598         e[k] = error_best[j];
00599         ++j;
00600         ++k;
00601     }
00602     else
00603     {
00604         s[k] = optimize->simulation_best[i];
00605         e[k] = optimize->error_best[i];
00606         ++i;
00607         ++k;
00608     }
00609 }
00610 while (k < optimize->nbest);
00611 optimize->nsaveds = k;
00612 memcpy (optimize->simulation_best, s, k * sizeof (unsigned int));
00613 memcpy (optimize->error_best, e, k * sizeof (double));
00614 #if DEBUG_OPTIMIZE
00615     fprintf (stderr, "optimize_merge: end\n");
00616 #endif
00617 }

```

5.21.3.14 optimize_merge_old()

static void optimize_merge_old () [inline], [static]

Function to merge the best results with the previous step best results on iterative methods.

Definition at line 1218 of file [optimize.c](#).

```

1219 {
1220     unsigned int i, j, k;
1221     double v[optimize->nbest * optimize->nvariables], e[optimize->nbest],
1222         *enew, *eold;
1223     #if DEBUG_OPTIMIZE
1224         fprintf (stderr, "optimize_merge_old: start\n");
1225     #endif
1226     anew = optimize->error_best;
1227     eold = optimize->error_old;
1228     i = j = k = 0;
1229     do
1230     {
1231         if (*enew < *eold)
1232         {
1233             memcpy (v + k * optimize->nvariables,
1234                 optimize->value
1235                 + optimize->simulation_best[i] * optimize->nvariables,
1236                 optimize->nvariables * sizeof (double));
1237             e[k] = *enew;
1238             ++k;
1239             ++enew;
1240             ++i;
1241         }
1242         else
1243         {
1244             memcpy (v + k * optimize->nvariables,
1245                 optimize->value_old + j * optimize->nvariables,
1246                 optimize->nvariables * sizeof (double));
1247             e[k] = *eold;

```

```

01248         ++k;
01249         ++eold;
01250         ++j;
01251     }
01252 }
01253 while (k < optimize->nbest);
01254 memcpy (optimize->value_old, v, k * optimize->nvariables * sizeof (double));
01255 memcpy (optimize->error_old, e, k * sizeof (double));
01256 #if DEBUG_OPTIMIZE
01257 fprintf (stderr, "optimize_merge_old: end\n");
01258 #endif
01259 }

```

5.21.3.15 optimize_MonteCarlo()

```
static void optimize_MonteCarlo ( ) [static]
```

Function to optimize with the Monte-Carlo algorithm.

Definition at line 721 of file [optimize.c](#).

```

00722 {
00723     unsigned int i, j;
00724     GThread *thread[nthreads];
00725     ParallelData data[nthreads];
00726 #if DEBUG_OPTIMIZE
00727     fprintf (stderr, "optimize_MonteCarlo: start\n");
00728 #endif
00729     for (i = 0; i < optimize->nsimulations; ++i)
00730         for (j = 0; j < optimize->nvariables; ++j)
00731             optimize->value[i * optimize->nvariables + j]
00732                 = optimize->rangemin[j] + gsl_rng_uniform (optimize->rng)
00733                   * (optimize->rangemax[j] - optimize->rangemin[j]);
00734     optimize->nsaveds = 0;
00735     if (nthreads <= 1)
00736         optimize_sequential ();
00737     else
00738     {
00739         for (i = 0; i < nthreads; ++i)
00740         {
00741             data[i].thread = i;
00742             thread[i]
00743                 = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00744         }
00745         for (i = 0; i < nthreads; ++i)
00746             g_thread_join (thread[i]);
00747     }
00748 #if HAVE_MPI
00749     // Communicating tasks results
00750     optimize_synchronise ();
00751 #endif
00752 #if DEBUG_OPTIMIZE
00753     fprintf (stderr, "optimize_MonteCarlo: end\n");
00754 #endif
00755 }

```

5.21.3.16 optimize_norm_euclidian()

```
static double optimize_norm_euclidian (
    unsigned int simulation ) [static]
```

Function to calculate the Euclidian error norm.

Returns

Euclidian error norm.

Parameters

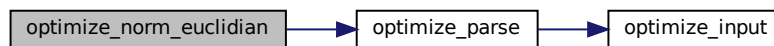
<i>simulation</i>	simulation number.
-------------------	--------------------

Definition at line 298 of file [optimize.c](#).

```

00299 {
00300     double e, ei;
00301     unsigned int i;
00302     #if DEBUG_OPTIMIZE
00303     fprintf (stderr, "optimize_norm_euclidian:  start\n");
00304     #endif
00305     e = 0.;
00306     for (i = 0; i < optimize->nexperiments; ++i)
00307     {
00308         ei = optimize_parse (simulation, i);
00309         e += ei * ei;
00310     }
00311     e = sqrt (e);
00312     #if DEBUG_OPTIMIZE
00313     fprintf (stderr, "optimize_norm_euclidian:  error=%lg\n", e);
00314     fprintf (stderr, "optimize_norm_euclidian:  end\n");
00315     #endif
00316     return e;
00317 }
```

Here is the call graph for this function:



5.21.3.17 optimize_norm_maximum()

```

static double optimize_norm_maximum (
    unsigned int simulation )  [static]
```

Function to calculate the maximum error norm.

Returns

Maximum error norm.

Parameters

<i>simulation</i>	simulation number.
-------------------	--------------------

Definition at line 325 of file [optimize.c](#).

```

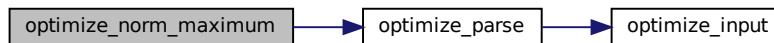
00326 {
00327     double e, ei;
00328     unsigned int i;
00329     #if DEBUG_OPTIMIZE
00330     fprintf (stderr, "optimize_norm_maximum:  start\n");
00331     #endif
00332     e = 0.;
00333     for (i = 0; i < optimize->nexperiments; ++i)
```

```

00334     {
00335         ei = fabs (optimize_parse (simulation, i));
00336         e = fmax (e, ei);
00337     }
00338     #if DEBUG_OPTIMIZE
00339     fprintf (stderr, "optimize_norm_maximum: error=%lg\n", e);
00340     fprintf (stderr, "optimize_norm_maximum: end\n");
00341     #endif
00342     return e;
00343 }

```

Here is the call graph for this function:



5.21.3.18 optimize_norm_p()

```

static double optimize_norm_p (
    unsigned int simulation ) [static]

```

Function to calculate the P error norm.

Returns

P error norm.

Parameters

<i>simulation</i>	simulation number.
-------------------	--------------------

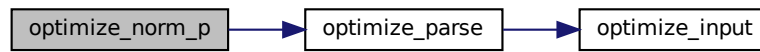
Definition at line 351 of file [optimize.c](#).

```

00352 {
00353     double e, ei;
00354     unsigned int i;
00355     #if DEBUG_OPTIMIZE
00356     fprintf (stderr, "optimize_norm_p: start\n");
00357     #endif
00358     e = 0.;
00359     for (i = 0; i < optimize->nexperiments; ++i)
00360     {
00361         ei = fabs (optimize_parse (simulation, i));
00362         e += pow (ei, optimize->p);
00363     }
00364     e = pow (e, 1. / optimize->p);
00365     #if DEBUG_OPTIMIZE
00366     fprintf (stderr, "optimize_norm_p: error=%lg\n", e);
00367     fprintf (stderr, "optimize_norm_p: end\n");
00368     #endif
00369     return e;
00370 }

```

Here is the call graph for this function:



5.21.3.19 optimize_norm_taxicab()

```
static double optimize_norm_taxicab (
    unsigned int simulation ) [static]
```

Function to calculate the taxicab error norm.

Returns

Taxicab error norm.

Parameters

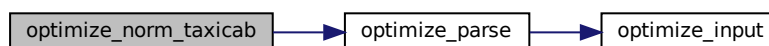
<i>simulation</i>	simulation number.
-------------------	--------------------

Definition at line 378 of file [optimize.c](#).

```

00379 {
00380     double e;
00381     unsigned int i;
00382     #if DEBUG_OPTIMIZE
00383     fprintf (stderr, "optimize_norm_taxicab: start\n");
00384     #endif
00385     e = 0.;
00386     for (i = 0; i < optimize->nexperiments; ++i)
00387         e += fabs (optimize_parse (simulation, i));
00388     #if DEBUG_OPTIMIZE
00389     fprintf (stderr, "optimize_norm_taxicab: error=%lg\n", e);
00390     fprintf (stderr, "optimize_norm_taxicab: end\n");
00391     #endif
00392     return e;
00393 }
```

Here is the call graph for this function:



5.21.3.20 optimize_open()

```
void optimize_open ( )
```

Function to open and perform a optimization.

Definition at line 1422 of file [optimize.c](#).

```
01423 {
01424     GTimeZone *tz;
01425     GDateTime *t0, *t;
01426     unsigned int i, j;
01427
01428     #if DEBUG_OPTIMIZE
01429         char *buffer;
01430         fprintf (stderr, "optimize_open:  start\n");
01431     #endif
01432
01433     // Getting initial time
01434     #if DEBUG_OPTIMIZE
01435         fprintf (stderr, "optimize_open:  getting initial time\n");
01436     #endif
01437     tz = g_time_zone_new_utc ();
01438     t0 = g_date_time_new_now (tz);
01439
01440     // Obtaining and initing the pseudo-random numbers generator seed
01441     #if DEBUG_OPTIMIZE
01442         fprintf (stderr, "optimize_open:  getting initial seed\n");
01443     #endif
01444     if (optimize->seed == DEFAULT_RANDOM_SEED)
01445         optimize->seed = input->seed;
01446     gsl_rng_set (optimize->rng, optimize->seed);
01447
01448     // Replacing the working directory
01449     #if DEBUG_OPTIMIZE
01450         fprintf (stderr, "optimize_open:  replacing the working directory\n");
01451     #endif
01452     g_chdir (input->directory);
01453
01454     // Getting results file names
01455     optimize->result = input->result;
01456     optimize->variables = input->variables;
01457
01458     // Obtaining the simulator file
01459     optimize->simulator = input->simulator;
01460
01461     // Obtaining the evaluator file
01462     optimize->evaluator = input->evaluator;
01463
01464     // Reading the algorithm
01465     optimize->algorithm = input->algorithm;
01466     switch (optimize->algorithm)
01467     {
01468         case ALGORITHM_MONTE_CARLO:
01469             optimize_algorithm = optimize_MonteCarlo;
01470             break;
01471         case ALGORITHM_SWEEP:
01472             optimize_algorithm = optimize_sweep;
01473             break;
01474         case ALGORITHM_ORTHOGONAL:
01475             optimize_algorithm = optimize_orthogonal;
01476             break;
01477         default:
01478             optimize_algorithm = optimize_genetic;
01479             optimize->mutation_ratio = input->mutation_ratio;
01480             optimize->reproduction_ratio = input->reproduction_ratio;
01481             optimize->adaptation_ratio = input->adaptation_ratio;
01482     }
01483     optimize->nvariables = input->nvariables;
01484     optimize->nsimulations = input->nsimulations;
01485     optimize->niterations = input->niterations;
01486     optimize->nbest = input->nbest;
01487     optimize->tolerance = input->tolerance;
01488     optimize->nsteps = input->nsteps;
01489     optimize->nestimates = 0;
01490     optimize->threshold = input->threshold;
01491     optimize->stop = 0;
01492     if (input->nsteps)
01493     {
01494         optimize->relaxation = input->relaxation;
01495         switch (input->climbing)
01496         {
01497             case CLIMBING_METHOD_COORDINATES:
01498                 optimize->nestimates = 2 * optimize->nvariables;
```

```

01499         optimize_estimate_climbing = optimize_estimate_climbing_coordinates;
01500         break;
01501     default:
01502         optimize->nestimates = input->nestimates;
01503         optimize_estimate_climbing = optimize_estimate_climbing_random;
01504     }
01505 }
01506
01507 #if DEBUG_OPTIMIZE
01508 fprintf (stderr, "optimize_open: nbest=%u\n", optimize->nbest);
01509 #endif
01510 optimize->simulation_best
01511 = (unsigned int *) alloca (optimize->nbest * sizeof (unsigned int));
01512 optimize->error_best = (double *) alloca (optimize->nbest * sizeof (double));
01513
01514 // Reading the experimental data
01515 #if DEBUG_OPTIMIZE
01516 buffer = g_get_current_dir ();
01517 fprintf (stderr, "optimize_open: current directory=%s\n", buffer);
01518 g_free (buffer);
01519 #endif
01520 optimize->nexperiments = input->nexperiments;
01521 optimize->ninputs = input->experiment->ninputs;
01522 optimize->experiment
01523 = (char **) alloca (input->nexperiments * sizeof (char *));
01524 optimize->weight = (double *) alloca (input->nexperiments * sizeof (double));
01525 for (i = 0; i < input->experiment->ninputs; ++i)
01526     optimize->file[i] = (GMappedFile **)
01527         g_malloc (input->nexperiments * sizeof (GMappedFile *));
01528 for (i = 0; i < input->nexperiments; ++i)
01529 {
01530     #if DEBUG_OPTIMIZE
01531     fprintf (stderr, "optimize_open: i=%u\n", i);
01532     #endif
01533     optimize->experiment[i] = input->experiment[i].name;
01534     optimize->weight[i] = input->experiment[i].weight;
01535     #if DEBUG_OPTIMIZE
01536     fprintf (stderr, "optimize_open: experiment=%s weight=%lg\n",
01537             optimize->experiment[i], optimize->weight[i]);
01538     #endif
01539     for (j = 0; j < input->experiment->ninputs; ++j)
01540     {
01541         #if DEBUG_OPTIMIZE
01542         fprintf (stderr, "optimize_open: stencil%u\n", j + 1);
01543         #endif
01544         optimize->file[j][i]
01545             = g_mapped_file_new (input->experiment[i].stencil[j], 0, NULL);
01546     }
01547 }
01548
01549 // Reading the variables data
01550 #if DEBUG_OPTIMIZE
01551 fprintf (stderr, "optimize_open: reading variables\n");
01552 #endif
01553 optimize->label = (char **) alloca (input->nvariables * sizeof (char *));
01554 j = input->nvariables * sizeof (double);
01555 optimize->rangemin = (double *) alloca (j);
01556 optimize->rangeminabs = (double *) alloca (j);
01557 optimize->rangemax = (double *) alloca (j);
01558 optimize->rangemaxabs = (double *) alloca (j);
01559 optimize->step = (double *) alloca (j);
01560 j = input->nvariables * sizeof (unsigned int);
01561 optimize->precision = (unsigned int *) alloca (j);
01562 optimize->nsweeps = (unsigned int *) alloca (j);
01563 optimize->nbits = (unsigned int *) alloca (j);
01564 for (i = 0; i < input->nvariables; ++i)
01565 {
01566     optimize->label[i] = input->variable[i].name;
01567     optimize->rangemin[i] = input->variable[i].rangemin;
01568     optimize->rangeminabs[i] = input->variable[i].rangeminabs;
01569     optimize->rangemax[i] = input->variable[i].rangemax;
01570     optimize->rangemaxabs[i] = input->variable[i].rangemaxabs;
01571     optimize->precision[i] = input->variable[i].precision;
01572     optimize->step[i] = input->variable[i].step;
01573     optimize->nsweeps[i] = input->variable[i].nsweeps;
01574     optimize->nbits[i] = input->variable[i].nbits;
01575 }
01576 if (input->algorithm == ALGORITHM_SWEEP
01577     || input->algorithm == ALGORITHM_ORTHOGONAL)
01578 {
01579     optimize->nsimulations = 1;
01580     for (i = 0; i < input->nvariables; ++i)
01581     {
01582         optimize->nsimulations *= optimize->nsweeps[i];
01583     }
01584     #if DEBUG_OPTIMIZE
01585     fprintf (stderr, "optimize_open: nsweeps=%u nsimulations=%u\n",
01586             optimize->nsweeps[i], optimize->nsimulations);
01587     #endif
01588 }

```

```

01586 #endif
01587     }
01588 }
01589 if (optimize->nsteps)
01590     optimize->climbing
01591     = (double *) alloca (optimize->nvariables * sizeof (double));
01592
01593 // Setting error norm
01594 switch (input->norm)
01595 {
01596     case ERROR_NORM_EUCLIDIAN:
01597         optimize_norm = optimize_norm_euclidian;
01598         break;
01599     case ERROR_NORM_MAXIMUM:
01600         optimize_norm = optimize_norm_maximum;
01601         break;
01602     case ERROR_NORM_P:
01603         optimize_norm = optimize_norm_p;
01604         optimize->p = input->p;
01605         break;
01606     default:
01607         optimize_norm = optimize_norm_taxicab;
01608 }
01609
01610 // Allocating values
01611 #if DEBUG_OPTIMIZE
01612 fprintf (stderr, "optimize_open: allocating variables\n");
01613 fprintf (stderr, "optimize_open: nvariables=%u algorithm=%u\n",
01614         optimize->nvariables, optimize->algorithm);
01615 #endif
01616 optimize->genetic_variable = NULL;
01617 if (optimize->algorithm == ALGORITHM_GENETIC)
01618 {
01619     optimize->genetic_variable = (GeneticVariable *)
01620     g_malloc (optimize->nvariables * sizeof (GeneticVariable));
01621     for (i = 0; i < optimize->nvariables; ++i)
01622     {
01623         #if DEBUG_OPTIMIZE
01624             fprintf (stderr, "optimize_open: i=%u min=%lg max=%lg nbits=%u\n",
01625                     i, optimize->rangemin[i], optimize->rangemax[i],
01626                     optimize->nbits[i]);
01627         #endif
01628         optimize->genetic_variable[i].minimum = optimize->rangemin[i];
01629         optimize->genetic_variable[i].maximum = optimize->rangemax[i];
01630         optimize->genetic_variable[i].nbits = optimize->nbits[i];
01631     }
01632 }
01633 #if DEBUG_OPTIMIZE
01634 fprintf (stderr, "optimize_open: nvariables=%u nsimulations=%u\n",
01635         optimize->nvariables, optimize->nsimulations);
01636 #endif
01637 optimize->value = (double *)
01638     g_malloc ((optimize->nsimulations
01639             + optimize->nestimates * optimize->nsteps)
01640             * optimize->nvariables * sizeof (double));
01641
01642 // Calculating simulations to perform for each task
01643 #if HAVE_MPI
01644 #if DEBUG_OPTIMIZE
01645     fprintf (stderr, "optimize_open: rank=%u ntasks=%u\n",
01646             optimize->mpi_rank, ntasks);
01647 #endif
01648     optimize->nstart = optimize->mpi_rank * optimize->nsimulations / ntasks;
01649     optimize->nend = (1 + optimize->mpi_rank) * optimize->nsimulations / ntasks;
01650     if (optimize->nsteps)
01651     {
01652         optimize->nstart_climbing
01653             = optimize->mpi_rank * optimize->nestimates / ntasks;
01654         optimize->nend_climbing
01655             = (1 + optimize->mpi_rank) * optimize->nestimates / ntasks;
01656     }
01657 #else
01658     optimize->nstart = 0;
01659     optimize->nend = optimize->nsimulations;
01660     if (optimize->nsteps)
01661     {
01662         optimize->nstart_climbing = 0;
01663         optimize->nend_climbing = optimize->nestimates;
01664     }
01665 #endif
01666 #if DEBUG_OPTIMIZE
01667     fprintf (stderr, "optimize_open: nstart=%u nend=%u\n", optimize->nstart,
01668             optimize->nend);
01669 #endif
01670
01671 // Calculating simulations to perform for each thread
01672 optimize->thread

```

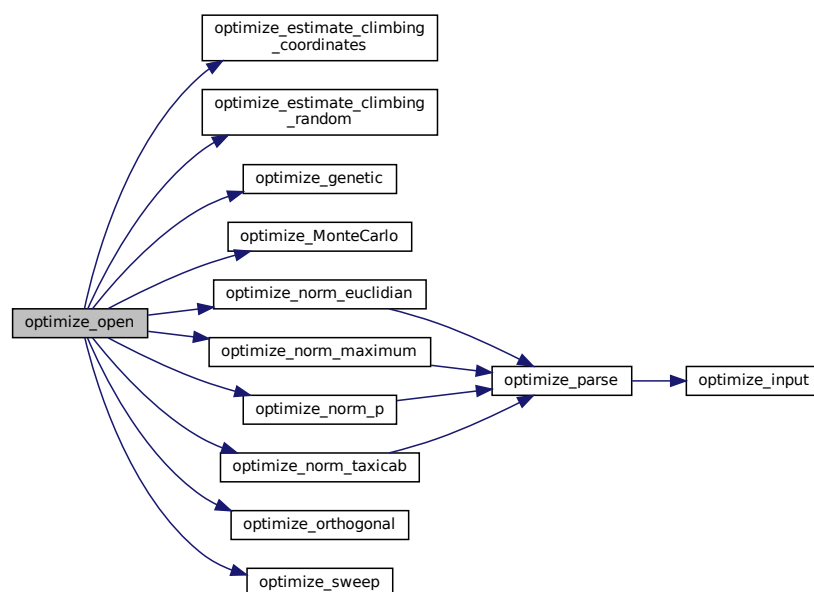


```

01673     = (unsigned int *) alloca ((1 + nthreads) * sizeof (unsigned int));
01674     for (i = 0; i <= nthreads; ++i)
01675     {
01676         optimize->thread[i] = optimize->nstart
01677             + i * (optimize->nend - optimize->nstart) / nthreads;
01678     #if DEBUG_OPTIMIZE
01679         fprintf (stderr, "optimize_open: i=%u thread=%u\n", i,
01680                 optimize->thread[i]);
01681     #endif
01682     }
01683     if (optimize->nsteps)
01684         optimize->thread_climbing = (unsigned int *)
01685             alloca ((1 + nthreads_climbing) * sizeof (unsigned int));
01686
01687     // Opening result files
01688     optimize->file_result = g_fopen (optimize->result, "w");
01689     optimize->file_variables = g_fopen (optimize->variables, "w");
01690
01691     // Performing the algorithm
01692     switch (optimize->algorithm)
01693     {
01694         // Genetic algorithm
01695         case ALGORITHM_GENETIC:
01696             optimize_genetic ();
01697             break;
01698
01699         // Iterative algorithm
01700         default:
01701             optimize_iterate ();
01702     }
01703
01704     // Getting calculation time
01705     t = g_date_time_new_now (tz);
01706     optimize->calculation_time = 0.000001 * g_date_time_difference (t, t0);
01707     g_date_time_unref (t);
01708     g_date_time_unref (t0);
01709     g_time_zone_unref (tz);
01710     printf ("%s = %.6lg s\n", _("Calculation time"), optimize->calculation_time);
01711     fprintf (optimize->file_result, "%s = %.6lg s\n",
01712             _("Calculation time"), optimize->calculation_time);
01713
01714     // Closing result files
01715     fclose (optimize->file_variables);
01716     fclose (optimize->file_result);
01717
01718     #if DEBUG_OPTIMIZE
01719     fprintf (stderr, "optimize_open: end\n");
01720     #endif
01721 }

```

Here is the call graph for this function:



5.21.3.21 optimize_orthogonal()

```
static void optimize_orthogonal ( ) [static]
```

Function to optimize with the orthogonal sampling algorithm.

Definition at line 761 of file [optimize.c](#).

