

MPCOTool

4.0.1

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# Chapter 1

## Data Structure Index

### 1.1 Data Structures

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## Chapter 2

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## Chapter 3

# Data Structure Documentation

### 3.1 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.*

#### 3.1.1 Detailed Description

Struct to define the experiment data.

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

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

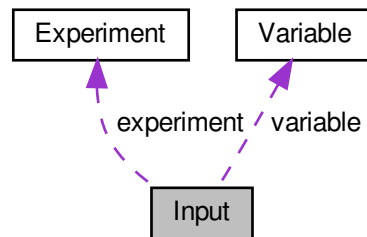
- [experiment.h](#)

## 3.2 Input Struct Reference

Struct to define the optimization input file.

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

Collaboration diagram for Input:



### Data Fields

- [Experiment](#) \* [experiment](#)  
*Array of 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.*

### 3.2.1 Detailed Description

Struct to define the optimization input file.

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

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

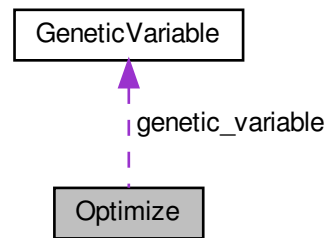
- [input.h](#)

## 3.3 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.*

### 3.3.1 Detailed Description

Struct to define the optimization ation data.

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

### 3.3.2 Field Documentation

#### 3.3.2.1 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](#).

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

- [optimize.h](#)



## 3.4 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.*

### 3.4.1 Detailed Description

Struct to define the options dialog.

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

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

- [interface.h](#)

## 3.5 ParallelData Struct Reference

Struct to pass to the GThreads parallelized function.

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

### Data Fields

- `unsigned int thread`  
*Thread number.*

### 3.5.1 Detailed Description

Struct to pass to the GThreads parallelized function.

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

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

- [optimize.h](#)

## 3.6 Running Struct Reference

Struct to define the running dialog.

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

### Data Fields

- `GtkDialog * dialog`  
*Main GtkDialog.*
- `GtkLabel * label`  
*Label GtkLabel.*
- `GtkSpinner * spinner`  
*Animation GtkSpinner.*
- `GtkGrid * grid`  
*Grid GtkGrid.*

### 3.6.1 Detailed Description

Struct to define the running dialog.

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

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

- [interface.h](#)

## 3.7 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.*

### 3.7.1 Detailed Description

Struct to define the variable data.

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

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

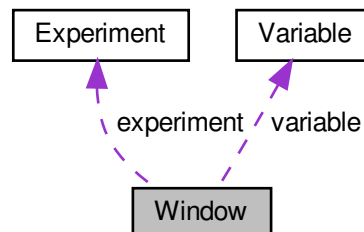
- [variable.h](#)

## 3.8 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 \* [bar\\_buttons](#)  
*GtkToolbar 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](#)  
*GtkGrid to set the error norm.*
- GtkWidget \* [button\\_norm](#) [NNORMS]  
*Array of GtkButtons to set the error norm.*
- GtkWidget \* [label\\_p](#)  
*GtkLabel 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 *GtkButtons* 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]  
*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.*
- GtkWidget \* [scrolled\\_maxabs](#)
  - Absolute maximum GtkWidget.*
- GtkWidget \* [label\\_precision](#)
  - Precision GtkWidget.*
- GtkWidget \* [spin\\_precision](#)
  - Precision digits GtkWidget.*
- GtkWidget \* [label\\_sweeps](#)
  - Sweeps number GtkWidget.*
- GtkWidget \* [spin\\_sweeps](#)
  - Sweeps number GtkWidget.*
- GtkWidget \* [label\\_bits](#)
  - Bits number GtkWidget.*
- GtkWidget \* [spin\\_bits](#)
  - Bits number GtkWidget.*
- GtkWidget \* [label\\_step](#)
  - GtkWidget to set the step.*
- GtkWidget \* [spin\\_step](#)
  - GtkWidget to set the step.*
- GtkWidget \* [scrolled\\_step](#)
  - step GtkWidget.*
- GtkWidget \* [frame\\_experiment](#)
  - Experiment GtkWidget.*
- GtkWidget \* [grid\\_experiment](#)
  - Experiment GtkWidget.*
- GtkWidget \* [combo\\_experiment](#)
  - Experiment GtkWidgetEntry.*
- GtkWidget \* [button\\_add\\_experiment](#)
  - GtkWidget to add a experiment.*
- GtkWidget \* [button\\_remove\\_experiment](#)
  - GtkWidget to remove a experiment.*
- GtkWidget \* [label\\_experiment](#)
  - Experiment GtkWidget.*
- GtkWidget \* [button\\_experiment](#)
  - GtkFileChooserButton to set the experimental data file.*
- GtkWidget \* [label\