```
00762 {
00763     unsigned int i, j, k, l;
00764     double e;
00765     GThread *thread[nthreads];
00766     ParallelData data[nthreads];
00767     #if DEBUG_OPTIMIZE
00768     fprintf (stderr, "optimize_orthogonal: start\n");
00769     #endif
00770     for (i = 0; i < optimize->nsimulations; ++i)
00771     {
00772         k = i;
00773         for (j = 0; j < optimize->nvariables; ++j)
00774         {
00775             l = k % optimize->nsweeps[j];
00776             k /= optimize->nsweeps[j];
00777             e = optimize->rangemin[j];
00778             if (optimize->nsweeps[j] > 1)
00779                 e += (l + gsl_rng_uniform (optimize->rng))
00780                     * (optimize->rangemax[j] - optimize->rangemin[j])
00781                     / optimize->nsweeps[j];
00782             optimize->value[i * optimize->nvariables + j] = e;
00783         }
00784     }
00785     optimize->nsaveds = 0;
00786     if (nthreads <= 1)
00787         optimize_sequential ();
00788     else
00789     {
00790         for (i = 0; i < nthreads; ++i)
00791         {
00792             data[i].thread = i;
00793             thread[i]
00794                 = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00795         }
00796         for (i = 0; i < nthreads; ++i)
00797             g_thread_join (thread[i]);
00798     }
00799     #if HAVE_MPI
00800     // Communicating tasks results
00801     optimize_synchronise ();
00802     #endif
00803     #if DEBUG_OPTIMIZE
00804     fprintf (stderr, "optimize_orthogonal: end\n");
00805     #endif
00806 }
```

5.21.3.22 optimize_parse()

```
static double optimize_parse (
    unsigned int simulation,
    unsigned int experiment ) [static]
```

Function to parse input files, simulating and calculating the objective function.

Returns

Objective function value.

Parameters

<i>simulation</i>	Simulation number.
<i>experiment</i>	Experiment number.

Definition at line 184 of file [optimize.c](#).

```

00186 {
00187     unsigned int i;
00188     double e;
00189     char buffer[512], input[MAX_NINPUTS][32], output[32], result[32], *buffer2,
00190         *buffer3, *buffer4;
00191     FILE *file_result;
00192
00193     #if DEBUG_OPTIMIZE
00194         fprintf (stderr, "optimize_parse: start\n");
00195         fprintf (stderr, "optimize_parse: simulation=%u experiment=%u\n",
00196                 simulation, experiment);
00197     #endif
00198
00199     // Opening input files
00200     for (i = 0; i < optimize->ninputs; ++i)
00201     {
00202         snprintf (&input[i][0], 32, "input-%u-%u", i, simulation, experiment);
00203     #if DEBUG_OPTIMIZE
00204         fprintf (stderr, "optimize_parse: i=%u input=%s\n", i, &input[i][0]);
00205     #endif
00206         optimize\_input (simulation, &input[i][0], optimize->file[i][experiment]);
00207     }
00208     for (; i < MAX_NINPUTS; ++i)
00209         strcpy (&input[i][0], "");
00210     #if DEBUG_OPTIMIZE
00211         fprintf (stderr, "optimize_parse: parsing end\n");
00212     #endif
00213
00214     // Performing the simulation
00215     snprintf (output, 32, "output-%u-%u", simulation, experiment);
00216     buffer2 = g_path_get_dirname (optimize->simulator);
00217     buffer3 = g_path_get_basename (optimize->simulator);
00218     buffer4 = g_build_filename (buffer2, buffer3, NULL);
00219     snprintf (buffer, 512, "%s\ " %s %s %s %s %s %s %s %s %s",
00220             buffer4, input[0], input[1], input[2], input[3], input[4],
00221             input[5], input[6], input[7], output);
00222     g_free (buffer4);
00223     g_free (buffer3);
00224     g_free (buffer2);
00225     #if DEBUG_OPTIMIZE
00226         fprintf (stderr, "optimize_parse: %s\n", buffer);
00227     #endif
00228     if (system (buffer) == -1)
00229         error_message = buffer;
00230
00231     // Checking the objective value function
00232     if (optimize->evaluator)
00233     {
00234         snprintf (result, 32, "result-%u-%u", simulation, experiment);
00235         buffer2 = g_path_get_dirname (optimize->evaluator);
00236         buffer3 = g_path_get_basename (optimize->evaluator);
00237         buffer4 = g_build_filename (buffer2, buffer3, NULL);
00238         snprintf (buffer, 512, "%s\ " %s %s %s",
00239                 buffer4, output, optimize->experiment[experiment], result);
00240         g_free (buffer4);
00241         g_free (buffer3);
00242         g_free (buffer2);
00243     #if DEBUG_OPTIMIZE
00244         fprintf (stderr, "optimize_parse: %s\n", buffer);
00245         fprintf (stderr, "optimize_parse: result=%s\n", result);
00246     #endif
00247         if (system (buffer) == -1)
00248             error_message = buffer;
00249         file_result = g_fopen (result, "r");
00250         e = atof (fgets (buffer, 512, file_result));
00251         fclose (file_result);
00252     }
00253     else
00254     {
00255     #if DEBUG_OPTIMIZE
00256         fprintf (stderr, "optimize_parse: output=%s\n", output);
00257     #endif
00258         strcpy (result, "");
00259         file_result = g_fopen (output, "r");
00260         e = atof (fgets (buffer, 512, file_result));
00261         fclose (file_result);
00262     }

```

```

00263
00264 // Removing files
00265 #if !DEBUG_OPTIMIZE
00266 for (i = 0; i < optimize->ninputs; ++i)
00267 {
00268     if (optimize->file[i][0])
00269     {
00270         snprintf (buffer, 512, RM " %s", &input[i][0]);
00271         if (system (buffer) == -1)
00272             error_message = buffer;
00273     }
00274 }
00275 snprintf (buffer, 512, RM " %s %s", output, result);
00276 if (system (buffer) == -1)
00277     error_message = buffer;
00278 #endif
00279
00280 // Processing pending events
00281 if (show_pending)
00282     show_pending ();
00283
00284 #if DEBUG_OPTIMIZE
00285 fprintf (stderr, "optimize_parse: end\n");
00286 #endif
00287
00288 // Returning the objective function
00289 return e * optimize->weight[experiment];
00290 }

```

Here is the call graph for this function:



5.21.3.23 optimize_print()

```
static void optimize_print ( ) [static]
```

Function to print the results.

Definition at line 399 of file `optimize.c`.

```

00400 {
00401     unsigned int i;
00402     char buffer[512];
00403     #if HAVE_MPI
00404         if (optimize->mpi_rank)
00405             return;
00406     #endif
00407     printf ("%s\n", _("Best result"));
00408     fprintf (optimize->file_result, "%s\n", _("Best result"));
00409     printf ("error = %.15le\n", optimize->error_old[0]);
00410     fprintf (optimize->file_result, "error = %.15le\n", optimize->error_old[0]);
00411     for (i = 0; i < optimize->nvariables; ++i)
00412     {
00413         snprintf (buffer, 512, "%s = %s\n",
00414                 optimize->label[i], format[optimize->precision[i]]);
00415         printf (buffer, optimize->value_old[i]);
00416         fprintf (optimize->file_result, buffer, optimize->value_old[i]);
00417     }
00418     fflush (optimize->file_result);
00419 }

```

5.21.3.24 optimize_refine()

```
static void optimize_refine ( ) [inline], [static]
```

Function to refine the search ranges of the variables in iterative algorithms.

Definition at line 1266 of file [optimize.c](#).

```
01267 {
01268     unsigned int i, j;
01269     double d;
01270     #if HAVE_MPI
01271     MPI_Status mpi_stat;
01272     #endif
01273     #if DEBUG_OPTIMIZE
01274     fprintf (stderr, "optimize_refine: start\n");
01275     #endif
01276     #if HAVE_MPI
01277     if (!optimize->mpi_rank)
01278     {
01279     #endif
01280         for (j = 0; j < optimize->nvariables; ++j)
01281         {
01282             optimize->rangemin[j] = optimize->rangemax[j]
01283             = optimize->value_old[j];
01284         }
01285         for (i = 0; ++i < optimize->nbest;)
01286         {
01287             for (j = 0; j < optimize->nvariables; ++j)
01288             {
01289                 optimize->rangemin[j]
01290                 = fmin (optimize->rangemin[j],
01291                     optimize->value_old[i * optimize->nvariables + j]);
01292                 optimize->rangemax[j]
01293                 = fmax (optimize->rangemax[j],
01294                     optimize->value_old[i * optimize->nvariables + j]);
01295             }
01296         }
01297         for (j = 0; j < optimize->nvariables; ++j)
01298         {
01299             d = optimize->tolerance
01300             * (optimize->rangemax[j] - optimize->rangemin[j]);
01301             switch (optimize->algorithm)
01302             {
01303             case ALGORITHM_MONTE_CARLO:
01304                 d *= 0.5;
01305                 break;
01306             default:
01307                 if (optimize->nsweeps[j] > 1)
01308                     d /= optimize->nsweeps[j] - 1;
01309                 else
01310                     d = 0.;
01311             }
01312             optimize->rangemin[j] -= d;
01313             optimize->rangemin[j]
01314             = fmax (optimize->rangemin[j], optimize->rangeminabs[j]);
01315             optimize->rangemax[j] += d;
01316             optimize->rangemax[j]
01317             = fmin (optimize->rangemax[j], optimize->rangemaxabs[j]);
01318             printf ("%s min=%lg max=%lg\n", optimize->label[j],
01319                 optimize->rangemin[j], optimize->rangemax[j]);
01320             fprintf (optimize->file_result, "%s min=%lg max=%lg\n",
01321                 optimize->label[j], optimize->rangemin[j],
01322                 optimize->rangemax[j]);
01323         }
01324     #if HAVE_MPI
01325         for (i = 1; (int) i < ntasks; ++i)
01326         {
01327             MPI_Send (optimize->rangemin, optimize->nvariables, MPI_DOUBLE, i,
01328                 1, MPI_COMM_WORLD);
01329             MPI_Send (optimize->rangemax, optimize->nvariables, MPI_DOUBLE, i,
01330                 1, MPI_COMM_WORLD);
01331         }
01332     }
01333     else
01334     {
01335         MPI_Recv (optimize->rangemin, optimize->nvariables, MPI_DOUBLE, 0, 1,
01336             MPI_COMM_WORLD, &mpi_stat);
01337         MPI_Recv (optimize->rangemax, optimize->nvariables, MPI_DOUBLE, 0, 1,
01338             MPI_COMM_WORLD, &mpi_stat);
01339     }
01340     #endif
01341     #if DEBUG_OPTIMIZE
01342     fprintf (stderr, "optimize_refine: end\n");
```

```
01343 #endif
01344 }
```

5.21.3.25 optimize_save_old()

```
static void optimize_save_old ( ) [inline], [static]
```

Function to save the best results on iterative methods.

Definition at line 1186 of file [optimize.c](#).

```
01187 {
01188     unsigned int i, j;
01189     #if DEBUG_OPTIMIZE
01190         fprintf (stderr, "optimize_save_old: start\n");
01191         fprintf (stderr, "optimize_save_old: nsaveds=%u\n", optimize->nsaveds);
01192     #endif
01193     memcpy (optimize->error_old, optimize->error_best,
01194             optimize->nbest * sizeof (double));
01195     for (i = 0; i < optimize->nbest; ++i)
01196     {
01197         j = optimize->simulation_best[i];
01198         #if DEBUG_OPTIMIZE
01199             fprintf (stderr, "optimize_save_old: i=%u j=%u\n", i, j);
01200         #endif
01201         memcpy (optimize->value_old + i * optimize->nvariables,
01202                 optimize->value + j * optimize->nvariables,
01203                 optimize->nvariables * sizeof (double));
01204     }
01205     #if DEBUG_OPTIMIZE
01206         for (i = 0; i < optimize->nvariables; ++i)
01207             fprintf (stderr, "optimize_save_old: best variable %u=%lg\n",
01208                     i, optimize->value_old[i]);
01209         fprintf (stderr, "optimize_save_old: end\n");
01210     #endif
01211 }
```

5.21.3.26 optimize_save_variables()

```
static void optimize_save_variables (
    unsigned int simulation,
    double error ) [static]
```

Function to save in a file the variables and the error.

Parameters

<i>simulation</i>	Simulation number.
<i>error</i>	Error value.

Definition at line 425 of file [optimize.c](#).

```
00427 {
00428     unsigned int i;
00429     char buffer[64];
00430     #if DEBUG_OPTIMIZE
00431         fprintf (stderr, "optimize_save_variables: start\n");
00432     #endif
00433     for (i = 0; i < optimize->nvariables; ++i)
00434     {
00435         snprintf (buffer, 64, "%s ", format[optimize->precision[i]]);
00436         fprintf (optimize->file_variables, buffer,
00437                 optimize->value[simulation * optimize->nvariables + i]);
00438     }
```

```

00439     fprintf (optimize->file_variables, "%.14le\n", error);
00440     fflush (optimize->file_variables);
00441     #if DEBUG_OPTIMIZE
00442     fprintf (stderr, "optimize_save_variables:  end\n");
00443     #endif
00444 }

```

5.21.3.27 optimize_sequential()

```
static void optimize_sequential ( ) [static]
```

Function to optimize sequentially.

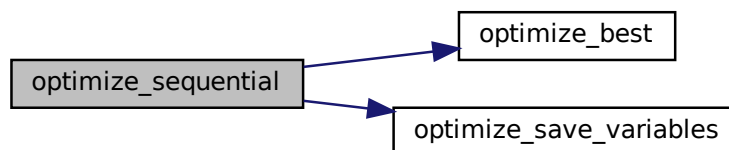
Definition at line 491 of file [optimize.c](#).

```

00492 {
00493     unsigned int i;
00494     double e;
00495     #if DEBUG_OPTIMIZE
00496     fprintf (stderr, "optimize_sequential:  start\n");
00497     fprintf (stderr, "optimize_sequential:  nstart=%u nend=%u\n",
00498             optimize->nstart, optimize->nend);
00499     #endif
00500     for (i = optimize->nstart; i < optimize->nend; ++i)
00501     {
00502         e = optimize_norm (i);
00503         optimize_best (i, e);
00504         optimize_save_variables (i, e);
00505         if (e < optimize->threshold)
00506         {
00507             optimize->stop = 1;
00508             break;
00509         }
00510     #if DEBUG_OPTIMIZE
00511     fprintf (stderr, "optimize_sequential:  i=%u e=%lg\n", i, e);
00512     #endif
00513     }
00514     #if DEBUG_OPTIMIZE
00515     fprintf (stderr, "optimize_sequential:  end\n");
00516     #endif
00517 }

```

Here is the call graph for this function:



5.21.3.28 optimize_step()

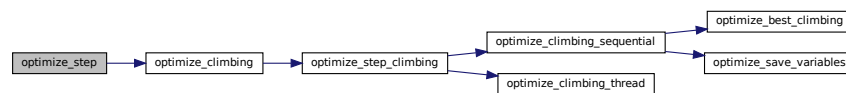
```
static void optimize_step ( ) [static]
```

Function to do a step of the iterative algorithm.

Definition at line 1350 of file [optimize.c](#).

```
01351 {
01352     #if DEBUG_OPTIMIZE
01353     fprintf (stderr, "optimize_step:  start\n");
01354     #endif
01355     optimize_algorithm ();
01356     if (optimize->nsteps)
01357         optimize_climbing ();
01358     #if DEBUG_OPTIMIZE
01359     fprintf (stderr, "optimize_step:  end\n");
01360     #endif
01361 }
```

Here is the call graph for this function:



5.21.3.29 optimize_step_climbing()

```
static void optimize_step_climbing (
    unsigned int simulation ) [inline], [static]
```

Function to do a step of the hill climbing method.

Parameters

<i>simulation</i>	Simulation number.
-------------------	--------------------

Definition at line 971 of file [optimize.c](#).

```
00972 {
00973     GThread *thread[nthreads_climbing];
00974     ParallelData data[nthreads_climbing];
00975     unsigned int i, j, k, b;
00976     #if DEBUG_OPTIMIZE
00977     fprintf (stderr, "optimize_step_climbing:  start\n");
00978     #endif
00979     for (i = 0; i < optimize->nestimates; ++i)
00980     {
00981         k = (simulation + i) * optimize->nvariables;
00982         b = optimize->simulation_best[0] * optimize->nvariables;
00983         #if DEBUG_OPTIMIZE
00984         fprintf (stderr, "optimize_step_climbing:  simulation=%u best=%u\n",
00985             simulation + i, optimize->simulation_best[0]);
00986         #endif
00987         for (j = 0; j < optimize->nvariables; ++j, ++k, ++b)
00988         {
00989             #if DEBUG_OPTIMIZE
00990             fprintf (stderr,
00991                 "optimize_step_climbing:  estimate=%u best=%u=%.14le\n",
00992                 i, j, optimize->value[b]);
00993             #endif
00994         }
00995     }
00996 }
```

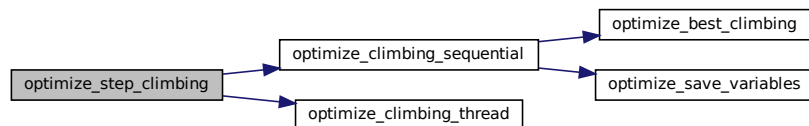


```

00994         optimize->value[k]
00995         = optimize->value[b] + optimize_estimate_climbing (j, i);
00996         optimize->value[k] = fmin (fmax (optimize->value[k],
00997                                     optimize->rangeminabs[j]),
00998                                     optimize->rangemaxabs[j]);
00999 #if DEBUG_OPTIMIZE
01000     fprintf (stderr,
01001             "optimize_step_climbing: estimate=%u variable%u=%.14le\n",
01002             i, j, optimize->value[k]);
01003 #endif
01004     }
01005 }
01006 if (nthreads_climbing == 1)
01007     optimize_climbing_sequential (simulation);
01008 else
01009     {
01010         for (i = 0; i <= nthreads_climbing; ++i)
01011         {
01012             optimize->thread_climbing[i]
01013             = simulation + optimize->nstart_climbing
01014             + i * (optimize->nend_climbing - optimize->nstart_climbing)
01015             / nthreads_climbing;
01016 #if DEBUG_OPTIMIZE
01017             fprintf (stderr,
01018                     "optimize_step_climbing: i=%u thread_climbing=%u\n",
01019                     i, optimize->thread_climbing[i]);
01020 #endif
01021         }
01022         for (i = 0; i < nthreads_climbing; ++i)
01023         {
01024             data[i].thread = i;
01025             thread[i] = g_thread_new
01026             (NULL, (GThreadFunc) optimize_climbing_thread, &data[i]);
01027         }
01028         for (i = 0; i < nthreads_climbing; ++i)
01029             g_thread_join (thread[i]);
01030     }
01031 #if DEBUG_OPTIMIZE
01032     fprintf (stderr, "optimize_step_climbing: end\n");
01033 #endif
01034 }

```

Here is the call graph for this function:



5.21.3.30 optimize_sweep()

```
static void optimize_sweep ( ) [static]
```

Function to optimize with the sweep algorithm.

Definition at line 671 of file `optimize.c`.

```

00672 {
00673     unsigned int i, j, k, l;
00674     double e;
00675     GThread *thread[nthreads];
00676     ParallelData data[nthreads];
00677 #if DEBUG_OPTIMIZE
00678     fprintf (stderr, "optimize_sweep: start\n");
00679 #endif
00680     for (i = 0; i < optimize->nsimulations; ++i)

```

```

00681     {
00682         k = i;
00683         for (j = 0; j < optimize->nvariables; ++j)
00684         {
00685             l = k % optimize->nsweeps[j];
00686             k /= optimize->nsweeps[j];
00687             e = optimize->rangemin[j];
00688             if (optimize->nsweeps[j] > 1)
00689                 e += 1 * (optimize->rangemax[j] - optimize->rangemin[j])
00690                     / (optimize->nsweeps[j] - 1);
00691             optimize->value[i * optimize->nvariables + j] = e;
00692         }
00693     }
00694     optimize->nsaveds = 0;
00695     if (nthreads <= 1)
00696         optimize_sequential ();
00697     else
00698     {
00699         for (i = 0; i < nthreads; ++i)
00700         {
00701             data[i].thread = i;
00702             thread[i]
00703                 = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00704         }
00705         for (i = 0; i < nthreads; ++i)
00706             g_thread_join (thread[i]);
00707     }
00708 #if HAVE_MPI
00709     // Communicating tasks results
00710     optimize_synchronise ();
00711 #endif
00712 #if DEBUG_OPTIMIZE
00713     fprintf (stderr, "optimize_sweep: end\n");
00714 #endif
00715 }

```

5.21.3.31 optimize_synchronise()

```
static void optimize_synchronise ( ) [static]
```

Function to synchronise the optimization results of MPI tasks.

Definition at line 624 of file [optimize.c](#).

```

00625 {
00626     unsigned int i, nsaveds, simulation_best[optimize->nbest], stop;
00627     double error_best[optimize->nbest];
00628     MPI_Status mpi_stat;
00629 #if DEBUG_OPTIMIZE
00630     fprintf (stderr, "optimize_synchronise: start\n");
00631 #endif
00632     if (optimize->mpi_rank == 0)
00633     {
00634         for (i = 1; (int) i < ntasks; ++i)
00635         {
00636             MPI_Recv (&nsaveds, 1, MPI_INT, i, 1, MPI_COMM_WORLD, &mpi_stat);
00637             MPI_Recv (simulation_best, nsaveds, MPI_INT, i, 1,
00638                     MPI_COMM_WORLD, &mpi_stat);
00639             MPI_Recv (error_best, nsaveds, MPI_DOUBLE, i, 1,
00640                     MPI_COMM_WORLD, &mpi_stat);
00641             optimize_merge (nsaveds, simulation_best, error_best);
00642             MPI_Recv (&stop, 1, MPI_UNSIGNED, i, 1, MPI_COMM_WORLD, &mpi_stat);
00643             if (stop)
00644                 optimize->stop = 1;
00645         }
00646         for (i = 1; (int) i < ntasks; ++i)
00647             MPI_Send (&optimize->stop, 1, MPI_UNSIGNED, i, 1, MPI_COMM_WORLD);
00648     }
00649     else
00650     {
00651         MPI_Send (&optimize->nsaveds, 1, MPI_INT, 0, 1, MPI_COMM_WORLD);
00652         MPI_Send (optimize->simulation_best, optimize->nsaveds, MPI_INT, 0, 1,
00653                 MPI_COMM_WORLD);
00654         MPI_Send (optimize->error_best, optimize->nsaveds, MPI_DOUBLE, 0, 1,
00655                 MPI_COMM_WORLD);
00656         MPI_Send (&optimize->stop, 1, MPI_UNSIGNED, 0, 1, MPI_COMM_WORLD);
00657         MPI_Recv (&stop, 1, MPI_UNSIGNED, 0, 1, MPI_COMM_WORLD, &mpi_stat);
00658         if (stop)
00659             optimize->stop = 1;

```

```

00660     }
00661     #if DEBUG_OPTIMIZE
00662     fprintf (stderr, "optimize_synchronise:  end\n");
00663     #endif
00664 }

```

5.21.3.32 optimize_thread()

```

static void * optimize_thread (
    ParallelData * data ) [static]

```

Function to optimize on a thread.

Returns

NULL.

Parameters

<i>data</i>	Function data.
-------------	----------------

Definition at line 525 of file [optimize.c](#).

```

00526 {
00527     unsigned int i, thread;
00528     double e;
00529     #if DEBUG_OPTIMIZE
00530     fprintf (stderr, "optimize_thread:  start\n");
00531     #endif
00532     thread = data->thread;
00533     #if DEBUG_OPTIMIZE
00534     fprintf (stderr, "optimize_thread:  thread=%u start=%u end=%u\n", thread,
00535             optimize->thread[thread], optimize->thread[thread + 1]);
00536     #endif
00537     for (i = optimize->thread[thread]; i < optimize->thread[thread + 1]; ++i)
00538     {
00539         e = optimize_norm (i);
00540         g_mutex_lock (mutex);
00541         optimize_best (i, e);
00542         optimize_save_variables (i, e);
00543         if (e < optimize->threshold)
00544             optimize->stop = 1;
00545         g_mutex_unlock (mutex);
00546         if (optimize->stop)
00547             break;
00548     #if DEBUG_OPTIMIZE
00549     fprintf (stderr, "optimize_thread:  i=%u e=%lg\n", i, e);
00550     #endif
00551     }
00552     #if DEBUG_OPTIMIZE
00553     fprintf (stderr, "optimize_thread:  end\n");
00554     #endif
00555     g_thread_exit (NULL);
00556     return NULL;
00557 }

```

5.21.4 Variable Documentation

5.21.4.1 `nthreads_climbing`

```
unsigned int nthreads_climbing
```

Number of threads for the hill climbing method.

Definition at line 80 of file [optimize.c](#).

5.21.4.2 `optimize`

```
Optimize optimize[1]
```

Optimization data.

Definition at line 79 of file [optimize.c](#).

5.21.4.3 `optimize_algorithm`

```
void(* optimize_algorithm) () ( ) [static]
```

Pointer to the function to perform a optimization algorithm step.

Definition at line 83 of file [optimize.c](#).

5.21.4.4 `optimize_estimate_climbing`

```
double(* optimize_estimate_climbing) (unsigned int variable, unsigned int estimate) (  
    unsigned int variable,  
    unsigned int estimate ) [static]
```

Pointer to the function to estimate the climbing.

Definition at line 85 of file [optimize.c](#).

5.21.4.5 `optimize_norm`

```
double(* optimize_norm) (unsigned int simulation) (  
    unsigned int simulation ) [static]
```

Pointer to the error norm function.

Definition at line 88 of file [optimize.c](#).

5.22 optimize.c

[Go to the documentation of this file.](#)

```

00001  /*
00002  MPCOTool:
00003  The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004  calibrations or optimizations of empirical parameters.
00005
00006  AUTHORS: Javier Burguete and Borja Latorre.
00007
00008  Copyright 2012-2023, AUTHORS.
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00023  SHALL AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
00024  SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
00025  PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
00026  BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
00027  CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028  IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029  OF SUCH DAMAGE.
00030  */
00031
00032  #define _GNU_SOURCE
00033  #include "config.h"
00034  #include <stdio.h>
00035  #include <stdlib.h>
00036  #include <string.h>
00037  #include <math.h>
00038  #include <sys/param.h>
00039  #include <gsl/gsl_rng.h>
00040  #include <libxml/parser.h>
00041  #include <libintl.h>
00042  #include <glib.h>
00043  #include <glib/gstdio.h>
00044  #include <json-glib/json-glib.h>
00045  #ifdef G_OS_WIN32
00046  #include <windows.h>
00047  #elif !defined(__BSD_VISIBLE) && !defined(NETBSD)
00048  #include <alloca.h>
00049  #endif
00050  #if HAVE_MPI
00051  #include <mpi.h>
00052  #endif
00053  #include "jb/src/jb_win.h"
00054  #include "genetic/genetic.h"
00055  #include "tools.h"
00056  #include "experiment.h"
00057  #include "variable.h"
00058  #include "input.h"
00059  #include "optimize.h"
00060
00061  #define DEBUG_OPTIMIZE 0
00062
00063  #ifdef G_OS_WIN32
00064  #define RM "del"
00065  #else
00066  #define RM "rm"
00067  #endif
00068
00069  Optimize optimize[1];
00070  unsigned int nthreads_climbing;
00071
00072  static void (*optimize_algorithm) ();
00073  static double (*optimize_estimate_climbing) (unsigned int variable,
00074                                              unsigned int estimate);
00075  static double (*optimize_norm) (unsigned int simulation);
00076
00077  static inline void
00078  optimize_input (unsigned int simulation,
00079                char *input,
00080                GMappedFile * stencil)
00081  {
00082      char buffer[32], value[32];

```

```

00100   GRegex *regex;
00101   FILE *file;
00102   char *buffer2, *buffer3 = NULL, *content;
00103   gsize length;
00104   unsigned int i;
00105
00106   #if DEBUG_OPTIMIZE
00107   fprintf (stderr, "optimize_input:  start\n");
00108   #endif
00109
00110   // Checking the file
00111   if (!stencil)
00112       goto optimize_input_end;
00113
00114   // Opening stencil
00115   content = g_mapped_file_get_contents (stencil);
00116   length = g_mapped_file_get_length (stencil);
00117   #if DEBUG_OPTIMIZE
00118   fprintf (stderr, "optimize_input:  length=%lu\ncontent:\n%s", length, content);
00119   #endif
00120   file = g_fopen (input, "w");
00121
00122   // Parsing stencil
00123   for (i = 0; i < optimize->nvariables; ++i)
00124   {
00125       #if DEBUG_OPTIMIZE
00126       fprintf (stderr, "optimize_input:  variable=%u\n", i);
00127       #endif
00128       snprintf (buffer, 32, "@variable%u@", i + 1);
00129       regex = g_regex_new (buffer, (GRegexCompileFlags) 0, (GRegexMatchFlags) 0,
00130                           NULL);
00131       if (i == 0)
00132       {
00133           buffer2 = g_regex_replace_literal (regex, content, length, 0,
00134                                             optimize->label[i],
00135                                             (GRegexMatchFlags) 0, NULL);
00136       #if DEBUG_OPTIMIZE
00137       fprintf (stderr, "optimize_input:  buffer2\n%s", buffer2);
00138       #endif
00139       }
00140       else
00141       {
00142           length = strlen (buffer3);
00143           buffer2 = g_regex_replace_literal (regex, buffer3, length, 0,
00144                                             optimize->label[i],
00145                                             (GRegexMatchFlags) 0, NULL);
00146           g_free (buffer3);
00147       }
00148       g_regex_unref (regex);
00149       length = strlen (buffer2);
00150       snprintf (buffer, 32, "@value%u@", i + 1);
00151       regex = g_regex_new (buffer, (GRegexCompileFlags) 0, (GRegexMatchFlags) 0,
00152                           NULL);
00153       snprintf (value, 32, format[optimize->precision[i]],
00154               optimize->value[simulation * optimize->nvariables + i]);
00155       #if DEBUG_OPTIMIZE
00156       fprintf (stderr, "optimize_input:  value=%s\n", value);
00157       #endif
00158       buffer3 = g_regex_replace_literal (regex, buffer2, length, 0, value,
00159                                         (GRegexMatchFlags) 0, NULL);
00160       g_free (buffer2);
00161       g_regex_unref (regex);
00162   }
00163
00164   // Saving input file
00165   fwrite (buffer3, strlen (buffer3), sizeof (char), file);
00166   g_free (buffer3);
00167   fclose (file);
00168
00169 optimize_input_end:
00170 #if DEBUG_OPTIMIZE
00171 fprintf (stderr, "optimize_input:  end\n");
00172 #endif
00173 return;
00174 }
00175
00176
00183 static double
00184 optimize_parse (unsigned int simulation,
00185                unsigned int experiment)
00186 {
00187     unsigned int i;
00188     double e;
00189     char buffer[512], input[MAX_NINPUTS][32], output[32], result[32], *buffer2,
00190           *buffer3, *buffer4;
00191     FILE *file_result;
00192

```

```

00193 #if DEBUG_OPTIMIZE
00194     fprintf (stderr, "optimize_parse:  start\n");
00195     fprintf (stderr, "optimize_parse:  simulation=%u experiment=%u\n",
00196             simulation, experiment);
00197 #endif
00198
00199 // Opening input files
00200 for (i = 0; i < optimize->ninputs; ++i)
00201 {
00202     snprintf (&input[i][0], 32, "input-%u-%u-%u", i, simulation, experiment);
00203 #if DEBUG_OPTIMIZE
00204     fprintf (stderr, "optimize_parse:  i=%u input=%s\n", i, &input[i][0]);
00205 #endif
00206     optimize_input (simulation, &input[i][0], optimize->file[i][experiment]);
00207 }
00208 for (; i < MAX_NINPUTS; ++i)
00209     strcpy (&input[i][0], "");
00210 #if DEBUG_OPTIMIZE
00211     fprintf (stderr, "optimize_parse:  parsing end\n");
00212 #endif
00213
00214 // Performing the simulation
00215     snprintf (output, 32, "output-%u-%u", simulation, experiment);
00216     buffer2 = g_path_get_dirname (optimize->simulator);
00217     buffer3 = g_path_get_basename (optimize->simulator);
00218     buffer4 = g_build_filename (buffer2, buffer3, NULL);
00219     snprintf (buffer, 512, "\"%s\" %s %s %s %s %s %s %s %s",
00220             buffer4, input[0], input[1], input[2], input[3], input[4],
00221             input[5], input[6], input[7], output);
00222     g_free (buffer4);
00223     g_free (buffer3);
00224     g_free (buffer2);
00225 #if DEBUG_OPTIMIZE
00226     fprintf (stderr, "optimize_parse:  %s\n", buffer);
00227 #endif
00228     if (system (buffer) == -1)
00229         error_message = buffer;
00230
00231 // Checking the objective value function
00232 if (optimize->evaluator)
00233 {
00234     snprintf (result, 32, "result-%u-%u", simulation, experiment);
00235     buffer2 = g_path_get_dirname (optimize->evaluator);
00236     buffer3 = g_path_get_basename (optimize->evaluator);
00237     buffer4 = g_build_filename (buffer2, buffer3, NULL);
00238     snprintf (buffer, 512, "\"%s\" %s %s %s",
00239             buffer4, output, optimize->experiment[experiment], result);
00240     g_free (buffer4);
00241     g_free (buffer3);
00242     g_free (buffer2);
00243 #if DEBUG_OPTIMIZE
00244     fprintf (stderr, "optimize_parse:  %s\n", buffer);
00245     fprintf (stderr, "optimize_parse:  result=%s\n", result);
00246 #endif
00247     if (system (buffer) == -1)
00248         error_message = buffer;
00249     file_result = g_fopen (result, "r");
00250     e = atof (fgets (buffer, 512, file_result));
00251     fclose (file_result);
00252 }
00253 else
00254 {
00255 #if DEBUG_OPTIMIZE
00256     fprintf (stderr, "optimize_parse:  output=%s\n", output);
00257 #endif
00258     strcpy (result, "");
00259     file_result = g_fopen (output, "r");
00260     e = atof (fgets (buffer, 512, file_result));
00261     fclose (file_result);
00262 }
00263
00264 // Removing files
00265 #if !DEBUG_OPTIMIZE
00266 for (i = 0; i < optimize->ninputs; ++i)
00267 {
00268     if (optimize->file[i][0])
00269     {
00270         snprintf (buffer, 512, RM " %s", &input[i][0]);
00271         if (system (buffer) == -1)
00272             error_message = buffer;
00273     }
00274 }
00275     snprintf (buffer, 512, RM " %s %s", output, result);
00276     if (system (buffer) == -1)
00277         error_message = buffer;
00278 #endif
00279

```

```

00280 // Processing pending events
00281 if (show_pending)
00282     show_pending ();
00283
00284 #if DEBUG_OPTIMIZE
00285     fprintf (stderr, "optimize_parse: end\n");
00286 #endif
00287
00288 // Returning the objective function
00289 return e * optimize->weight[experiment];
00290 }
00291
00297 static double
00298 optimize_norm_euclidian (unsigned int simulation)
00299 {
00300     double e, ei;
00301     unsigned int i;
00302     #if DEBUG_OPTIMIZE
00303     fprintf (stderr, "optimize_norm_euclidian: start\n");
00304     #endif
00305     e = 0.;
00306     for (i = 0; i < optimize->nexperiments; ++i)
00307     {
00308         ei = optimize_parse (simulation, i);
00309         e += ei * ei;
00310     }
00311     e = sqrt (e);
00312     #if DEBUG_OPTIMIZE
00313     fprintf (stderr, "optimize_norm_euclidian: error=%lg\n", e);
00314     fprintf (stderr, "optimize_norm_euclidian: end\n");
00315     #endif
00316     return e;
00317 }
00318
00324 static double
00325 optimize_norm_maximum (unsigned int simulation)
00326 {
00327     double e, ei;
00328     unsigned int i;
00329     #if DEBUG_OPTIMIZE
00330     fprintf (stderr, "optimize_norm_maximum: start\n");
00331     #endif
00332     e = 0.;
00333     for (i = 0; i < optimize->nexperiments; ++i)
00334     {
00335         ei = fabs (optimize_parse (simulation, i));
00336         e = fmax (e, ei);
00337     }
00338     #if DEBUG_OPTIMIZE
00339     fprintf (stderr, "optimize_norm_maximum: error=%lg\n", e);
00340     fprintf (stderr, "optimize_norm_maximum: end\n");
00341     #endif
00342     return e;
00343 }
00344
00350 static double
00351 optimize_norm_p (unsigned int simulation)
00352 {
00353     double e, ei;
00354     unsigned int i;
00355     #if DEBUG_OPTIMIZE
00356     fprintf (stderr, "optimize_norm_p: start\n");
00357     #endif
00358     e = 0.;
00359     for (i = 0; i < optimize->nexperiments; ++i)
00360     {
00361         ei = fabs (optimize_parse (simulation, i));
00362         e += pow (ei, optimize->p);
00363     }
00364     e = pow (e, 1. / optimize->p);
00365     #if DEBUG_OPTIMIZE
00366     fprintf (stderr, "optimize_norm_p: error=%lg\n", e);
00367     fprintf (stderr, "optimize_norm_p: end\n");
00368     #endif
00369     return e;
00370 }
00371
00377 static double
00378 optimize_norm_taxicab (unsigned int simulation)
00379 {
00380     double e;
00381     unsigned int i;
00382     #if DEBUG_OPTIMIZE
00383     fprintf (stderr, "optimize_norm_taxicab: start\n");
00384     #endif
00385     e = 0.;
00386     for (i = 0; i < optimize->nexperiments; ++i)

```



```

00387     e += fabs (optimize_parse (simulation, i));
00388 #if DEBUG_OPTIMIZE
00389     fprintf (stderr, "optimize_norm_taxicab: error=%lg\n", e);
00390     fprintf (stderr, "optimize_norm_taxicab: end\n");
00391 #endif
00392     return e;
00393 }
00394
00395 static void
00396 optimize_print ()
00397 {
00400     {
00401         unsigned int i;
00402         char buffer[512];
00403         #if HAVE_MPI
00404         if (optimize->mpi_rank)
00405             return;
00406         #endif
00407         printf ("%s\n", _("Best result"));
00408         fprintf (optimize->file_result, "%s\n", _("Best result"));
00409         printf ("error = %.15le\n", optimize->error_old[0]);
00410         fprintf (optimize->file_result, "error = %.15le\n", optimize->error_old[0]);
00411         for (i = 0; i < optimize->nvariables; ++i)
00412             {
00413                 snprintf (buffer, 512, "%s = %s\n",
00414                     optimize->label[i], format[optimize->precision[i]]);
00415                 printf (buffer, optimize->value_old[i]);
00416                 fprintf (optimize->file_result, buffer, optimize->value_old[i]);
00417             }
00418         fflush (optimize->file_result);
00419     }
00420
00421 static void
00422 optimize_save_variables (unsigned int simulation,
00423                         double error)
00424 {
00425     unsigned int i;
00426     char buffer[64];
00427     #if DEBUG_OPTIMIZE
00428     fprintf (stderr, "optimize_save_variables: start\n");
00429     #endif
00430     for (i = 0; i < optimize->nvariables; ++i)
00431         {
00432             snprintf (buffer, 64, "%s ", format[optimize->precision[i]]);
00433             fprintf (optimize->file_variables, buffer,
00434                 optimize->value[simulation * optimize->nvariables + i]);
00435         }
00436     fprintf (optimize->file_variables, "%.14le\n", error);
00437     fflush (optimize->file_variables);
00438     #if DEBUG_OPTIMIZE
00439     fprintf (stderr, "optimize_save_variables: end\n");
00440     #endif
00441 }
00442
00443 static void
00444 optimize_best (unsigned int simulation,
00445               double value)
00446 {
00447     unsigned int i, j;
00448     double e;
00449     #if DEBUG_OPTIMIZE
00450     fprintf (stderr, "optimize_best: start\n");
00451     #endif
00452     fprintf (stderr, "optimize_best: nsaveds=%u nbest=%u\n",
00453         optimize->nsaveds, optimize->nbest);
00454     #endif
00455     if (optimize->nsaveds < optimize->nbest
00456         || value < optimize->error_best[optimize->nsaveds - 1])
00457     {
00458         if (optimize->nsaveds < optimize->nbest)
00459             ++optimize->nsaveds;
00460         optimize->error_best[optimize->nsaveds - 1] = value;
00461         optimize->simulation_best[optimize->nsaveds - 1] = simulation;
00462         for (i = optimize->nsaveds; --i;)
00463             {
00464                 if (optimize->error_best[i] < optimize->error_best[i - 1])
00465                 {
00466                     j = optimize->simulation_best[i];
00467                     e = optimize->error_best[i];
00468                     optimize->simulation_best[i] = optimize->simulation_best[i - 1];
00469                     optimize->error_best[i] = optimize->error_best[i - 1];
00470                     optimize->simulation_best[i - 1] = j;
00471                     optimize->error_best[i - 1] = e;
00472                 }
00473             }
00474         else
00475             break;
00476     }
00477 }
00478
00479 #if DEBUG_OPTIMIZE

```

```

00483     fprintf (stderr, "optimize_best:  end\n");
00484 #endif
00485 }
00486
00490 static void
00491 optimize_sequential ()
00492 {
00493     unsigned int i;
00494     double e;
00495 #if DEBUG_OPTIMIZE
00496     fprintf (stderr, "optimize_sequential:  start\n");
00497     fprintf (stderr, "optimize_sequential:  nstart=%u nend=%u\n",
00498             optimize->nstart, optimize->nend);
00499 #endif
00500     for (i = optimize->nstart; i < optimize->nend; ++i)
00501     {
00502         e = optimize_norm (i);
00503         optimize_best (i, e);
00504         optimize_save_variables (i, e);
00505         if (e < optimize->threshold)
00506         {
00507             optimize->stop = 1;
00508             break;
00509         }
00510 #if DEBUG_OPTIMIZE
00511         fprintf (stderr, "optimize_sequential:  i=%u e=%lg\n", i, e);
00512 #endif
00513     }
00514 #if DEBUG_OPTIMIZE
00515     fprintf (stderr, "optimize_sequential:  end\n");
00516 #endif
00517 }
00518
00524 static void *
00525 optimize_thread (ParallelData * data)
00526 {
00527     unsigned int i, thread;
00528     double e;
00529 #if DEBUG_OPTIMIZE
00530     fprintf (stderr, "optimize_thread:  start\n");
00531 #endif
00532     thread = data->thread;
00533 #if DEBUG_OPTIMIZE
00534     fprintf (stderr, "optimize_thread:  thread=%u start=%u end=%u\n", thread,
00535             optimize->thread[thread], optimize->thread[thread + 1]);
00536 #endif
00537     for (i = optimize->thread[thread]; i < optimize->thread[thread + 1]; ++i)
00538     {
00539         e = optimize_norm (i);
00540         g_mutex_lock (mutex);
00541         optimize_best (i, e);
00542         optimize_save_variables (i, e);
00543         if (e < optimize->threshold)
00544             optimize->stop = 1;
00545         g_mutex_unlock (mutex);
00546         if (optimize->stop)
00547             break;
00548 #if DEBUG_OPTIMIZE
00549         fprintf (stderr, "optimize_thread:  i=%u e=%lg\n", i, e);
00550 #endif
00551     }
00552 #if DEBUG_OPTIMIZE
00553     fprintf (stderr, "optimize_thread:  end\n");
00554 #endif
00555     g_thread_exit (NULL);
00556     return NULL;
00557 }
00558
00562 static inline void
00563 optimize_merge (unsigned int nsaveds,
00564                unsigned int *simulation_best,
00565                double *error_best)
00566 {
00567     unsigned int i, j, k, s[optimize->nbest];
00568     double e[optimize->nbest];
00569 #if DEBUG_OPTIMIZE
00570     fprintf (stderr, "optimize_merge:  start\n");
00571 #endif
00572 #endif
00573     i = j = k = 0;
00574     do
00575     {
00576         if (i == optimize->nsaveds)
00577         {
00578             s[k] = simulation_best[j];
00579             e[k] = error_best[j];
00580             ++j;
00581             ++k;
00582         }

```

```

00583         if (j == nsaveds)
00584             break;
00585     }
00586     else if (j == nsaveds)
00587     {
00588         s[k] = optimize->simulation_best[i];
00589         e[k] = optimize->error_best[i];
00590         ++i;
00591         ++k;
00592         if (i == optimize->nsaveds)
00593             break;
00594     }
00595     else if (optimize->error_best[i] > error_best[j])
00596     {
00597         s[k] = simulation_best[j];
00598         e[k] = error_best[j];
00599         ++j;
00600         ++k;
00601     }
00602     else
00603     {
00604         s[k] = optimize->simulation_best[i];
00605         e[k] = optimize->error_best[i];
00606         ++i;
00607         ++k;
00608     }
00609 }
00610 while (k < optimize->nbest);
00611 optimize->nsaveds = k;
00612 memcpy (optimize->simulation_best, s, k * sizeof (unsigned int));
00613 memcpy (optimize->error_best, e, k * sizeof (double));
00614 #if DEBUG_OPTIMIZE
00615 fprintf (stderr, "optimize_merge: end\n");
00616 #endif
00617 }
00618
00622 #if HAVE_MPI
00623 static void
00624 optimize_synchronise ()
00625 {
00626     unsigned int i, nsaveds, simulation_best[optimize->nbest], stop;
00627     double error_best[optimize->nbest];
00628     MPI_Status mpi_stat;
00629     #if DEBUG_OPTIMIZE
00630     fprintf (stderr, "optimize_synchronise: start\n");
00631     #endif
00632     if (optimize->mpi_rank == 0)
00633     {
00634         for (i = 1; (int) i < ntasks; ++i)
00635         {
00636             MPI_Recv (&nsaveds, 1, MPI_INT, i, 1, MPI_COMM_WORLD, &mpi_stat);
00637             MPI_Recv (simulation_best, nsaveds, MPI_INT, i, 1,
00638                     MPI_COMM_WORLD, &mpi_stat);
00639             MPI_Recv (error_best, nsaveds, MPI_DOUBLE, i, 1,
00640                     MPI_COMM_WORLD, &mpi_stat);
00641             optimize_merge (nsaveds, simulation_best, error_best);
00642             MPI_Recv (&stop, 1, MPI_UNSIGNED, i, 1, MPI_COMM_WORLD, &mpi_stat);
00643             if (stop)
00644                 optimize->stop = 1;
00645         }
00646         for (i = 1; (int) i < ntasks; ++i)
00647             MPI_Send (&optimize->stop, 1, MPI_UNSIGNED, i, 1, MPI_COMM_WORLD);
00648     }
00649     else
00650     {
00651         MPI_Send (&optimize->nsaveds, 1, MPI_INT, 0, 1, MPI_COMM_WORLD);
00652         MPI_Send (optimize->simulation_best, optimize->nsaveds, MPI_INT, 0, 1,
00653                 MPI_COMM_WORLD);
00654         MPI_Send (optimize->error_best, optimize->nsaveds, MPI_DOUBLE, 0, 1,
00655                 MPI_COMM_WORLD);
00656         MPI_Send (&optimize->stop, 1, MPI_UNSIGNED, 0, 1, MPI_COMM_WORLD);
00657         MPI_Recv (&stop, 1, MPI_UNSIGNED, 0, 1, MPI_COMM_WORLD, &mpi_stat);
00658         if (stop)
00659             optimize->stop = 1;
00660     }
00661     #if DEBUG_OPTIMIZE
00662     fprintf (stderr, "optimize_synchronise: end\n");
00663     #endif
00664 }
00665 #endif
00666
00670 static void
00671 optimize_sweep ()
00672 {
00673     unsigned int i, j, k, l;
00674     double e;
00675     GThread *thread[nthreads];

```

```

00676     ParallelData data[nthreads];
00677     #if DEBUG_OPTIMIZE
00678     fprintf (stderr, "optimize_sweep: start\n");
00679     #endif
00680     for (i = 0; i < optimize->nsimulations; ++i)
00681     {
00682         k = i;
00683         for (j = 0; j < optimize->nvariables; ++j)
00684         {
00685             l = k % optimize->nsweeps[j];
00686             k /= optimize->nsweeps[j];
00687             e = optimize->rangemin[j];
00688             if (optimize->nsweeps[j] > 1)
00689                 e += l * (optimize->rangemax[j] - optimize->rangemin[j])
00690                     / (optimize->nsweeps[j] - 1);
00691             optimize->value[i * optimize->nvariables + j] = e;
00692         }
00693     }
00694     optimize->nsaveds = 0;
00695     if (nthreads <= 1)
00696         optimize_sequential ();
00697     else
00698     {
00699         for (i = 0; i < nthreads; ++i)
00700         {
00701             data[i].thread = i;
00702             thread[i]
00703                 = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00704         }
00705         for (i = 0; i < nthreads; ++i)
00706             g_thread_join (thread[i]);
00707     }
00708     #if HAVE_MPI
00709     // Communicating tasks results
00710     optimize_synchronise ();
00711     #endif
00712     #if DEBUG_OPTIMIZE
00713     fprintf (stderr, "optimize_sweep: end\n");
00714     #endif
00715 }
00716
00720 static void
00721 optimize_MonteCarlo ()
00722 {
00723     unsigned int i, j;
00724     GThread *thread[nthreads];
00725     ParallelData data[nthreads];
00726     #if DEBUG_OPTIMIZE
00727     fprintf (stderr, "optimize_MonteCarlo: start\n");
00728     #endif
00729     for (i = 0; i < optimize->nsimulations; ++i)
00730     for (j = 0; j < optimize->nvariables; ++j)
00731         optimize->value[i * optimize->nvariables + j]
00732             = optimize->rangemin[j] + gsl_rng_uniform (optimize->rng)
00733               * (optimize->rangemax[j] - optimize->rangemin[j]);
00734     optimize->nsaveds = 0;
00735     if (nthreads <= 1)
00736         optimize_sequential ();
00737     else
00738     {
00739         for (i = 0; i < nthreads; ++i)
00740         {
00741             data[i].thread = i;
00742             thread[i]
00743                 = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00744         }
00745         for (i = 0; i < nthreads; ++i)
00746             g_thread_join (thread[i]);
00747     }
00748     #if HAVE_MPI
00749     // Communicating tasks results
00750     optimize_synchronise ();
00751     #endif
00752     #if DEBUG_OPTIMIZE
00753     fprintf (stderr, "optimize_MonteCarlo: end\n");
00754     #endif
00755 }
00756
00760 static void
00761 optimize_orthogonal ()
00762 {
00763     unsigned int i, j, k, l;
00764     double e;
00765     GThread *thread[nthreads];
00766     ParallelData data[nthreads];
00767     #if DEBUG_OPTIMIZE
00768     fprintf (stderr, "optimize_orthogonal: start\n");

```

```

00769 #endif
00770     for (i = 0; i < optimize->nsimulations; ++i)
00771     {
00772         k = i;
00773         for (j = 0; j < optimize->nvariables; ++j)
00774         {
00775             l = k % optimize->nsweeps[j];
00776             k /= optimize->nsweeps[j];
00777             e = optimize->rangemin[j];
00778             if (optimize->nsweeps[j] > 1)
00779                 e += (1 + gsl_rng_uniform (optimize->rng))
00780                     * (optimize->rangemax[j] - optimize->rangemin[j])
00781                     / optimize->nsweeps[j];
00782             optimize->value[i * optimize->nvariables + j] = e;
00783         }
00784     }
00785     optimize->nsaveds = 0;
00786     if (nthreads <= 1)
00787         optimize_sequential ();
00788     else
00789     {
00790         for (i = 0; i < nthreads; ++i)
00791         {
00792             data[i].thread = i;
00793             thread[i]
00794                 = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00795         }
00796         for (i = 0; i < nthreads; ++i)
00797             g_thread_join (thread[i]);
00798     }
00799 #if HAVE_MPI
00800     // Communicating tasks results
00801     optimize_synchronize ();
00802 #endif
00803 #if DEBUG_OPTIMIZE
00804     fprintf (stderr, "optimize_orthogonal:  end\n");
00805 #endif
00806 }
00807
00811 static void
00812 optimize_best_climbing (unsigned int simulation,
00813                         double value)
00814 {
00815     #if DEBUG_OPTIMIZE
00816     fprintf (stderr, "optimize_best_climbing:  start\n");
00817     fprintf (stderr,
00818             "optimize_best_climbing:  simulation=%u value=%.14le best=%.14le\n",
00819             simulation, value, optimize->error_best[0]);
00820 #endif
00821     if (value < optimize->error_best[0])
00822     {
00823         optimize->error_best[0] = value;
00824         optimize->simulation_best[0] = simulation;
00825     #if DEBUG_OPTIMIZE
00826     fprintf (stderr,
00827             "optimize_best_climbing:  BEST simulation=%u value=%.14le\n",
00828             simulation, value);
00829 #endif
00830     }
00831 #if DEBUG_OPTIMIZE
00832     fprintf (stderr, "optimize_best_climbing:  end\n");
00833 #endif
00834 }
00835
00839 static inline void
00840 optimize_climbing_sequential (unsigned int simulation)
00841 {
00842     double e;
00843     unsigned int i, j;
00844     #if DEBUG_OPTIMIZE
00845     fprintf (stderr, "optimize_climbing_sequential:  start\n");
00846     fprintf (stderr, "optimize_climbing_sequential:  nstart_climbing=%u "
00847             "nend_climbing=%u\n",
00848             optimize->nstart_climbing, optimize->nend_climbing);
00849 #endif
00850     for (i = optimize->nstart_climbing; i < optimize->nend_climbing; ++i)
00851     {
00852         j = simulation + i;
00853         e = optimize_norm (j);
00854         optimize_best_climbing (j, e);
00855         optimize_save_variables (j, e);
00856         if (e < optimize->threshold)
00857         {
00858             optimize->stop = 1;
00859             break;
00860         }
00861     }
00862 #if DEBUG_OPTIMIZE

```

```

00862     fprintf (stderr, "optimize_climbing_sequential: i=%u e=%lg\n", i, e);
00863 #endif
00864 }
00865 #if DEBUG_OPTIMIZE
00866     fprintf (stderr, "optimize_climbing_sequential: end\n");
00867 #endif
00868 }
00869
00875 static void *
00876 optimize_climbing_thread (ParallelData * data)
00877 {
00878     unsigned int i, thread;
00879     double e;
00880 #if DEBUG_OPTIMIZE
00881     fprintf (stderr, "optimize_climbing_thread: start\n");
00882 #endif
00883     thread = data->thread;
00884 #if DEBUG_OPTIMIZE
00885     fprintf (stderr, "optimize_climbing_thread: thread=%u start=%u end=%u\n",
00886             thread,
00887             optimize->thread_climbing[thread],
00888             optimize->thread_climbing[thread + 1]);
00889 #endif
00890     for (i = optimize->thread_climbing[thread];
00891          i < optimize->thread_climbing[thread + 1]; ++i)
00892     {
00893         e = optimize_norm (i);
00894         g_mutex_lock (mutex);
00895         optimize_best_climbing (i, e);
00896         optimize_save_variables (i, e);
00897         if (e < optimize->threshold)
00898             optimize->stop = 1;
00899         g_mutex_unlock (mutex);
00900         if (optimize->stop)
00901             break;
00902 #if DEBUG_OPTIMIZE
00903         fprintf (stderr, "optimize_climbing_thread: i=%u e=%lg\n", i, e);
00904 #endif
00905     }
00906 #if DEBUG_OPTIMIZE
00907     fprintf (stderr, "optimize_climbing_thread: end\n");
00908 #endif
00909     g_thread_exit (NULL);
00910     return NULL;
00911 }
00912
00916 static double
00917 optimize_estimate_climbing_random (unsigned int variable,
00918                                   unsigned int estimate
00919                                   __attribute__((unused)))
00920 {
00921     double x;
00922 #if DEBUG_OPTIMIZE
00923     fprintf (stderr, "optimize_estimate_climbing_random: start\n");
00924 #endif
00925     x = optimize->climbing[variable]
00926         + (1. - 2. * gsl_rng_uniform (optimize->rng)) * optimize->step[variable];
00927 #if DEBUG_OPTIMIZE
00928     fprintf (stderr, "optimize_estimate_climbing_random: climbing%u=%lg\n",
00929             variable, x);
00930     fprintf (stderr, "optimize_estimate_climbing_random: end\n");
00931 #endif
00932     return x;
00933 }
00934
00941 static double
00942 optimize_estimate_climbing_coordinates (unsigned int variable,
00943                                         unsigned int estimate)
00944 {
00945     double x;
00946 #if DEBUG_OPTIMIZE
00947     fprintf (stderr, "optimize_estimate_climbing_coordinates: start\n");
00948 #endif
00949     x = optimize->climbing[variable];
00950     if (estimate >= (2 * variable) && estimate < (2 * variable + 2))
00951     {
00952         if (estimate & 1)
00953             x += optimize->step[variable];
00954         else
00955             x -= optimize->step[variable];
00956     }
00957 #if DEBUG_OPTIMIZE
00958     fprintf (stderr,
00959             "optimize_estimate_climbing_coordinates: climbing%u=%lg\n",
00960             variable, x);
00961     fprintf (stderr, "optimize_estimate_climbing_coordinates: end\n");
00962 #endif

```

```

00964     return x;
00965 }
00966
00970 static inline void
00971 optimize_step_climbing (unsigned int simulation)
00972 {
00973     GThread *thread[nthreads_climbing];
00974     ParallelData data[nthreads_climbing];
00975     unsigned int i, j, k, b;
00976 #if DEBUG_OPTIMIZE
00977     fprintf (stderr, "optimize_step_climbing: start\n");
00978 #endif
00979     for (i = 0; i < optimize->nestimates; ++i)
00980     {
00981         k = (simulation + i) * optimize->nvariables;
00982         b = optimize->simulation_best[0] * optimize->nvariables;
00983 #if DEBUG_OPTIMIZE
00984         fprintf (stderr, "optimize_step_climbing: simulation=%u best=%u\n",
00985                 simulation + i, optimize->simulation_best[0]);
00986 #endif
00987         for (j = 0; j < optimize->nvariables; ++j, ++k, ++b)
00988         {
00989             #if DEBUG_OPTIMIZE
00990                 fprintf (stderr,
00991                         "optimize_step_climbing: estimate=%u best%u=%.14le\n",
00992                         i, j, optimize->value[b]);
00993             #endif
00994             optimize->value[k]
00995                 = optimize->value[b] + optimize_estimate_climbing (j, i);
00996             optimize->value[k] = fmin (fmax (optimize->value[k],
00997                                             optimize->rangeminabs[j]),
00998                                     optimize->rangemaxabs[j]);
00999             #if DEBUG_OPTIMIZE
01000                 fprintf (stderr,
01001                         "optimize_step_climbing: estimate=%u variable%u=%.14le\n",
01002                         i, j, optimize->value[k]);
01003             #endif
01004         }
01005     }
01006     if (nthreads_climbing == 1)
01007         optimize_climbing_sequential (simulation);
01008     else
01009     {
01010         for (i = 0; i <= nthreads_climbing; ++i)
01011         {
01012             optimize->thread_climbing[i]
01013                 = simulation + optimize->nstart_climbing
01014                 + i * (optimize->nend_climbing - optimize->nstart_climbing)
01015                 / nthreads_climbing;
01016             #if DEBUG_OPTIMIZE
01017                 fprintf (stderr,
01018                         "optimize_step_climbing: i=%u thread_climbing=%u\n",
01019                         i, optimize->thread_climbing[i]);
01020             #endif
01021         }
01022         for (i = 0; i < nthreads_climbing; ++i)
01023         {
01024             data[i].thread = i;
01025             thread[i] = g_thread_new
01026                 (NULL, (GThreadFunc) optimize_climbing_thread, &data[i]);
01027         }
01028         for (i = 0; i < nthreads_climbing; ++i)
01029             g_thread_join (thread[i]);
01030     }
01031     #if DEBUG_OPTIMIZE
01032     fprintf (stderr, "optimize_step_climbing: end\n");
01033     #endif
01034 }
01035
01039 static inline void
01040 optimize_climbing ()
01041 {
01042     unsigned int i, j, k, b, s, adjust;
01043     #if DEBUG_OPTIMIZE
01044     fprintf (stderr, "optimize_climbing: start\n");
01045     #endif
01046     for (i = 0; i < optimize->nvariables; ++i)
01047         optimize->climbing[i] = 0.;
01048     b = optimize->simulation_best[0] * optimize->nvariables;
01049     s = optimize->nsimulations;
01050     adjust = 1;
01051     for (i = 0; i < optimize->nsteps; ++i, s += optimize->nestimates, b = k)
01052     {
01053         #if DEBUG_OPTIMIZE
01054         fprintf (stderr, "optimize_climbing: step=%u old_best=%u\n",
01055                 i, optimize->simulation_best[0]);
01056         #endif

```

```

01057     optimize_step_climbing (s);
01058     k = optimize->simulation_best[0] * optimize->nvariables;
01059 #if DEBUG_OPTIMIZE
01060     fprintf (stderr, "optimize_climbing: step=%u best=%u\n",
01061             i, optimize->simulation_best[0]);
01062 #endif
01063     if (k == b)
01064     {
01065         if (adjust)
01066             for (j = 0; j < optimize->nvariables; ++j)
01067                 optimize->step[j] *= 0.5;
01068         for (j = 0; j < optimize->nvariables; ++j)
01069             optimize->climbing[j] = 0.;
01070         adjust = 1;
01071     }
01072     else
01073     {
01074         for (j = 0; j < optimize->nvariables; ++j)
01075         {
01076 #if DEBUG_OPTIMIZE
01077             fprintf (stderr,
01078                     "optimize_climbing: best=%u=%.14le old%u=%.14le\n",
01079                     j, optimize->value[k + j], j, optimize->value[b + j]);
01080 #endif
01081             optimize->climbing[j]
01082                 = (1. - optimize->relaxation) * optimize->climbing[j]
01083                   + optimize->relaxation
01084                   * (optimize->value[k + j] - optimize->value[b + j]);
01085 #if DEBUG_OPTIMIZE
01086             fprintf (stderr, "optimize_climbing: climbing%u=%.14le\n",
01087                     j, optimize->climbing[j]);
01088 #endif
01089         }
01090         adjust = 0;
01091     }
01092 }
01093 #if DEBUG_OPTIMIZE
01094 fprintf (stderr, "optimize_climbing: end\n");
01095 #endif
01096 }
01097
01103 static double
01104 optimize_genetic_objective (Entity * entity)
01105 {
01106     unsigned int j;
01107     double objective;
01108     char buffer[64];
01109 #if DEBUG_OPTIMIZE
01110     fprintf (stderr, "optimize_genetic_objective: start\n");
01111 #endif
01112     for (j = 0; j < optimize->nvariables; ++j)
01113     {
01114         optimize->value[entity->id * optimize->nvariables + j]
01115             = genetic_get_variable (entity, optimize->genetic_variable + j);
01116     }
01117     objective = optimize_norm (entity->id);
01118     g_mutex_lock (mutex);
01119     for (j = 0; j < optimize->nvariables; ++j)
01120     {
01121         snprintf (buffer, 64, "%s ", format[optimize->precision[j]]);
01122         fprintf (optimize->file_variables, buffer,
01123                 genetic_get_variable (entity, optimize->genetic_variable + j));
01124     }
01125     fprintf (optimize->file_variables, "%.14le\n", objective);
01126     g_mutex_unlock (mutex);
01127 #if DEBUG_OPTIMIZE
01128     fprintf (stderr, "optimize_genetic_objective: end\n");
01129 #endif
01130     return objective;
01131 }
01132
01136 static void
01137 optimize_genetic ()
01138 {
01139     double *best_variable = NULL;
01140     char *best_genome = NULL;
01141     double best_objective = 0.;
01142 #if DEBUG_OPTIMIZE
01143     fprintf (stderr, "optimize_genetic: start\n");
01144     fprintf (stderr, "optimize_genetic: ntasks=%u nthreads=%u\n", ntasks,
01145             nthreads);
01146     fprintf (stderr,
01147             "optimize_genetic: nvariables=%u population=%u generations=%u\n",
01148             optimize->nvariables, optimize->nsimulations, optimize->niterations);
01149     fprintf (stderr,
01150             "optimize_genetic: mutation=%lg reproduction=%lg adaptation=%lg\n",
01151             optimize->mutation_ratio, optimize->reproduction_ratio,

```



```

01152         optimize->adaptation_ratio);
01153 #endif
01154     genetic_algorithm_default (optimize->nvariables,
01155                               optimize->genetic_variable,
01156                               optimize->nsimulations,
01157                               optimize->niterations,
01158                               optimize->mutation_ratio,
01159                               optimize->reproduction_ratio,
01160                               optimize->adaptation_ratio,
01161                               optimize->seed,
01162                               optimize->threshold,
01163                               &optimize_genetic_objective,
01164                               &best_genome, &best_variable, &best_objective);
01165 #if DEBUG_OPTIMIZE
01166     fprintf (stderr, "optimize_genetic:  the best\n");
01167 #endif
01168     optimize->error_old = (double *) g_malloc (sizeof (double));
01169     optimize->value_old
01170     = (double *) g_malloc (optimize->nvariables * sizeof (double));
01171     optimize->error_old[0] = best_objective;
01172     memcpy (optimize->value_old, best_variable,
01173            optimize->nvariables * sizeof (double));
01174     g_free (best_genome);
01175     g_free (best_variable);
01176     optimize_print ();
01177 #if DEBUG_OPTIMIZE
01178     fprintf (stderr, "optimize_genetic:  end\n");
01179 #endif
01180 }
01181
01182 static inline void
01183 optimize_save_old ()
01184 {
01185     unsigned int i, j;
01186 #if DEBUG_OPTIMIZE
01187     fprintf (stderr, "optimize_save_old:  start\n");
01188     fprintf (stderr, "optimize_save_old:  nsaveds=%u\n", optimize->nsaveds);
01189 #endif
01190     memcpy (optimize->error_old, optimize->error_best,
01191            optimize->nbest * sizeof (double));
01192     for (i = 0; i < optimize->nbest; ++i)
01193     {
01194         j = optimize->simulation_best[i];
01195 #if DEBUG_OPTIMIZE
01196         fprintf (stderr, "optimize_save_old:  i=%u j=%u\n", i, j);
01197 #endif
01198         memcpy (optimize->value_old + i * optimize->nvariables,
01199                optimize->value + j * optimize->nvariables,
01200                optimize->nvariables * sizeof (double));
01201     }
01202 #if DEBUG_OPTIMIZE
01203     for (i = 0; i < optimize->nvariables; ++i)
01204         fprintf (stderr, "optimize_save_old:  best variable %u=%lg\n",
01205                 i, optimize->value_old[i]);
01206     fprintf (stderr, "optimize_save_old:  end\n");
01207 #endif
01208 }
01209
01210 static inline void
01211 optimize_merge_old ()
01212 {
01213     unsigned int i, j, k;
01214     double v[optimize->nbest * optimize->nvariables], e[optimize->nbest],
01215            *enew, *eold;
01216 #if DEBUG_OPTIMIZE
01217     fprintf (stderr, "optimize_merge_old:  start\n");
01218 #endif
01219     enew = optimize->error_best;
01220     eold = optimize->error_old;
01221     i = j = k = 0;
01222     do
01223     {
01224         if (*enew < *eold)
01225         {
01226             memcpy (v + k * optimize->nvariables,
01227                    optimize->value
01228                    + optimize->simulation_best[i] * optimize->nvariables,
01229                    optimize->nvariables * sizeof (double));
01230             e[k] = *enew;
01231             ++k;
01232             ++enew;
01233             ++i;
01234         }
01235         else
01236         {
01237             memcpy (v + k * optimize->nvariables,
01238                    optimize->value_old + j * optimize->nvariables,

```

```

01246         optimize->nvariables * sizeof (double));
01247     e[k] = *eold;
01248     ++k;
01249     ++eold;
01250     ++j;
01251 }
01252 }
01253 while (k < optimize->nbest);
01254 memcpy (optimize->value_old, v, k * optimize->nvariables * sizeof (double));
01255 memcpy (optimize->error_old, e, k * sizeof (double));
01256 #if DEBUG_OPTIMIZE
01257 fprintf (stderr, "optimize_merge_old: end\n");
01258 #endif
01259 }
01260
01265 static inline void
01266 optimize_refine ()
01267 {
01268     unsigned int i, j;
01269     double d;
01270     #if HAVE_MPI
01271     MPI_Status mpi_stat;
01272     #endif
01273     #if DEBUG_OPTIMIZE
01274     fprintf (stderr, "optimize_refine: start\n");
01275     #endif
01276     #if HAVE_MPI
01277     if (!optimize->mpi_rank)
01278     {
01279     #endif
01280         for (j = 0; j < optimize->nvariables; ++j)
01281         {
01282             optimize->rangemin[j] = optimize->rangemax[j]
01283             = optimize->value_old[j];
01284         }
01285         for (i = 0; ++i < optimize->nbest;)
01286         {
01287             for (j = 0; j < optimize->nvariables; ++j)
01288             {
01289                 optimize->rangemin[j]
01290                 = fmin (optimize->rangemin[j],
01291                     optimize->value_old[i * optimize->nvariables + j]);
01292                 optimize->rangemax[j]
01293                 = fmax (optimize->rangemax[j],
01294                     optimize->value_old[i * optimize->nvariables + j]);
01295             }
01296         }
01297         for (j = 0; j < optimize->nvariables; ++j)
01298         {
01299             d = optimize->tolerance
01300             * (optimize->rangemax[j] - optimize->rangemin[j]);
01301             switch (optimize->algorithm)
01302             {
01303             case ALGORITHM_MONTE_CARLO:
01304                 d *= 0.5;
01305                 break;
01306             default:
01307                 if (optimize->nsweeps[j] > 1)
01308                     d /= optimize->nsweeps[j] - 1;
01309                 else
01310                     d = 0.;
01311             }
01312             optimize->rangemin[j] -= d;
01313             optimize->rangemin[j]
01314             = fmax (optimize->rangemin[j], optimize->rangeminabs[j]);
01315             optimize->rangemax[j] += d;
01316             optimize->rangemax[j]
01317             = fmin (optimize->rangemax[j], optimize->rangemaxabs[j]);
01318             printf ("%s min=%lg max=%lg\n", optimize->label[j],
01319                 optimize->rangemin[j], optimize->rangemax[j]);
01320             fprintf (optimize->file_result, "%s min=%lg max=%lg\n",
01321                 optimize->label[j], optimize->rangemin[j],
01322                 optimize->rangemax[j]);
01323         }
01324     #if HAVE_MPI
01325         for (i = 1; (int) i < ntasks; ++i)
01326         {
01327             MPI_Send (optimize->rangemin, optimize->nvariables, MPI_DOUBLE, i,
01328                 1, MPI_COMM_WORLD);
01329             MPI_Send (optimize->rangemax, optimize->nvariables, MPI_DOUBLE, i,
01330                 1, MPI_COMM_WORLD);
01331         }
01332     }
01333     else
01334     {
01335         MPI_Recv (optimize->rangemin, optimize->nvariables, MPI_DOUBLE, 0, 1,
01336             MPI_COMM_WORLD, &mpi_stat);

```

```

01337     MPI_Recv (optimize->rangemax, optimize->nvariables, MPI_DOUBLE, 0, 1,
01338               MPI_COMM_WORLD, &mpi_stat);
01339 }
01340 #endif
01341 #if DEBUG_OPTIMIZE
01342 fprintf (stderr, "optimize_refine: end\n");
01343 #endif
01344 }
01345
01346 static void
01350 optimize_step ()
01351 {
01352 #if DEBUG_OPTIMIZE
01353     fprintf (stderr, "optimize_step: start\n");
01354 #endif
01355     optimize_algorithm ();
01356     if (optimize->nsteps)
01357         optimize_climbing ();
01358 #if DEBUG_OPTIMIZE
01359     fprintf (stderr, "optimize_step: end\n");
01360 #endif
01361 }
01362
01363 static inline void
01367 optimize_iterate ()
01368 {
01369     unsigned int i;
01370 #if DEBUG_OPTIMIZE
01371     fprintf (stderr, "optimize_iterate: start\n");
01372 #endif
01373     optimize->error_old = (double *) g_malloc (optimize->nbest * sizeof (double));
01374     optimize->value_old =
01375         (double *) g_malloc (optimize->nbest * optimize->nvariables *
01376                               sizeof (double));
01377     optimize_step ();
01378     optimize_save_old ();
01379     optimize_refine ();
01380     optimize_print ();
01381     for (i = 1; i < optimize->niterations && !optimize->stop; ++i)
01382     {
01383         optimize_step ();
01384         optimize_merge_old ();
01385         optimize_refine ();
01386         optimize_print ();
01387     }
01388 #if DEBUG_OPTIMIZE
01389     fprintf (stderr, "optimize_iterate: end\n");
01390 #endif
01391 }
01392
01393 void
01397 optimize_free ()
01398 {
01399     unsigned int i, j;
01400 #if DEBUG_OPTIMIZE
01401     fprintf (stderr, "optimize_free: start\n");
01402 #endif
01403     for (j = 0; j < optimize->ninputs; ++j)
01404     {
01405         for (i = 0; i < optimize->nexperiments; ++i)
01406             g_mapped_file_unref (optimize->file[j][i]);
01407         g_free (optimize->file[j]);
01408     }
01409     g_free (optimize->error_old);
01410     g_free (optimize->value_old);
01411     g_free (optimize->value);
01412     g_free (optimize->genetic_variable);
01413 #if DEBUG_OPTIMIZE
01414     fprintf (stderr, "optimize_free: end\n");
01415 #endif
01416 }
01417
01421 void
01422 optimize_open ()
01423 {
01424     GTimeZone *tz;
01425     GDateTime *t0, *t;
01426     unsigned int i, j;
01427
01428 #if DEBUG_OPTIMIZE
01429     char *buffer;
01430     fprintf (stderr, "optimize_open: start\n");
01431 #endif
01432
01433     // Getting initial time
01434 #if DEBUG_OPTIMIZE
01435     fprintf (stderr, "optimize_open: getting initial time\n");

```

```

01436 #endif
01437 tz = g_time_zone_new_utc ();
01438 t0 = g_date_time_new_now (tz);
01439
01440 // Obtaining and initing the pseudo-random numbers generator seed
01441 #if DEBUG_OPTIMIZE
01442 fprintf (stderr, "optimize_open:  getting initial seed\n");
01443 #endif
01444 if (optimize->seed == DEFAULT_RANDOM_SEED)
01445     optimize->seed = input->seed;
01446 gsl_rng_set (optimize->rng, optimize->seed);
01447
01448 // Replacing the working directory
01449 #if DEBUG_OPTIMIZE
01450 fprintf (stderr, "optimize_open:  replacing the working directory\n");
01451 #endif
01452 g_chdir (input->directory);
01453
01454 // Getting results file names
01455 optimize->result = input->result;
01456 optimize->variables = input->variables;
01457
01458 // Obtaining the simulator file
01459 optimize->simulator = input->simulator;
01460
01461 // Obtaining the evaluator file
01462 optimize->evaluator = input->evaluator;
01463
01464 // Reading the algorithm
01465 optimize->algorithm = input->algorithm;
01466 switch (optimize->algorithm)
01467 {
01468     case ALGORITHM_MONTE_CARLO:
01469         optimize_algorithm = optimize_MonteCarlo;
01470         break;
01471     case ALGORITHM_SWEEP:
01472         optimize_algorithm = optimize_sweep;
01473         break;
01474     case ALGORITHM_ORTHOGONAL:
01475         optimize_algorithm = optimize_orthogonal;
01476         break;
01477     default:
01478         optimize_algorithm = optimize_genetic;
01479         optimize->mutation_ratio = input->mutation_ratio;
01480         optimize->reproduction_ratio = input->reproduction_ratio;
01481         optimize->adaptation_ratio = input->adaptation_ratio;
01482 }
01483 optimize->nvariables = input->nvariables;
01484 optimize->nsimulations = input->nsimulations;
01485 optimize->niterations = input->niterations;
01486 optimize->nbest = input->nbest;
01487 optimize->tolerance = input->tolerance;
01488 optimize->nsteps = input->nsteps;
01489 optimize->nestimates = 0;
01490 optimize->threshold = input->threshold;
01491 optimize->stop = 0;
01492 if (input->nsteps)
01493 {
01494     optimize->relaxation = input->relaxation;
01495     switch (input->climbing)
01496     {
01497         case CLIMBING_METHOD_COORDINATES:
01498             optimize->nestimates = 2 * optimize->nvariables;
01499             optimize_estimate_climbing = optimize_estimate_climbing_coordinates;
01500             break;
01501         default:
01502             optimize->nestimates = input->nestimates;
01503             optimize_estimate_climbing = optimize_estimate_climbing_random;
01504     }
01505 }
01506
01507 #if DEBUG_OPTIMIZE
01508 fprintf (stderr, "optimize_open:  nbest=%u\n", optimize->nbest);
01509 #endif
01510 optimize->simulation_best
01511     = (unsigned int *) alloca (optimize->nbest * sizeof (unsigned int));
01512 optimize->error_best = (double *) alloca (optimize->nbest * sizeof (double));
01513
01514 // Reading the experimental data
01515 #if DEBUG_OPTIMIZE
01516 buffer = g_get_current_dir ();
01517 fprintf (stderr, "optimize_open:  current directory=%s\n", buffer);
01518 g_free (buffer);
01519 #endif
01520 optimize->nexperiments = input->nexperiments;
01521 optimize->ninputs = input->experiment->ninputs;
01522 optimize->experiment

```

```

01523     = (char **) alloca (input->nexperiments * sizeof (char *));
01524     optimize->weight = (double *) alloca (input->nexperiments * sizeof (double));
01525     for (i = 0; i < input->experiment->ninputs; ++i)
01526         optimize->file[i] = (GMappedFile **);
01527     g_malloc (input->nexperiments * sizeof (GMappedFile *));
01528     for (i = 0; i < input->nexperiments; ++i)
01529     {
01530     #if DEBUG_OPTIMIZE
01531         fprintf (stderr, "optimize_open: i=%u\n", i);
01532     #endif
01533         optimize->experiment[i] = input->experiment[i].name;
01534         optimize->weight[i] = input->experiment[i].weight;
01535     #if DEBUG_OPTIMIZE
01536         fprintf (stderr, "optimize_open: experiment=%s weight=%lg\n",
01537             optimize->experiment[i], optimize->weight[i]);
01538     #endif
01539         for (j = 0; j < input->experiment->ninputs; ++j)
01540         {
01541         #if DEBUG_OPTIMIZE
01542             fprintf (stderr, "optimize_open: stencil%u\n", j + 1);
01543         #endif
01544             optimize->file[j][i]
01545                 = g_mapped_file_new (input->experiment[i].stencil[j], 0, NULL);
01546         }
01547     }
01548     // Reading the variables data
01549     #if DEBUG_OPTIMIZE
01550     fprintf (stderr, "optimize_open: reading variables\n");
01551     #endif
01552     optimize->label = (char **) alloca (input->nvariables * sizeof (char *));
01553     j = input->nvariables * sizeof (double);
01554     optimize->rangemin = (double *) alloca (j);
01555     optimize->rangeminabs = (double *) alloca (j);
01556     optimize->rangemax = (double *) alloca (j);
01557     optimize->rangemaxabs = (double *) alloca (j);
01558     optimize->step = (double *) alloca (j);
01559     j = input->nvariables * sizeof (unsigned int);
01560     optimize->precision = (unsigned int *) alloca (j);
01561     optimize->nsweeps = (unsigned int *) alloca (j);
01562     optimize->nbits = (unsigned int *) alloca (j);
01563     for (i = 0; i < input->nvariables; ++i)
01564     {
01565         optimize->label[i] = input->variable[i].name;
01566         optimize->rangemin[i] = input->variable[i].rangemin;
01567         optimize->rangeminabs[i] = input->variable[i].rangeminabs;
01568         optimize->rangemax[i] = input->variable[i].rangemax;
01569         optimize->rangemaxabs[i] = input->variable[i].rangemaxabs;
01570         optimize->precision[i] = input->variable[i].precision;
01571         optimize->step[i] = input->variable[i].step;
01572         optimize->nsweeps[i] = input->variable[i].nsweeps;
01573         optimize->nbits[i] = input->variable[i].nbits;
01574     }
01575     if (input->algorithm == ALGORITHM_SWEEP
01576         || input->algorithm == ALGORITHM_ORTHOGONAL)
01577     {
01578         optimize->nsimulations = 1;
01579         for (i = 0; i < input->nvariables; ++i)
01580         {
01581             optimize->nsimulations *= optimize->nsweeps[i];
01582         }
01583     #if DEBUG_OPTIMIZE
01584         fprintf (stderr, "optimize_open: nsweeps=%u nsimulations=%u\n",
01585             optimize->nsweeps[i], optimize->nsimulations);
01586     #endif
01587     }
01588     if (optimize->nsteps)
01589         optimize->climbing
01590             = (double *) alloca (optimize->nvariables * sizeof (double));
01591     // Setting error norm
01592     switch (input->norm)
01593     {
01594     case ERROR_NORM_EUCLIDIAN:
01595         optimize_norm = optimize_norm_euclidian;
01596         break;
01597     case ERROR_NORM_MAXIMUM:
01598         optimize_norm = optimize_norm_maximum;
01599         break;
01600     case ERROR_NORM_P:
01601         optimize_norm = optimize_norm_p;
01602         optimize->p = input->p;
01603         break;
01604     default:
01605         optimize_norm = optimize_norm_taxicab;
01606     }
01607 }
01608
01609

```

```

01610 // Allocating values
01611 #if DEBUG_OPTIMIZE
01612 fprintf (stderr, "optimize_open: allocating variables\n");
01613 fprintf (stderr, "optimize_open: nvariables=%u algorithm=%u\n",
01614         optimize->nvariables, optimize->algorithm);
01615 #endif
01616 optimize->genetic_variable = NULL;
01617 if (optimize->algorithm == ALGORITHM_GENETIC)
01618 {
01619     optimize->genetic_variable = (GeneticVariable *)
01620     g_malloc (optimize->nvariables * sizeof (GeneticVariable));
01621     for (i = 0; i < optimize->nvariables; ++i)
01622     {
01623         #if DEBUG_OPTIMIZE
01624             fprintf (stderr, "optimize_open: i=%u min=%lg max=%lg nbits=%u\n",
01625                     i, optimize->rangemin[i], optimize->rangemax[i],
01626                     optimize->nbits[i]);
01627         #endif
01628         optimize->genetic_variable[i].minimum = optimize->rangemin[i];
01629         optimize->genetic_variable[i].maximum = optimize->rangemax[i];
01630         optimize->genetic_variable[i].nbits = optimize->nbits[i];
01631     }
01632 }
01633 #if DEBUG_OPTIMIZE
01634 fprintf (stderr, "optimize_open: nvariables=%u nsimulations=%u\n",
01635         optimize->nvariables, optimize->nsimulations);
01636 #endif
01637 optimize->value = (double *)
01638 g_malloc ((optimize->nsimulations
01639           + optimize->nestimates * optimize->nsteps)
01640           * optimize->nvariables * sizeof (double));
01641 // Calculating simulations to perform for each task
01642 #if HAVE_MPI
01643 #if DEBUG_OPTIMIZE
01644     fprintf (stderr, "optimize_open: rank=%u ntasks=%u\n",
01645             optimize->mpi_rank, ntasks);
01646 #endif
01647 #endif
01648 optimize->nstart = optimize->mpi_rank * optimize->nsimulations / ntasks;
01649 optimize->nend = (1 + optimize->mpi_rank) * optimize->nsimulations / ntasks;
01650 if (optimize->nsteps)
01651 {
01652     optimize->nstart_climbing
01653     = optimize->mpi_rank * optimize->nestimates / ntasks;
01654     optimize->nend_climbing
01655     = (1 + optimize->mpi_rank) * optimize->nestimates / ntasks;
01656 }
01657 #else
01658 optimize->nstart = 0;
01659 optimize->nend = optimize->nsimulations;
01660 if (optimize->nsteps)
01661 {
01662     optimize->nstart_climbing = 0;
01663     optimize->nend_climbing = optimize->nestimates;
01664 }
01665 #endif
01666 #if DEBUG_OPTIMIZE
01667 fprintf (stderr, "optimize_open: nstart=%u nend=%u\n", optimize->nstart,
01668         optimize->nend);
01669 #endif
01670 // Calculating simulations to perform for each thread
01671 optimize->thread
01672 = (unsigned int *) alloca ((1 + nthreads) * sizeof (unsigned int));
01673 for (i = 0; i <= nthreads; ++i)
01674 {
01675     optimize->thread[i] = optimize->nstart
01676     + i * (optimize->nend - optimize->nstart) / nthreads;
01677 #if DEBUG_OPTIMIZE
01678     fprintf (stderr, "optimize_open: i=%u thread=%u\n", i,
01679             optimize->thread[i]);
01680 #endif
01681 }
01682 if (optimize->nsteps)
01683     optimize->thread_climbing = (unsigned int *)
01684     alloca ((1 + nthreads_climbing) * sizeof (unsigned int));
01685 // Opening result files
01686 optimize->file_result = g_fopen (optimize->result, "w");
01687 optimize->file_variables = g_fopen (optimize->variables, "w");
01688 // Performing the algorithm
01689 switch (optimize->algorithm)
01690 {
01691     // Genetic algorithm
01692     case ALGORITHM_GENETIC:
01693         optimize_genetic ();

```

```

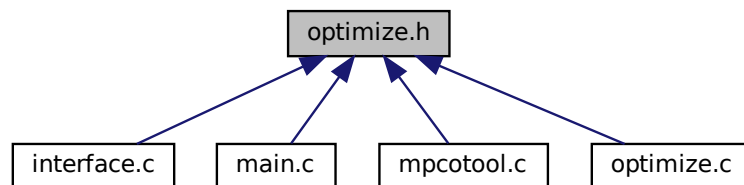
01697         break;
01698
01699         // Iterative algorithm
01700     default:
01701         optimize_iterate ();
01702     }
01703
01704     // Getting calculation time
01705     t = g_date_time_new_now (tz);
01706     optimize->calculation_time = 0.000001 * g_date_time_difference (t, t0);
01707     g_date_time_unref (t);
01708     g_date_time_unref (t0);
01709     g_time_zone_unref (tz);
01710     printf ("%s = %.6lg s\n", _("Calculation time"), optimize->calculation_time);
01711     fprintf (optimize->file_result, "%s = %.6lg s\n",
01712             _("Calculation time"), optimize->calculation_time);
01713
01714     // Closing result files
01715     fclose (optimize->file_variables);
01716     fclose (optimize->file_result);
01717
01718     #if DEBUG_OPTIMIZE
01719     fprintf (stderr, "optimize_open: end\n");
01720     #endif
01721 }

```

5.23 optimize.h File Reference

Header file to define the optimization functions.

This graph shows which files directly or indirectly include this file:



Data Structures

- struct [Optimize](#)
Struct to define the optimization ation data.
- struct [ParallelData](#)
Struct to pass to the GThreads parallelized function.

Functions

- void [optimize_free](#) ()
- void [optimize_open](#) ()

Variables

- int **ntasks**
- unsigned int **nthreads**
- unsigned int [nthreads_climbing](#)
Number of threads for the hill climbing method.
- GMutex **mutex** [1]
- [Optimize optimize](#) [1]
Optimization data.

5.23.1 Detailed Description

Header file to define the optimization functions.

Authors

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Definition in file [optimize.h](#).

5.23.2 Function Documentation

5.23.2.1 optimize_free()

```
void optimize_free ( )
```

Function to free the memory used by the [Optimize](#) struct.

Definition at line 1397 of file [optimize.c](#).

```
01398 {
01399     unsigned int i, j;
01400     #if DEBUG_OPTIMIZE
01401     fprintf (stderr, "optimize_free: start\n");
01402     #endif
01403     for (j = 0; j < optimize->ninputs; ++j)
01404     {
01405         for (i = 0; i < optimize->nexperiments; ++i)
01406             g_mapped_file_unref (optimize->file[j][i]);
01407         g_free (optimize->file[j]);
01408     }
01409     g_free (optimize->error_old);
01410     g_free (optimize->value_old);
01411     g_free (optimize->value);
01412     g_free (optimize->genetic_variable);
01413     #if DEBUG_OPTIMIZE
01414     fprintf (stderr, "optimize_free: end\n");
01415     #endif
01416 }
```


5.23.2.2 optimize_open()

```
void optimize_open ( )
```

Function to open and perform a optimization.

Definition at line 1422 of file [optimize.c](#).

```
01423 {
01424     GTimeZone *tz;
01425     GDateTime *t0, *t;
01426     unsigned int i, j;
01427
01428     #if DEBUG_OPTIMIZE
01429         char *buffer;
01430         fprintf (stderr, "optimize_open: start\n");
01431     #endif
01432
01433     // Getting initial time
01434     #if DEBUG_OPTIMIZE
01435         fprintf (stderr, "optimize_open: getting initial time\n");
01436     #endif
01437     tz = g_time_zone_new_utc ();
01438     t0 = g_date_time_new_now (tz);
01439
01440     // Obtaining and initing the pseudo-random numbers generator seed
01441     #if DEBUG_OPTIMIZE
01442         fprintf (stderr, "optimize_open: getting initial seed\n");
01443     #endif
01444     if (optimize->seed == DEFAULT_RANDOM_SEED)
01445         optimize->seed = input->seed;
01446     gsl_rng_set (optimize->rng, optimize->seed);
01447
01448     // Replacing the working directory
01449     #if DEBUG_OPTIMIZE
01450         fprintf (stderr, "optimize_open: replacing the working directory\n");
01451     #endif
01452     g_chdir (input->directory);
01453
01454     // Getting results file names
01455     optimize->result = input->result;
01456     optimize->variables = input->variables;
01457
01458     // Obtaining the simulator file
01459     optimize->simulator = input->simulator;
01460
01461     // Obtaining the evaluator file
01462     optimize->evaluator = input->evaluator;
01463
01464     // Reading the algorithm
01465     optimize->algorithm = input->algorithm;
01466     switch (optimize->algorithm)
01467     {
01468         case ALGORITHM_MONTE_CARLO:
01469             optimize_algorithm = optimize_MonteCarlo;
01470             break;
01471         case ALGORITHM_SWEEP:
01472             optimize_algorithm = optimize_sweep;
01473             break;
01474         case ALGORITHM_ORTHOGONAL:
01475             optimize_algorithm = optimize_orthogonal;
01476             break;
01477         default:
01478             optimize_algorithm = optimize_genetic;
01479             optimize->mutation_ratio = input->mutation_ratio;
01480             optimize->reproduction_ratio = input->reproduction_ratio;
01481             optimize->adaptation_ratio = input->adaptation_ratio;
01482     }
01483     optimize->nvariables = input->nvariables;
01484     optimize->nsimulations = input->nsimulations;
01485     optimize->niterations = input->niterations;
01486     optimize->nbest = input->nbest;
01487     optimize->tolerance = input->tolerance;
01488     optimize->nsteps = input->nsteps;
01489     optimize->nestimates = 0;
01490     optimize->threshold = input->threshold;
01491     optimize->stop = 0;
01492     if (input->nsteps)
01493     {
01494         optimize->relaxation = input->relaxation;
01495         switch (input->climbing)
01496         {
01497             case CLIMBING_METHOD_COORDINATES:
01498                 optimize->nestimates = 2 * optimize->nvariables;
```

```

01499         optimize_estimate_climbing = optimize_estimate_climbing_coordinates;
01500         break;
01501     default:
01502         optimize->nestimates = input->nestimates;
01503         optimize_estimate_climbing = optimize_estimate_climbing_random;
01504     }
01505 }
01506
01507 #if DEBUG_OPTIMIZE
01508 fprintf (stderr, "optimize_open: nbest=%u\n", optimize->nbest);
01509 #endif
01510 optimize->simulation_best
01511 = (unsigned int *) alloca (optimize->nbest * sizeof (unsigned int));
01512 optimize->error_best = (double *) alloca (optimize->nbest * sizeof (double));
01513
01514 // Reading the experimental data
01515 #if DEBUG_OPTIMIZE
01516 buffer = g_get_current_dir ();
01517 fprintf (stderr, "optimize_open: current directory=%s\n", buffer);
01518 g_free (buffer);
01519 #endif
01520 optimize->nexperiments = input->nexperiments;
01521 optimize->ninputs = input->experiment->ninputs;
01522 optimize->experiment
01523 = (char **) alloca (input->nexperiments * sizeof (char *));
01524 optimize->weight = (double *) alloca (input->nexperiments * sizeof (double));
01525 for (i = 0; i < input->experiment->ninputs; ++i)
01526     optimize->file[i] = (GMappedFile **)
01527         g_malloc (input->nexperiments * sizeof (GMappedFile *));
01528 for (i = 0; i < input->nexperiments; ++i)
01529 {
01530     #if DEBUG_OPTIMIZE
01531     fprintf (stderr, "optimize_open: i=%u\n", i);
01532     #endif
01533     optimize->experiment[i] = input->experiment[i].name;
01534     optimize->weight[i] = input->experiment[i].weight;
01535     #if DEBUG_OPTIMIZE
01536     fprintf (stderr, "optimize_open: experiment=%s weight=%lg\n",
01537             optimize->experiment[i], optimize->weight[i]);
01538     #endif
01539     for (j = 0; j < input->experiment->ninputs; ++j)
01540     {
01541         #if DEBUG_OPTIMIZE
01542         fprintf (stderr, "optimize_open: stencil%u\n", j + 1);
01543         #endif
01544         optimize->file[j][i]
01545             = g_mapped_file_new (input->experiment[i].stencil[j], 0, NULL);
01546     }
01547 }
01548
01549 // Reading the variables data
01550 #if DEBUG_OPTIMIZE
01551 fprintf (stderr, "optimize_open: reading variables\n");
01552 #endif
01553 optimize->label = (char **) alloca (input->nvariables * sizeof (char *));
01554 j = input->nvariables * sizeof (double);
01555 optimize->rangemin = (double *) alloca (j);
01556 optimize->rangeminabs = (double *) alloca (j);
01557 optimize->rangemax = (double *) alloca (j);
01558 optimize->rangemaxabs = (double *) alloca (j);
01559 optimize->step = (double *) alloca (j);
01560 j = input->nvariables * sizeof (unsigned int);
01561 optimize->precision = (unsigned int *) alloca (j);
01562 optimize->nsweeps = (unsigned int *) alloca (j);
01563 optimize->nbits = (unsigned int *) alloca (j);
01564 for (i = 0; i < input->nvariables; ++i)
01565 {
01566     optimize->label[i] = input->variable[i].name;
01567     optimize->rangemin[i] = input->variable[i].rangemin;
01568     optimize->rangeminabs[i] = input->variable[i].rangeminabs;
01569     optimize->rangemax[i] = input->variable[i].rangemax;
01570     optimize->rangemaxabs[i] = input->variable[i].rangemaxabs;
01571     optimize->precision[i] = input->variable[i].precision;
01572     optimize->step[i] = input->variable[i].step;
01573     optimize->nsweeps[i] = input->variable[i].nsweeps;
01574     optimize->nbits[i] = input->variable[i].nbits;
01575 }
01576 if (input->algorithm == ALGORITHM_SWEEP
01577     || input->algorithm == ALGORITHM_ORTHOGONAL)
01578 {
01579     optimize->nsimulations = 1;
01580     for (i = 0; i < input->nvariables; ++i)
01581     {
01582         optimize->nsimulations *= optimize->nsweeps[i];
01583     }
01584     #if DEBUG_OPTIMIZE
01585     fprintf (stderr, "optimize_open: nsweeps=%u nsimulations=%u\n",
01586             optimize->nsweeps[i], optimize->nsimulations);
01587     #endif
01588 }

```

```

01586 #endif
01587     }
01588 }
01589 if (optimize->nsteps)
01590     optimize->climbing
01591     = (double *) alloca (optimize->nvariables * sizeof (double));
01592
01593 // Setting error norm
01594 switch (input->norm)
01595 {
01596     case ERROR_NORM_EUCLIDIAN:
01597         optimize_norm = optimize_norm_euclidian;
01598         break;
01599     case ERROR_NORM_MAXIMUM:
01600         optimize_norm = optimize_norm_maximum;
01601         break;
01602     case ERROR_NORM_P:
01603         optimize_norm = optimize_norm_p;
01604         optimize->p = input->p;
01605         break;
01606     default:
01607         optimize_norm = optimize_norm_taxicab;
01608 }
01609
01610 // Allocating values
01611 #if DEBUG_OPTIMIZE
01612 fprintf (stderr, "optimize_open: allocating variables\n");
01613 fprintf (stderr, "optimize_open: nvariables=%u algorithm=%u\n",
01614         optimize->nvariables, optimize->algorithm);
01615 #endif
01616 optimize->genetic_variable = NULL;
01617 if (optimize->algorithm == ALGORITHM_GENETIC)
01618 {
01619     optimize->genetic_variable = (GeneticVariable *)
01620     g_malloc (optimize->nvariables * sizeof (GeneticVariable));
01621     for (i = 0; i < optimize->nvariables; ++i)
01622     {
01623 #if DEBUG_OPTIMIZE
01624         fprintf (stderr, "optimize_open: i=%u min=%lg max=%lg nbits=%u\n",
01625                 i, optimize->rangemin[i], optimize->rangemax[i],
01626                 optimize->nbits[i]);
01627 #endif
01628         optimize->genetic_variable[i].minimum = optimize->rangemin[i];
01629         optimize->genetic_variable[i].maximum = optimize->rangemax[i];
01630         optimize->genetic_variable[i].nbits = optimize->nbits[i];
01631     }
01632 }
01633 #if DEBUG_OPTIMIZE
01634 fprintf (stderr, "optimize_open: nvariables=%u nsimulations=%u\n",
01635         optimize->nvariables, optimize->nsimulations);
01636 #endif
01637 optimize->value = (double *)
01638     g_malloc ((optimize->nsimulations
01639             + optimize->nestimates * optimize->nsteps)
01640             * optimize->nvariables * sizeof (double));
01641
01642 // Calculating simulations to perform for each task
01643 #if HAVE_MPI
01644 #if DEBUG_OPTIMIZE
01645     fprintf (stderr, "optimize_open: rank=%u ntasks=%u\n",
01646             optimize->mpi_rank, ntasks);
01647 #endif
01648     optimize->nstart = optimize->mpi_rank * optimize->nsimulations / ntasks;
01649     optimize->nend = (1 + optimize->mpi_rank) * optimize->nsimulations / ntasks;
01650     if (optimize->nsteps)
01651     {
01652         optimize->nstart_climbing
01653         = optimize->mpi_rank * optimize->nestimates / ntasks;
01654         optimize->nend_climbing
01655         = (1 + optimize->mpi_rank) * optimize->nestimates / ntasks;
01656     }
01657 #else
01658     optimize->nstart = 0;
01659     optimize->nend = optimize->nsimulations;
01660     if (optimize->nsteps)
01661     {
01662         optimize->nstart_climbing = 0;
01663         optimize->nend_climbing = optimize->nestimates;
01664     }
01665 #endif
01666 #if DEBUG_OPTIMIZE
01667     fprintf (stderr, "optimize_open: nstart=%u nend=%u\n", optimize->nstart,
01668             optimize->nend);
01669 #endif
01670
01671 // Calculating simulations to perform for each thread
01672 optimize->thread

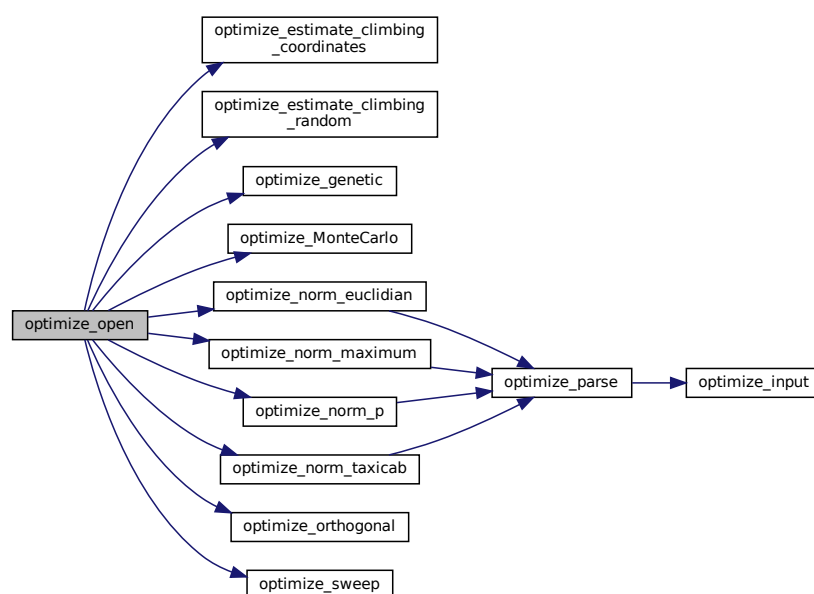
```

```

01673     = (unsigned int *) alloca ((1 + nthreads) * sizeof (unsigned int));
01674     for (i = 0; i <= nthreads; ++i)
01675     {
01676         optimize->thread[i] = optimize->nstart
01677             + i * (optimize->nend - optimize->nstart) / nthreads;
01678     #if DEBUG_OPTIMIZE
01679         fprintf (stderr, "optimize_open: i=%u thread=%u\n", i,
01680                 optimize->thread[i]);
01681     #endif
01682     }
01683     if (optimize->nsteps)
01684         optimize->thread_climbing = (unsigned int *)
01685             alloca ((1 + nthreads_climbing) * sizeof (unsigned int));
01686
01687     // Opening result files
01688     optimize->file_result = g_fopen (optimize->result, "w");
01689     optimize->file_variables = g_fopen (optimize->variables, "w");
01690
01691     // Performing the algorithm
01692     switch (optimize->algorithm)
01693     {
01694         // Genetic algorithm
01695         case ALGORITHM_GENETIC:
01696             optimize_genetic ();
01697             break;
01698
01699         // Iterative algorithm
01700         default:
01701             optimize_iterate ();
01702     }
01703
01704     // Getting calculation time
01705     t = g_date_time_new_now (tz);
01706     optimize->calculation_time = 0.000001 * g_date_time_difference (t, t0);
01707     g_date_time_unref (t);
01708     g_date_time_unref (t0);
01709     g_time_zone_unref (tz);
01710     printf ("%s = %.6lg s\n", _("Calculation time"), optimize->calculation_time);
01711     fprintf (optimize->file_result, "%s = %.6lg s\n",
01712             _("Calculation time"), optimize->calculation_time);
01713
01714     // Closing result files
01715     fclose (optimize->file_variables);
01716     fclose (optimize->file_result);
01717
01718     #if DEBUG_OPTIMIZE
01719     fprintf (stderr, "optimize_open: end\n");
01720     #endif
01721 }

```

Here is the call graph for this function:



5.23.3 Variable Documentation

5.23.3.1 nthreads_climbing

```
unsigned int nthreads_climbing [extern]
```

Number of threads for the hill climbing method.

Definition at line 80 of file [optimize.c](#).

5.23.3.2 optimize

```
Optimize optimize[1] [extern]
```

Optimization data.

Definition at line 79 of file [optimize.c](#).

5.24 optimize.h

[Go to the documentation of this file.](#)

```
00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burguete and Borja Latorre.
00007
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00016 2. Redistributions in binary form must reproduce the above copyright notice,
00017 this list of conditions and the following disclaimer in the
00018 documentation and/or other materials provided with the distribution.
00019
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00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #ifndef OPTIMIZE__H
00033 #define OPTIMIZE__H 1
00034
00035 typedef struct
00036 {
00037     GMappedFile **file[MAX_NINPUTS];
00038     char **experiment;
00039     char **label;
00040     gsl_rng *rng;
00041 }
```

```

00051 GeneticVariable *genetic_variable;
00053 FILE *file_result;
00054 FILE *file_variables;
00055 char *result;
00056 char *variables;
00057 char *simulator;
00058 char *evaluator;
00060 double *value;
00061 double *rangemin;
00062 double *rangemax;
00063 double *rangeminabs;
00064 double *rangemaxabs;
00065 double *error_best;
00066 double *weight;
00067 double *step;
00068 double *climbing;
00069 double *value_old;
00071 double *error_old;
00073 unsigned int *precision;
00074 unsigned int *nsweeps;
00075 unsigned int *nbits;
00077 unsigned int *thread;
00079 unsigned int *thread_climbing;
00082 unsigned int *simulation_best;
00083 double tolerance;
00084 double mutation_ratio;
00085 double reproduction_ratio;
00086 double adaptation_ratio;
00087 double relaxation;
00088 double calculation_time;
00089 double p;
00090 double threshold;
00091 unsigned long int seed;
00093 unsigned int nvariables;
00094 unsigned int nexperiments;
00095 unsigned int ninputs;
00096 unsigned int nsimulations;
00097 unsigned int nsteps;
00099 unsigned int nestimates;
00101 unsigned int algorithm;
00102 unsigned int nstart;
00103 unsigned int nend;
00104 unsigned int nstart_climbing;
00106 unsigned int nend_climbing;
00108 unsigned int niterations;
00109 unsigned int nbest;
00110 unsigned int nsaveds;
00111 unsigned int stop;
00112 #if HAVE_MPI
00113 int mpi_rank;
00114 #endif
00115 } Optimize;
00116
00121 typedef struct
00122 {
00123 unsigned int thread;
00124 } ParallelData;
00125
00126 // Global variables
00127 extern int ntasks;
00128 extern unsigned int nthreads;
00129 extern unsigned int nthreads_climbing;
00130 extern GMutex mutex[1];
00131 extern Optimize optimize[1];
00132
00133 // Public functions
00134 void optimize_free ();
00135 void optimize_open ();
00136
00137 #endif

```

5.25 tools.c File Reference

Source file to define some useful functions.

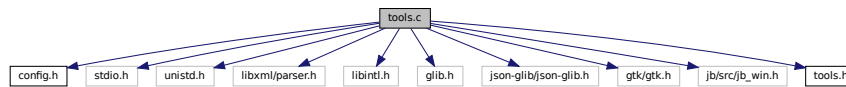
```

#include "config.h"
#include <stdio.h>
#include <unistd.h>
#include <libxml/parser.h>

```

```
#include <libintl.h>
#include <glib.h>
#include <json-glib/json-glib.h>
#include <gtk/gtk.h>
#include "jb/src/jb_win.h"
#include "tools.h"
```

Include dependency graph for tools.c:



Functions

- void [process_pending](#) ()
- unsigned int [gtk_array_get_active](#) (GtkRadioButton *array[], unsigned int n)

Variables

- GtkWidget * [main_window](#)
Main GtkWidget.
- char * [error_message](#)
Error message.
- void(* [show_pending](#))() = NULL
Pointer to the function to show pending events.

5.25.1 Detailed Description

Source file to define some useful functions.

Authors

Javier Burguete and Borja Latorre.

Copyright

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Definition in file [tools.c](#).

5.25.2 Function Documentation

5.25.2.1 [gtk_array_get_active\(\)](#)

```
unsigned int gtk_array_get_active (
    GtkRadioButton * array[],
    unsigned int n )
```

Function to get the active GtkRadioButton.

Returns

Active GtkRadioButton.

Parameters

<i>array</i>	Array of GtkRadioButtons.
<i>n</i>	Number of GtkRadioButtons.

Definition at line 82 of file [tools.c](#).

```
00089 {
00090     unsigned int i;
00091     for (i = 0; i < n; ++i)
00092         if (gtk_check_button_get_active (array[i]))
00093             break;
00094     return i;
00095 }
```

5.25.2.2 process_pending()

```
void process_pending ( )
```

Function to process events on long computation.

Definition at line 69 of file [tools.c](#).

```
00070 {
00071     GMainContext *context = g_main_context_default ();
00072     while (g_main_context_pending (context))
00073         g_main_context_iteration (context, 0);
00074 }
```

5.25.3 Variable Documentation**5.25.3.1 error_message**

```
char* error_message
```

Error message.

Definition at line 59 of file [tools.c](#).

5.25.3.2 main_window

```
GtkWindow* main_window
```

Main GtkWindow.

Definition at line 56 of file [tools.c](#).

5.25.3.3 show_pending

```
void(* show_pending) () ( ) = NULL
```

Pointer to the function to show pending events.

Definition at line 60 of file [tools.c](#).

5.26 tools.c

[Go to the documentation of this file.](#)

```
00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burquete and Borja Latorre.
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00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #define _GNU_SOURCE
00033 #include "config.h"
00034 #include <stdio.h>
00035 #include <unistd.h>
00036 #include <libxml/parser.h>
00037 #include <libintl.h>
00038 #include <glib.h>
00039 #include <json-glib/json-glib.h>
00040 #ifdef G_OS_WIN32
00041 #include <windows.h>
00042 #endif
00043 #if HAVE_GTK
00044 #include <gtk/gtk.h>
00045 #endif
00046 #include "jb/src/jb_win.h"
00047 #include "tools.h"
00048
00049 #if HAVE_GTK
00050 GtkWidget *main_window;
00051 #endif
00052
00053 char *error_message;
00054 void (*show_pending) () = NULL;
00055
00056 #if HAVE_GTK
00057 void
00058 process_pending ()
00059 {
00060     GMainContext *context = g_main_context_default ();
00061     while (g_main_context_pending (context))
00062         g_main_context_iteration (context, 0);
00063 }
00064
00065 unsigned int
```

```

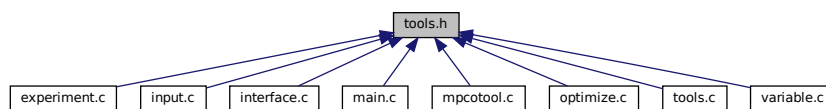
00082 gtk_array_get_active (
00083     #if !GTK4
00084         GtkWidget * array[],
00085     #else
00086         GtkCheckButton * array[],
00087     #endif
00088     unsigned int n)
00089 {
00090     unsigned int i;
00091     for (i = 0; i < n; ++i)
00092         if (gtk_check_button_get_active (array[i]))
00093             break;
00094     return i;
00095 }
00096
00097 #endif

```

5.27 tools.h File Reference

Header file to define some useful functions.

This graph shows which files directly or indirectly include this file:



Macros

- #define `ERROR_TYPE` `GTK_MESSAGE_ERROR`
Macro to define the error message type.
- #define `INFO_TYPE` `GTK_MESSAGE_INFO`
Macro to define the information message type.
- #define `G_APPLICATION_DEFAULT_FLAGS` `G_APPLICATION_FLAGS_NONE`

Functions

- void `process_pending` ()
- unsigned int `gtk_array_get_active` (GtkWidget *array[], unsigned int n)

Variables

- GtkWidget * `main_window`
Main GtkWidget.
- char * `error_message`
Error message.
- void(* `show_pending`)()
Pointer to the function to show pending events.

5.27.1 Detailed Description

Header file to define some useful functions.

Authors

Javier Burguete.

Copyright

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Definition in file [tools.h](#).

5.27.2 Macro Definition Documentation

5.27.2.1 ERROR_TYPE

```
#define ERROR_TYPE GTK_MESSAGE_ERROR
```

Macro to define the error message type.

Definition at line 48 of file [tools.h](#).

5.27.2.2 G_APPLICATION_DEFAULT_FLAGS

```
#define G_APPLICATION_DEFAULT_FLAGS G_APPLICATION_FLAGS_NONE
```

Definition at line 64 of file [tools.h](#).

5.27.2.3 INFO_TYPE

```
#define INFO_TYPE GTK_MESSAGE_INFO
```

Macro to define the information message type.

Definition at line 49 of file [tools.h](#).

5.27.3 Function Documentation

5.27.3.1 gtk_array_get_active()

```
unsigned int gtk_array_get_active (  
    GtkRadioButton * array[],  
    unsigned int n )
```

Function to get the active GtkRadioButton.

Returns

Active GtkRadioButton.

Parameters

<i>array</i>	Array of GtkRadioButtons.
<i>n</i>	Number of GtkRadioButtons.

Definition at line 82 of file [tools.c](#).

```
00089 {
00090     unsigned int i;
00091     for (i = 0; i < n; ++i)
00092         if (gtk_check_button_get_active (array[i]))
00093             break;
00094     return i;
00095 }
```

5.27.3.2 process_pending()

```
void process_pending ( )
```

Function to process events on long computation.

Definition at line 69 of file [tools.c](#).

```
00070 {
00071     GMainContext *context = g_main_context_default ();
00072     while (g_main_context_pending (context))
00073         g_main_context_iteration (context, 0);
00074 }
```

5.27.4 Variable Documentation**5.27.4.1 error_message**

```
char* error_message [extern]
```

Error message.

Definition at line 59 of file [tools.c](#).

5.27.4.2 main_window

```
GtkWindow* main_window [extern]
```

Main GtkWindow.

Definition at line 56 of file [tools.c](#).

5.27.4.3 show_pending

```
void(* show_pending) () ( ) [extern]
```

Pointer to the function to show pending events.

Definition at line 60 of file [tools.c](#).

5.28 tools.h

[Go to the documentation of this file.](#)

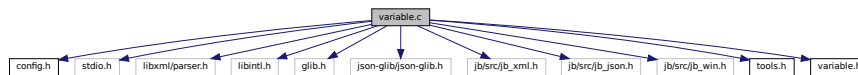
```
00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burguete and Borja Latorre.
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00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #ifndef TOOLS__H
00033 #define TOOLS__H 1
00034
00035 #if HAVE_GTK
00036 #define ERROR_TYPE GTK_MESSAGE_ERROR
00037 #define INFO_TYPE GTK_MESSAGE_INFO
00038 extern GtkWidget *main_window;
00039 #else
00040 #define ERROR_TYPE 0
00041 #define INFO_TYPE 0
00042 #endif
00043
00044 extern char *error_message;
00045 extern void (*show_pending) ();
00046
00047 // Public functions
00048
00049 #if HAVE_GTK
00050 #ifndef G_APPLICATION_DEFAULT_FLAGS
00051 #define G_APPLICATION_DEFAULT_FLAGS G_APPLICATION_FLAGS_NONE
00052 #endif
00053 void process_pending ();
00054
00055 #if !GTK4
00056 unsigned int gtk_array_get_active (GtkRadioButton * array[], unsigned int n);
00057 #else
00058 unsigned int gtk_array_get_active (GtkCheckButton * array[], unsigned int n);
00059 #endif
00060 #endif
00061 #endif
```

5.29 variable.c File Reference

Source file to define the variable data.

```
#include "config.h"
#include <stdio.h>
#include <libxml/parser.h>
#include <libintl.h>
#include <glib.h>
#include <json-glib/json-glib.h>
#include "jb/src/jb_xml.h"
#include "jb/src/jb_json.h"
#include "jb/src/jb_win.h"
#include "tools.h"
#include "variable.h"
```

Include dependency graph for variable.c:



Macros

- `#define DEBUG_VARIABLE 0`
Macro to debug variable functions.

Functions

- void [variable_free](#) ([Variable](#) *variable, unsigned int type)
- void [variable_error](#) ([Variable](#) *variable, char *message)
- int [variable_open_xml](#) ([Variable](#) *variable, xmlNode *node, unsigned int algorithm, unsigned int nsteps)
- int [variable_open_json](#) ([Variable](#) *variable, JsonNode *node, unsigned int algorithm, unsigned int nsteps)

Variables

- const char * [format](#) [[NPRECISIONS](#)]
Array of C-strings with variable formats.
- const double [precision](#) [[NPRECISIONS](#)]
Array of variable precisions.

5.29.1 Detailed Description

Source file to define the variable data.

Authors

Javier Burguete and Borja Latorre.

Copyright

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Definition in file [variable.c](#).

5.29.2 Macro Definition Documentation

5.29.2.1 DEBUG_VARIABLE

```
#define DEBUG_VARIABLE 0
```

Macro to debug variable functions.

Definition at line 51 of file [variable.c](#).

5.29.3 Function Documentation

5.29.3.1 variable_error()

```
void variable_error (  
    Variable * variable,  
    char * message )
```

Function to print a message error opening an [Variable](#) struct.

Parameters

<i>variable</i>	Variable struct.
<i>message</i>	Error message.

Definition at line 88 of file [variable.c](#).

```
00092 {  
00093     char buffer[64];  
00094     if (!variable->name)  
00095         snprintf (buffer, 64, "%s: %s", _("Variable"), message);  
00096     else  
00097         snprintf (buffer, 64, "%s %s: %s", _("Variable"), variable->name, message);  
00098     error_message = g_strdup (buffer);  
00099 }
```

5.29.3.2 variable_free()

```
void variable_free (  
    Variable * variable,  
    unsigned int type )
```

Function to free the memory of a [Variable](#) struct.

Parameters

<i>variable</i>	Variable struct.
<i>type</i>	Type of input file.

Definition at line 67 of file [variable.c](#).

```

00071 {
00072 #if DEBUG_VARIABLE
00073     fprintf (stderr, "variable_free:  start\n");
00074 #endif
00075     if (type == INPUT_TYPE_XML)
00076         xmlFree (variable->name);
00077     else
00078         g_free (variable->name);
00079 #if DEBUG_VARIABLE
00080     fprintf (stderr, "variable_free:  end\n");
00081 #endif
00082 }
```

5.29.3.3 variable_open_json()

```

int variable_open_json (
    Variable * variable,
    JsonNode * node,
    unsigned int algorithm,
    unsigned int nsteps )
```

Function to open the variable file.

Returns

1 on success, 0 on error.

Parameters

<i>variable</i>	Variable struct.
<i>node</i>	XML node.
<i>algorithm</i>	Algorithm type.
<i>nsteps</i>	Number of steps to do the hill climbing method.

Definition at line 270 of file [variable.c](#).

```

00275 {
00276     JsonObject *object;
00277     const char *label;
00278     int error_code;
00279 #if DEBUG_VARIABLE
00280     fprintf (stderr, "variable_open_json:  start\n");
00281 #endif
00282     object = json_node_get_object (node);
00283     label = json_object_get_string_member (object, LABEL_NAME);
00284     if (!label)
00285     {
00286         variable_error (variable, _("no name"));
00287         goto exit_on_error;
00288     }
00289     variable->name = g_strdup (label);
00290     if (json_object_get_member (object, LABEL_MINIMUM))
00291     {
00292         variable->rangemin
00293             = jb_json_object_get_float (object, LABEL_MINIMUM, &error_code);
00294         if (!error_code)
```



```

00295     {
00296         variable_error (variable, _("bad minimum"));
00297         goto exit_on_error;
00298     }
00299     variable->rangeminabs
00300     = jb_json_object_get_float_with_default (object, LABEL_ABSOLUTE_MINIMUM,
00301                                             &error_code, -G_MAXDOUBLE);
00302     if (!error_code)
00303     {
00304         variable_error (variable, _("bad absolute minimum"));
00305         goto exit_on_error;
00306     }
00307     if (variable->rangemin < variable->rangeminabs)
00308     {
00309         variable_error (variable, _("minimum range not allowed"));
00310         goto exit_on_error;
00311     }
00312 }
00313 else
00314 {
00315     variable_error (variable, _("no minimum range"));
00316     goto exit_on_error;
00317 }
00318 if (json_object_get_member (object, LABEL_MAXIMUM))
00319 {
00320     variable->rangemax
00321     = jb_json_object_get_float (object, LABEL_MAXIMUM, &error_code);
00322     if (!error_code)
00323     {
00324         variable_error (variable, _("bad maximum"));
00325         goto exit_on_error;
00326     }
00327     variable->rangemaxabs
00328     = jb_json_object_get_float_with_default (object, LABEL_ABSOLUTE_MAXIMUM,
00329                                             &error_code, G_MAXDOUBLE);
00330     if (!error_code)
00331     {
00332         variable_error (variable, _("bad absolute maximum"));
00333         goto exit_on_error;
00334     }
00335     if (variable->rangemax > variable->rangemaxabs)
00336     {
00337         variable_error (variable, _("maximum range not allowed"));
00338         goto exit_on_error;
00339     }
00340     if (variable->rangemax < variable->rangemin)
00341     {
00342         variable_error (variable, _("bad range"));
00343         goto exit_on_error;
00344     }
00345 }
00346 else
00347 {
00348     variable_error (variable, _("no maximum range"));
00349     goto exit_on_error;
00350 }
00351 variable->precision
00352 = jb_json_object_get_uint_with_default (object, LABEL_PRECISION,
00353                                         &error_code, DEFAULT_PRECISION);
00354 if (!error_code || variable->precision >= NPRECISIONS)
00355 {
00356     variable_error (variable, _("bad precision"));
00357     goto exit_on_error;
00358 }
00359 if (algorithm == ALGORITHM_SWEEP || algorithm == ALGORITHM_ORTHOGONAL)
00360 {
00361     if (json_object_get_member (object, LABEL_NSWEEPS))
00362     {
00363         variable->nsweeps
00364         = jb_json_object_get_uint (object, LABEL_NSWEEPS, &error_code);
00365         if (!error_code || !variable->nsweeps)
00366         {
00367             variable_error (variable, _("bad sweeps"));
00368             goto exit_on_error;
00369         }
00370     }
00371     else
00372     {
00373         variable_error (variable, _("no sweeps number"));
00374         goto exit_on_error;
00375     }
00376 #if DEBUG_VARIABLE
00377     fprintf (stderr, "variable_open_json: nsweeps=%u\n", variable->nsweeps);
00378 #endif
00379 }
00380 if (algorithm == ALGORITHM_GENETIC)
00381 {

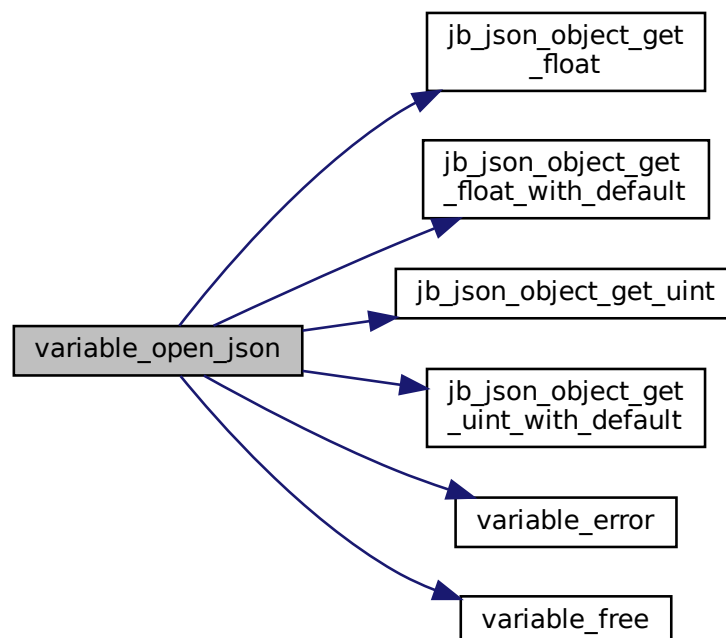
```

```

00382     // Obtaining bits representing each variable
00383     if (json_object_get_member (object, LABEL_NBITS))
00384     {
00385         variable->nbits
00386         = jb_json_object_get_uint (object, LABEL_NBITS, &error_code);
00387         if (!error_code || !variable->nbits)
00388         {
00389             variable_error (variable, _("invalid bits number"));
00390             goto exit_on_error;
00391         }
00392     }
00393     else
00394     {
00395         variable_error (variable, _("no bits number"));
00396         goto exit_on_error;
00397     }
00398 }
00399 else if (nsteps)
00400 {
00401     variable->step
00402     = jb_json_object_get_float (object, LABEL_STEP, &error_code);
00403     if (!error_code || variable->step < 0.)
00404     {
00405         variable_error (variable, _("bad step size"));
00406         goto exit_on_error;
00407     }
00408 }
00409
00410 #if DEBUG_VARIABLE
00411 fprintf (stderr, "variable_open_json: end\n");
00412 #endif
00413 return 1;
00414 exit_on_error:
00415 variable_free (variable, INPUT_TYPE_JSON);
00416 #if DEBUG_VARIABLE
00417 fprintf (stderr, "variable_open_json: end\n");
00418 #endif
00419 return 0;
00420 }

```

Here is the call graph for this function:



5.29.3.4 variable_open_xml()

```
int variable_open_xml (
    Variable * variable,
    xmlNode * node,
    unsigned int algorithm,
    unsigned int nsteps )
```

Function to open the variable file.

Returns

1 on success, 0 on error.

Parameters

<i>variable</i>	Variable struct.
<i>node</i>	XML node.
<i>algorithm</i>	Algorithm type.
<i>nsteps</i>	Number of steps to do the hill climbing method.

Definition at line 107 of file [variable.c](#).

```
00112 {
00113     int error_code;
00114
00115     #if DEBUG_VARIABLE
00116     fprintf (stderr, "variable_open_xml: start\n");
00117     #endif
00118
00119     variable->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00120     if (!variable->name)
00121     {
00122         variable_error (variable, _("no name"));
00123         goto exit_on_error;
00124     }
00125     if (xmlHasProp (node, (const xmlChar *) LABEL_MINIMUM))
00126     {
00127         variable->rangemin
00128         = jb_xml_node_get_float (node, (const xmlChar *) LABEL_MINIMUM,
00129                                 &error_code);
00130         if (!error_code)
00131         {
00132             variable_error (variable, _("bad minimum"));
00133             goto exit_on_error;
00134         }
00135         variable->rangeminabs = jb_xml_node_get_float_with_default
00136         (node, (const xmlChar *) LABEL_ABSOLUTE_MINIMUM, &error_code,
00137         -G_MAXDOUBLE);
00138
00139         if (!error_code)
00140         {
00141             variable_error (variable, _("bad absolute minimum"));
00142             goto exit_on_error;
00143         }
00144         if (variable->rangemin < variable->rangeminabs)
00145         {
00146             variable_error (variable, _("minimum range not allowed"));
00147             goto exit_on_error;
00148         }
00149     }
00150     else
00151     {
00152         variable_error (variable, _("no minimum range"));
00153         goto exit_on_error;
00154     }
00155     if (xmlHasProp (node, (const xmlChar *) LABEL_MAXIMUM))
00156     {
00157         variable->rangemax
00158         = jb_xml_node_get_float (node, (const xmlChar *) LABEL_MAXIMUM,
00159                                 &error_code);
00160         if (!error_code)
00161         {
```

```

00162         variable_error (variable, _("bad maximum"));
00163         goto exit_on_error;
00164     }
00165     variable->rangemaxabs = jb_xml_node_get_float_with_default
00166         (node, (const xmlChar *) LABEL_ABSOLUTE_MAXIMUM, &error_code,
00167          G_MAXDOUBLE);
00168     if (!error_code)
00169     {
00170         variable_error (variable, _("bad absolute maximum"));
00171         goto exit_on_error;
00172     }
00173     if (variable->rangemax > variable->rangemaxabs)
00174     {
00175         variable_error (variable, _("maximum range not allowed"));
00176         goto exit_on_error;
00177     }
00178     if (variable->rangemax < variable->rangemin)
00179     {
00180         variable_error (variable, _("bad range"));
00181         goto exit_on_error;
00182     }
00183 }
00184 else
00185 {
00186     variable_error (variable, _("no maximum range"));
00187     goto exit_on_error;
00188 }
00189 variable->precision
00190 = jb_xml_node_get_uint_with_default (node,
00191                                     (const xmlChar *) LABEL_PRECISION,
00192                                     &error_code, DEFAULT_PRECISION);
00193 if (!error_code || variable->precision >= NPRECISIONS)
00194 {
00195     variable_error (variable, _("bad precision"));
00196     goto exit_on_error;
00197 }
00198 if (algorithm == ALGORITHM_SWEEP || algorithm == ALGORITHM_ORTHOGONAL)
00199 {
00200     if (xmlHasProp (node, (const xmlChar *) LABEL_NSWEEPS))
00201     {
00202         variable->nsweeps
00203         = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NSWEEPS,
00204                                &error_code);
00205         if (!error_code || !variable->nsweeps)
00206         {
00207             variable_error (variable, _("bad sweeps"));
00208             goto exit_on_error;
00209         }
00210     }
00211     else
00212     {
00213         variable_error (variable, _("no sweeps number"));
00214         goto exit_on_error;
00215     }
00216 #if DEBUG_VARIABLE
00217     fprintf (stderr, "variable_open_xml: nsweeps=%u\n", variable->nsweeps);
00218 #endif
00219 }
00220 if (algorithm == ALGORITHM_GENETIC)
00221 {
00222     // Obtaining bits representing each variable
00223     if (xmlHasProp (node, (const xmlChar *) LABEL_NBITS))
00224     {
00225         variable->nbits
00226         = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NBITS,
00227                                &error_code);
00228         if (!error_code || !variable->nbits)
00229         {
00230             variable_error (variable, _("invalid bits number"));
00231             goto exit_on_error;
00232         }
00233     }
00234     else
00235     {
00236         variable_error (variable, _("no bits number"));
00237         goto exit_on_error;
00238     }
00239 }
00240 else if (nsteps)
00241 {
00242     variable->step
00243     = jb_xml_node_get_float (node, (const xmlChar *) LABEL_STEP,
00244                              &error_code);
00245     if (!error_code || variable->step < 0.)
00246     {
00247         variable_error (variable, _("bad step size"));
00248         goto exit_on_error;

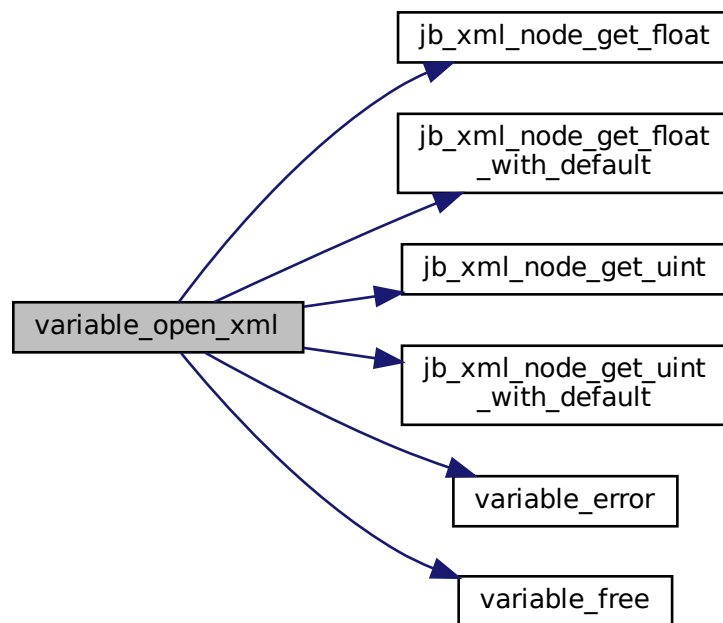
```

```

00249     }
00250 }
00251
00252 #if DEBUG_VARIABLE
00253 fprintf(stderr, "variable_open_xml: end\n");
00254 #endif
00255 return 1;
00256 exit_on_error:
00257 variable_free (variable, INPUT_TYPE_XML);
00258 #if DEBUG_VARIABLE
00259 fprintf(stderr, "variable_open_xml: end\n");
00260 #endif
00261 return 0;
00262 }

```

Here is the call graph for this function:



5.29.4 Variable Documentation

5.29.4.1 format

```
const char* format[NPRECISIONS]
```

Initial value:

```

= {
    "%.01f", "%.11f", "%.21f", "%.31f", "%.41f", "%.51f", "%.61f", "%.71f",
    "%.81f", "%.91f", "%.101f", "%.111f", "%.121f", "%.131f", "%.141f"
}

```

Array of C-strings with variable formats.

Definition at line 53 of file [variable.c](#).

5.29.4.2 precision

```
const double precision[NPRECISIONS]
```

Initial value:

```
= {
    1., 0.1, 0.01, 1e-3, 1e-4, 1e-5, 1e-6, 1e-7, 1e-8, 1e-9, 1e-10, 1e-11,
    1e-12, 1e-13, 1e-14
}
```

Array of variable precisions.

Definition at line 58 of file [variable.c](#).

5.30 variable.c

[Go to the documentation of this file.](#)

```
00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burquete and Borja Latorre.
00007
00008 Copyright 2012-2023, AUTHORS.
00009
00010 Redistribution and use in source and binary forms, with or without modification,
00011 are permitted provided that the following conditions are met:
00012
00013 1. Redistributions of source code must retain the above copyright notice,
00014 this list of conditions and the following disclaimer.
00015
00016 2. Redistributions in binary form must reproduce the above copyright notice,
00017 this list of conditions and the following disclaimer in the
00018 documentation and/or other materials provided with the distribution.
00019
00020 THIS SOFTWARE IS PROVIDED BY AUTHORS "AS IS" AND ANY EXPRESS OR IMPLIED
00021 WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
00022 MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
00023 SHALL AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
00024 SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
00025 PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
00026 BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
00027 CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028 IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029 OF SUCH DAMAGE.
00030 */
00031
00032 #define _GNU_SOURCE
00033 #include "config.h"
00034 #include <stdio.h>
00035 #include <libxml/parser.h>
00036 #include <libintl.h>
00037 #include <glib.h>
00038 #include <json-glib/json-glib.h>
00039 #include "jb/src/jb_xml.h"
00040 #include "jb/src/jb_json.h"
00041 #include "jb/src/jb_win.h"
00042 #include "tools.h"
00043 #include "variable.h"
00044
00045 #define DEBUG_VARIABLE 0
00046
00047 const char *format[NPRECISIONS] = {
00048     "%.0lf", "%.1lf", "%.2lf", "%.3lf", "%.4lf", "%.5lf", "%.6lf", "%.7lf",
00049     "%.8lf", "%.9lf", "%.10lf", "%.11lf", "%.12lf", "%.13lf", "%.14lf"
00050 };
00051
00052 const double precision[NPRECISIONS] = {
00053     1., 0.1, 0.01, 1e-3, 1e-4, 1e-5, 1e-6, 1e-7, 1e-8, 1e-9, 1e-10, 1e-11,
00054     1e-12, 1e-13, 1e-14
00055 };
00056
00057 void
00058 variable_free (Variable * variable,
00059               unsigned int type)
```

```

00071 {
00072 #if DEBUG_VARIABLE
00073     fprintf (stderr, "variable_free: start\n");
00074 #endif
00075     if (type == INPUT_TYPE_XML)
00076         xmlFree (variable->name);
00077     else
00078         g_free (variable->name);
00079 #if DEBUG_VARIABLE
00080     fprintf (stderr, "variable_free: end\n");
00081 #endif
00082 }
00083
00084 void
00085 variable_error (Variable * variable,
00086                char *message)
00087 {
00088     char buffer[64];
00089     if (!variable->name)
00090         snprintf (buffer, 64, "%s: %s", _("Variable"), message);
00091     else
00092         snprintf (buffer, 64, "%s %s: %s", _("Variable"), variable->name, message);
00093     error_message = g_strdup (buffer);
00094 }
00095
00096 int
00097 variable_open_xml (Variable * variable,
00098                  xmlNode * node,
00099                  unsigned int algorithm,
00100                  unsigned int nsteps)
00101 {
00102     int error_code;
00103 #if DEBUG_VARIABLE
00104     fprintf (stderr, "variable_open_xml: start\n");
00105 #endif
00106     variable->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00107     if (!variable->name)
00108     {
00109         variable_error (variable, _("no name"));
00110         goto exit_on_error;
00111     }
00112     if (xmlHasProp (node, (const xmlChar *) LABEL_MINIMUM))
00113     {
00114         variable->rangemin
00115             = jb_xml_node_get_float (node, (const xmlChar *) LABEL_MINIMUM,
00116                                     &error_code);
00117         if (!error_code)
00118         {
00119             variable_error (variable, _("bad minimum"));
00120             goto exit_on_error;
00121         }
00122         variable->rangeminabs = jb_xml_node_get_float_with_default
00123             (node, (const xmlChar *) LABEL_ABSOLUTE_MINIMUM, &error_code,
00124             -G_MAXDOUBLE);
00125         if (!error_code)
00126         {
00127             variable_error (variable, _("bad absolute minimum"));
00128             goto exit_on_error;
00129         }
00130         if (variable->rangemin < variable->rangeminabs)
00131         {
00132             variable_error (variable, _("minimum range not allowed"));
00133             goto exit_on_error;
00134         }
00135     }
00136     else
00137     {
00138         variable_error (variable, _("no minimum range"));
00139         goto exit_on_error;
00140     }
00141     if (xmlHasProp (node, (const xmlChar *) LABEL_MAXIMUM))
00142     {
00143         variable->rangemax
00144             = jb_xml_node_get_float (node, (const xmlChar *) LABEL_MAXIMUM,
00145                                     &error_code);
00146         if (!error_code)
00147         {
00148             variable_error (variable, _("bad maximum"));
00149             goto exit_on_error;
00150         }
00151         variable->rangemaxabs = jb_xml_node_get_float_with_default
00152             (node, (const xmlChar *) LABEL_ABSOLUTE_MAXIMUM, &error_code,
00153             G_MAXDOUBLE);
00154         if (!error_code)

```

```

00169     {
00170         variable_error (variable, _("bad absolute maximum"));
00171         goto exit_on_error;
00172     }
00173     if (variable->rangemax > variable->rangemaxabs)
00174     {
00175         variable_error (variable, _("maximum range not allowed"));
00176         goto exit_on_error;
00177     }
00178     if (variable->rangemax < variable->rangemin)
00179     {
00180         variable_error (variable, _("bad range"));
00181         goto exit_on_error;
00182     }
00183 }
00184 else
00185 {
00186     variable_error (variable, _("no maximum range"));
00187     goto exit_on_error;
00188 }
00189 variable->precision
00190 = jb_xml_node_get_uint_with_default (node,
00191                                     (const xmlChar *) LABEL_PRECISION,
00192                                     &error_code, DEFAULT_PRECISION);
00193 if (!error_code || variable->precision >= NPRECISIONS)
00194 {
00195     variable_error (variable, _("bad precision"));
00196     goto exit_on_error;
00197 }
00198 if (algorithm == ALGORITHM_SWEEP || algorithm == ALGORITHM_ORTHOGONAL)
00199 {
00200     if (xmlHasProp (node, (const xmlChar *) LABEL_NSWEEPS))
00201     {
00202         variable->nsweeps
00203         = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NSWEEPS,
00204                                &error_code);
00205         if (!error_code || !variable->nsweeps)
00206         {
00207             variable_error (variable, _("bad sweeps"));
00208             goto exit_on_error;
00209         }
00210     }
00211     else
00212     {
00213         variable_error (variable, _("no sweeps number"));
00214         goto exit_on_error;
00215     }
00216 #if DEBUG_VARIABLE
00217     fprintf (stderr, "variable_open_xml: nsweeps=%u\n", variable->nsweeps);
00218 #endif
00219 }
00220 if (algorithm == ALGORITHM_GENETIC)
00221 {
00222     // Obtaining bits representing each variable
00223     if (xmlHasProp (node, (const xmlChar *) LABEL_NBITS))
00224     {
00225         variable->nbits
00226         = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NBITS,
00227                                &error_code);
00228         if (!error_code || !variable->nbits)
00229         {
00230             variable_error (variable, _("invalid bits number"));
00231             goto exit_on_error;
00232         }
00233     }
00234     else
00235     {
00236         variable_error (variable, _("no bits number"));
00237         goto exit_on_error;
00238     }
00239 }
00240 else if (nsteps)
00241 {
00242     variable->step
00243     = jb_xml_node_get_float (node, (const xmlChar *) LABEL_STEP,
00244                             &error_code);
00245     if (!error_code || variable->step < 0.)
00246     {
00247         variable_error (variable, _("bad step size"));
00248         goto exit_on_error;
00249     }
00250 }
00251 #if DEBUG_VARIABLE
00252 fprintf (stderr, "variable_open_xml: end\n");
00253 #endif
00254 return 1;

```



```

00256 exit_on_error:
00257     variable_free (variable, INPUT_TYPE_XML);
00258     #if DEBUG_VARIABLE
00259     fprintf (stderr, "variable_open_xml: end\n");
00260     #endif
00261     return 0;
00262 }
00263
00264 int
00270 variable_open_json (Variable * variable,
00271                     JsonNode * node,
00272                     unsigned int algorithm,
00273                     unsigned int nsteps)
00274 {
00275     JsonObject *object;
00276     const char *label;
00277     int error_code;
00278     #if DEBUG_VARIABLE
00279     fprintf (stderr, "variable_open_json: start\n");
00280     #endif
00281     object = json_node_get_object (node);
00282     label = json_object_get_string_member (object, LABEL_NAME);
00283     if (!label)
00284     {
00285         variable_error (variable, _("no name"));
00286         goto exit_on_error;
00287     }
00288     variable->name = g_strdup (label);
00289     if (json_object_get_member (object, LABEL_MINIMUM))
00290     {
00291         variable->rangemin
00292         = jb_json_object_get_float (object, LABEL_MINIMUM, &error_code);
00293         if (!error_code)
00294         {
00295             variable_error (variable, _("bad minimum"));
00296             goto exit_on_error;
00297         }
00298         variable->rangeminabs
00299         = jb_json_object_get_float_with_default (object, LABEL_ABSOLUTE_MINIMUM,
00300                                                 &error_code, -G_MAXDOUBLE);
00301         if (!error_code)
00302         {
00303             variable_error (variable, _("bad absolute minimum"));
00304             goto exit_on_error;
00305         }
00306         if (variable->rangemin < variable->rangeminabs)
00307         {
00308             variable_error (variable, _("minimum range not allowed"));
00309             goto exit_on_error;
00310         }
00311     }
00312     else
00313     {
00314         variable_error (variable, _("no minimum range"));
00315         goto exit_on_error;
00316     }
00317     if (json_object_get_member (object, LABEL_MAXIMUM))
00318     {
00319         variable->rangemax
00320         = jb_json_object_get_float (object, LABEL_MAXIMUM, &error_code);
00321         if (!error_code)
00322         {
00323             variable_error (variable, _("bad maximum"));
00324             goto exit_on_error;
00325         }
00326         variable->rangemaxabs
00327         = jb_json_object_get_float_with_default (object, LABEL_ABSOLUTE_MAXIMUM,
00328                                                 &error_code, G_MAXDOUBLE);
00329         if (!error_code)
00330         {
00331             variable_error (variable, _("bad absolute maximum"));
00332             goto exit_on_error;
00333         }
00334         if (variable->rangemax > variable->rangemaxabs)
00335         {
00336             variable_error (variable, _("maximum range not allowed"));
00337             goto exit_on_error;
00338         }
00339         if (variable->rangemax < variable->rangemin)
00340         {
00341             variable_error (variable, _("bad range"));
00342             goto exit_on_error;
00343         }
00344     }
00345     else
00346     {
00347         variable_error (variable, _("no maximum range"));
00348     }

```

```

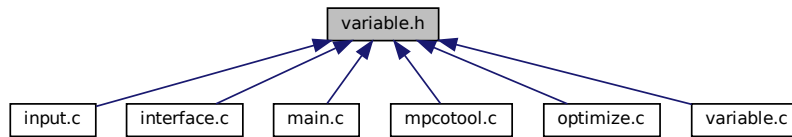
00349     goto exit_on_error;
00350 }
00351 variable->precision
00352 = jb_json_object_get_uint_with_default (object, LABEL_PRECISION,
00353                                         &error_code, DEFAULT_PRECISION);
00354 if (!error_code || variable->precision >= NPRECISIONS)
00355 {
00356     variable_error (variable, _("bad precision"));
00357     goto exit_on_error;
00358 }
00359 if (algorithm == ALGORITHM_SWEEP || algorithm == ALGORITHM_ORTHOGONAL)
00360 {
00361     if (json_object_get_member (object, LABEL_NSWEEPS))
00362     {
00363         variable->nsweeps
00364         = jb_json_object_get_uint (object, LABEL_NSWEEPS, &error_code);
00365         if (!error_code || !variable->nsweeps)
00366         {
00367             variable_error (variable, _("bad sweeps"));
00368             goto exit_on_error;
00369         }
00370     }
00371     else
00372     {
00373         variable_error (variable, _("no sweeps number"));
00374         goto exit_on_error;
00375     }
00376 #if DEBUG_VARIABLE
00377     fprintf (stderr, "variable_open_json:  nsweeps=%u\n", variable->nsweeps);
00378 #endif
00379 }
00380 if (algorithm == ALGORITHM_GENETIC)
00381 {
00382     // Obtaining bits representing each variable
00383     if (json_object_get_member (object, LABEL_NBITS))
00384     {
00385         variable->nbits
00386         = jb_json_object_get_uint (object, LABEL_NBITS, &error_code);
00387         if (!error_code || !variable->nbits)
00388         {
00389             variable_error (variable, _("invalid bits number"));
00390             goto exit_on_error;
00391         }
00392     }
00393     else
00394     {
00395         variable_error (variable, _("no bits number"));
00396         goto exit_on_error;
00397     }
00398 }
00399 else if (nsteps)
00400 {
00401     variable->step
00402     = jb_json_object_get_float (object, LABEL_STEP, &error_code);
00403     if (!error_code || variable->step < 0.)
00404     {
00405         variable_error (variable, _("bad step size"));
00406         goto exit_on_error;
00407     }
00408 }
00409
00410 #if DEBUG_VARIABLE
00411     fprintf (stderr, "variable_open_json:  end\n");
00412 #endif
00413 return 1;
00414 exit_on_error:
00415     variable_free (variable, INPUT_TYPE_JSON);
00416 #if DEBUG_VARIABLE
00417     fprintf (stderr, "variable_open_json:  end\n");
00418 #endif
00419 return 0;
00420 }

```

5.31 variable.h File Reference

Header file to define the variable data.

This graph shows which files directly or indirectly include this file:



Data Structures

- struct [Variable](#)

Struct to define the variable data.

Enumerations

- enum [Algorithm](#) { [ALGORITHM_MONTE_CARLO](#) = 0 , [ALGORITHM_SWEEP](#) = 1 , [ALGORITHM_GENETIC](#) = 2 , [ALGORITHM_ORTHOGONAL](#) = 3 }

Enum to define the algorithms.

Functions

- void [variable_free](#) ([Variable](#) *variable, unsigned int type)
- void [variable_error](#) ([Variable](#) *variable, char *message)
- int [variable_open_xml](#) ([Variable](#) *variable, xmlDoc *node, unsigned int algorithm, unsigned int nsteps)
- int [variable_open_json](#) ([Variable](#) *variable, cJSON *node, unsigned int algorithm, unsigned int nsteps)

Variables

- const char * [format](#) [[NPRECISIONS](#)]
Array of C-strings with variable formats.
- const double [precision](#) [[NPRECISIONS](#)]
Array of variable precisions.

5.31.1 Detailed Description

Header file to define the variable data.

Authors

Javier Burguete.

Copyright

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Definition in file [variable.h](#).

5.31.2 Enumeration Type Documentation

5.31.2.1 Algorithm

enum [Algorithm](#)

Enum to define the algorithms.

Enumerator

ALGORITHM_MONTE_CARLO	Monte-Carlo algorithm.
ALGORITHM_SWEEP	Sweep algorithm.
ALGORITHM_GENETIC	Genetic algorithm.
ALGORITHM_ORTHOGONAL	Orthogonal sampling algorithm.

Definition at line 42 of file [variable.h](#).

```
00043 {
00044     ALGORITHM_MONTE_CARLO = 0,
00045     ALGORITHM_SWEEP = 1,
00046     ALGORITHM_GENETIC = 2,
00047     ALGORITHM_ORTHOGONAL = 3
00048 };
```

5.31.3 Function Documentation

5.31.3.1 variable_error()

```
void variable_error (
    Variable * variable,
    char * message )
```

Function to print a message error opening an [Variable](#) struct.

Parameters

<i>variable</i>	Variable struct.
<i>message</i>	Error message.

Definition at line 88 of file [variable.c](#).

```
00092 {
00093     char buffer[64];
00094     if (!variable->name)
00095         snprintf (buffer, 64, "%s: %s", _("Variable"), message);
00096     else
00097         snprintf (buffer, 64, "%s %s: %s", _("Variable"), variable->name, message);
00098     error_message = g_strdup (buffer);
00099 }
```

5.31.3.2 variable_free()

```
void variable_free (
    Variable * variable,
    unsigned int type )
```

Function to free the memory of a [Variable](#) struct.

Parameters

<i>variable</i>	Variable struct.
<i>type</i>	Type of input file.

Definition at line 67 of file [variable.c](#).

```
00071 {
00072 #if DEBUG_VARIABLE
00073     fprintf (stderr, "variable_free: start\n");
00074 #endif
00075     if (type == INPUT_TYPE_XML)
00076         xmlFree (variable->name);
00077     else
00078         g_free (variable->name);
00079 #if DEBUG_VARIABLE
00080     fprintf (stderr, "variable_free: end\n");
00081 #endif
00082 }
```

5.31.3.3 variable_open_json()

```
int variable_open_json (
    Variable * variable,
    JsonNode * node,
    unsigned int algorithm,
    unsigned int nsteps )
```

Function to open the variable file.

Returns

1 on success, 0 on error.

Parameters

<i>variable</i>	Variable struct.
<i>node</i>	XML node.
<i>algorithm</i>	Algorithm type.
<i>nsteps</i>	Number of steps to do the hill climbing method.

Definition at line 270 of file [variable.c](#).

```
00275 {
00276     JsonObject *object;
```

```

00277     const char *label;
00278     int error_code;
00279 #if DEBUG_VARIABLE
00280     fprintf (stderr, "variable_open_json: start\n");
00281 #endif
00282     object = json_node_get_object (node);
00283     label = json_object_get_string_member (object, LABEL_NAME);
00284     if (!label)
00285     {
00286         variable_error (variable, _("no name"));
00287         goto exit_on_error;
00288     }
00289     variable->name = g_strdup (label);
00290     if (json_object_get_member (object, LABEL_MINIMUM))
00291     {
00292         variable->rangemin
00293         = jb_json_object_get_float (object, LABEL_MINIMUM, &error_code);
00294         if (!error_code)
00295         {
00296             variable_error (variable, _("bad minimum"));
00297             goto exit_on_error;
00298         }
00299         variable->rangeminabs
00300         = jb_json_object_get_float_with_default (object, LABEL_ABSOLUTE_MINIMUM,
00301                                                 &error_code, -G_MAXDOUBLE);
00302         if (!error_code)
00303         {
00304             variable_error (variable, _("bad absolute minimum"));
00305             goto exit_on_error;
00306         }
00307         if (variable->rangemin < variable->rangeminabs)
00308         {
00309             variable_error (variable, _("minimum range not allowed"));
00310             goto exit_on_error;
00311         }
00312     }
00313     else
00314     {
00315         variable_error (variable, _("no minimum range"));
00316         goto exit_on_error;
00317     }
00318     if (json_object_get_member (object, LABEL_MAXIMUM))
00319     {
00320         variable->rangemax
00321         = jb_json_object_get_float (object, LABEL_MAXIMUM, &error_code);
00322         if (!error_code)
00323         {
00324             variable_error (variable, _("bad maximum"));
00325             goto exit_on_error;
00326         }
00327         variable->rangemaxabs
00328         = jb_json_object_get_float_with_default (object, LABEL_ABSOLUTE_MAXIMUM,
00329                                                 &error_code, G_MAXDOUBLE);
00330         if (!error_code)
00331         {
00332             variable_error (variable, _("bad absolute maximum"));
00333             goto exit_on_error;
00334         }
00335         if (variable->rangemax > variable->rangemaxabs)
00336         {
00337             variable_error (variable, _("maximum range not allowed"));
00338             goto exit_on_error;
00339         }
00340         if (variable->rangemax < variable->rangemin)
00341         {
00342             variable_error (variable, _("bad range"));
00343             goto exit_on_error;
00344         }
00345     }
00346     else
00347     {
00348         variable_error (variable, _("no maximum range"));
00349         goto exit_on_error;
00350     }
00351     variable->precision
00352     = jb_json_object_get_uint_with_default (object, LABEL_PRECISION,
00353                                           &error_code, DEFAULT_PRECISION);
00354     if (!error_code || variable->precision >= NPRECISIONS)
00355     {
00356         variable_error (variable, _("bad precision"));
00357         goto exit_on_error;
00358     }
00359     if (algorithm == ALGORITHM_SWEEP || algorithm == ALGORITHM_ORTHOGONAL)
00360     {
00361         if (json_object_get_member (object, LABEL_NSWEEPS))
00362         {
00363             variable->nsweeps

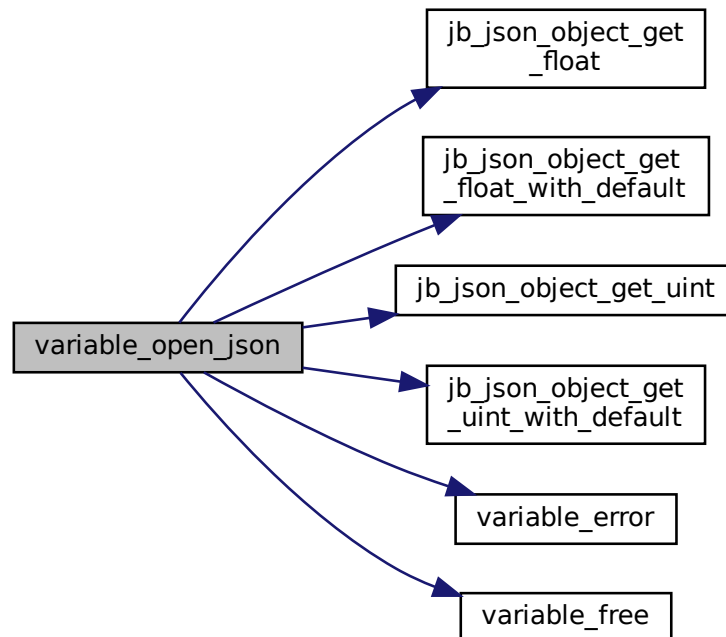
```

```

00364         = jb_json_object_get_uint (object, LABEL_NSWEEPS, &error_code);
00365     if (!error_code || !variable->nsweeps)
00366     {
00367         variable_error (variable, _("bad sweeps"));
00368         goto exit_on_error;
00369     }
00370 }
00371 else
00372 {
00373     variable_error (variable, _("no sweeps number"));
00374     goto exit_on_error;
00375 }
00376 #if DEBUG_VARIABLE
00377     fprintf (stderr, "variable_open_json:  nsweeps=%u\n", variable->nsweeps);
00378 #endif
00379 }
00380 if (algorithm == ALGORITHM_GENETIC)
00381 {
00382     // Obtaining bits representing each variable
00383     if (json_object_get_member (object, LABEL_NBITS))
00384     {
00385         variable->nbits
00386         = jb_json_object_get_uint (object, LABEL_NBITS, &error_code);
00387         if (!error_code || !variable->nbits)
00388         {
00389             variable_error (variable, _("invalid bits number"));
00390             goto exit_on_error;
00391         }
00392     }
00393     else
00394     {
00395         variable_error (variable, _("no bits number"));
00396         goto exit_on_error;
00397     }
00398 }
00399 else if (nsteps)
00400 {
00401     variable->step
00402     = jb_json_object_get_float (object, LABEL_STEP, &error_code);
00403     if (!error_code || variable->step < 0.)
00404     {
00405         variable_error (variable, _("bad step size"));
00406         goto exit_on_error;
00407     }
00408 }
00409
00410 #if DEBUG_VARIABLE
00411     fprintf (stderr, "variable_open_json:  end\n");
00412 #endif
00413     return 1;
00414 exit_on_error:
00415     variable_free (variable, INPUT_TYPE_JSON);
00416 #if DEBUG_VARIABLE
00417     fprintf (stderr, "variable_open_json:  end\n");
00418 #endif
00419     return 0;
00420 }

```

Here is the call graph for this function:



5.31.3.4 variable_open_xml()

```

int variable_open_xml (
    Variable * variable,
    xmlNode * node,
    unsigned int algorithm,
    unsigned int nsteps )

```

Function to open the variable file.

Returns

1 on success, 0 on error.

Parameters

<i>variable</i>	Variable struct.
<i>node</i>	XML node.
<i>algorithm</i>	Algorithm type.
<i>nsteps</i>	Number of steps to do the hill climbing method.

Definition at line 107 of file [variable.c](#).

```

00112 {
00113     int error_code;
00114
00115     #if DEBUG_VARIABLE
00116     fprintf (stderr, "variable_open_xml: start\n");
00117     #endif
00118
00119     variable->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00120     if (!variable->name)
00121     {
00122         variable_error (variable, _("no name"));
00123         goto exit_on_error;
00124     }
00125     if (xmlHasProp (node, (const xmlChar *) LABEL_MINIMUM))
00126     {
00127         variable->rangemin
00128             = jb_xml_node_get_float (node, (const xmlChar *) LABEL_MINIMUM,
00129                                     &error_code);
00130         if (!error_code)
00131         {
00132             variable_error (variable, _("bad minimum"));
00133             goto exit_on_error;
00134         }
00135         variable->rangeminabs = jb_xml_node_get_float_with_default
00136             (node, (const xmlChar *) LABEL_ABSOLUTE_MINIMUM, &error_code,
00137             -G_MAXDOUBLE);
00138         if (!error_code)
00139         {
00140             variable_error (variable, _("bad absolute minimum"));
00141             goto exit_on_error;
00142         }
00143     }
00144     if (variable->rangemin < variable->rangeminabs)
00145     {
00146         variable_error (variable, _("minimum range not allowed"));
00147         goto exit_on_error;
00148     }
00149 }
00150 else
00151 {
00152     variable_error (variable, _("no minimum range"));
00153     goto exit_on_error;
00154 }
00155 if (xmlHasProp (node, (const xmlChar *) LABEL_MAXIMUM))
00156 {
00157     variable->rangemax
00158         = jb_xml_node_get_float (node, (const xmlChar *) LABEL_MAXIMUM,
00159                                 &error_code);
00160     if (!error_code)
00161     {
00162         variable_error (variable, _("bad maximum"));
00163         goto exit_on_error;
00164     }
00165     variable->rangemaxabs = jb_xml_node_get_float_with_default
00166         (node, (const xmlChar *) LABEL_ABSOLUTE_MAXIMUM, &error_code,
00167         G_MAXDOUBLE);
00168     if (!error_code)
00169     {
00170         variable_error (variable, _("bad absolute maximum"));
00171         goto exit_on_error;
00172     }
00173     if (variable->rangemax > variable->rangemaxabs)
00174     {
00175         variable_error (variable, _("maximum range not allowed"));
00176         goto exit_on_error;
00177     }
00178     if (variable->rangemax < variable->rangemin)
00179     {
00180         variable_error (variable, _("bad range"));
00181         goto exit_on_error;
00182     }
00183 }
00184 else
00185 {
00186     variable_error (variable, _("no maximum range"));
00187     goto exit_on_error;
00188 }
00189 variable->precision
00190     = jb_xml_node_get_uint_with_default (node,
00191                                         (const xmlChar *) LABEL_PRECISION,
00192                                         &error_code, DEFAULT_PRECISION);
00193 if (!error_code || variable->precision >= NPRECISIONS)
00194 {
00195     variable_error (variable, _("bad precision"));
00196     goto exit_on_error;
00197 }

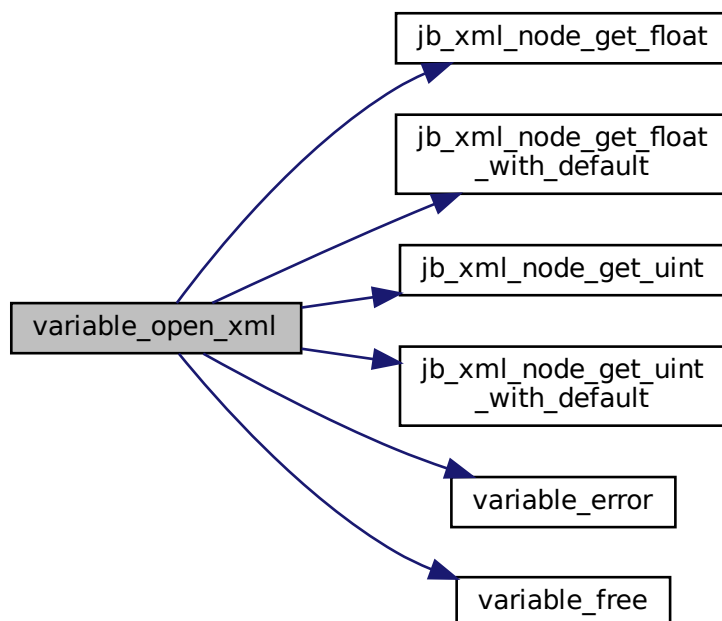
```

```

00198     if (algorithm == ALGORITHM_SWEEP || algorithm == ALGORITHM_ORTHOGONAL)
00199     {
00200         if (xmlHasProp (node, (const xmlChar *) LABEL_NSWEEPS))
00201         {
00202             variable->nsweeps
00203             = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NSWEEPS,
00204                                     &error_code);
00205             if (!error_code || !variable->nsweeps)
00206             {
00207                 variable_error (variable, _("bad sweeps"));
00208                 goto exit_on_error;
00209             }
00210         }
00211         else
00212         {
00213             variable_error (variable, _("no sweeps number"));
00214             goto exit_on_error;
00215         }
00216 #if DEBUG_VARIABLE
00217         fprintf (stderr, "variable_open_xml: nsweeps=%u\n", variable->nsweeps);
00218 #endif
00219     }
00220     if (algorithm == ALGORITHM_GENETIC)
00221     {
00222         // Obtaining bits representing each variable
00223         if (xmlHasProp (node, (const xmlChar *) LABEL_NBITS))
00224         {
00225             variable->nbits
00226             = jb_xml_node_get_uint (node, (const xmlChar *) LABEL_NBITS,
00227                                     &error_code);
00228             if (!error_code || !variable->nbits)
00229             {
00230                 variable_error (variable, _("invalid bits number"));
00231                 goto exit_on_error;
00232             }
00233         }
00234         else
00235         {
00236             variable_error (variable, _("no bits number"));
00237             goto exit_on_error;
00238         }
00239     }
00240     else if (nsteps)
00241     {
00242         variable->step
00243         = jb_xml_node_get_float (node, (const xmlChar *) LABEL_STEP,
00244                                 &error_code);
00245         if (!error_code || variable->step < 0.)
00246         {
00247             variable_error (variable, _("bad step size"));
00248             goto exit_on_error;
00249         }
00250     }
00251 #if DEBUG_VARIABLE
00252     fprintf (stderr, "variable_open_xml: end\n");
00253 #endif
00254     return 1;
00255 exit_on_error:
00256     variable_free (variable, INPUT_TYPE_XML);
00257 #if DEBUG_VARIABLE
00258     fprintf (stderr, "variable_open_xml: end\n");
00259 #endif
00260     return 0;
00261 }

```

Here is the call graph for this function:



5.31.4 Variable Documentation

5.31.4.1 format

```
const char* format[NPRECISIONS] [extern]
```

Array of C-strings with variable formats.

Definition at line 53 of file [variable.c](#).

5.31.4.2 precision

```
const double precision[NPRECISIONS] [extern]
```

Array of variable precisions.

Definition at line 58 of file [variable.c](#).

5.32 variable.h

[Go to the documentation of this file.](#)

```

00001  /*
00002  MPCOTool:
00003  The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004  calibrations or optimizations of empirical parameters.
00005
00006  AUTHORS: Javier Burguete and Borja Latorre.
00007
00008  Copyright 2012-2023, AUTHORS.
00009
00010  Redistribution and use in source and binary forms, with or without modification,
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00020  THIS SOFTWARE IS PROVIDED BY AUTHORS "AS IS" AND ANY EXPRESS OR IMPLIED
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00022  MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
00023  SHALL AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
00024  SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
00025  PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
00026  BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
00027  CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING
00028  IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY
00029  OF SUCH DAMAGE.
00030  */
00031
00032 #ifndef VARIABLE__H
00033 #define VARIABLE__H 1
00034
00035 enum Algorithm
00036 {
00037     ALGORITHM_MONTE_CARLO = 0,
00038     ALGORITHM_SWEEP = 1,
00039     ALGORITHM_GENETIC = 2,
00040     ALGORITHM_ORTHOGONAL = 3
00041 };
00042
00043 typedef struct
00044 {
00045     char *name;
00046     double rangemin;
00047     double rangemax;
00048     double rangeminabs;
00049     double rangemaxabs;
00050     double step;
00051     unsigned int precision;
00052     unsigned int nsweeps;
00053     unsigned int nbits;
00054 } Variable;
00055
00056 extern const char *format[NPRECISIONS];
00057 extern const double precision[NPRECISIONS];
00058
00059 // Public functions
00060 void variable_free (Variable * variable, unsigned int type);
00061 void variable_error (Variable * variable, char *message);
00062 int variable_open_xml (Variable * variable, xmlNode * node,
00063                       unsigned int algorithm, unsigned int nsteps);
00064 int variable_open_json (Variable * variable, JsonNode * node,
00065                        unsigned int algorithm, unsigned int nsteps);
00066
00067 #endif

```

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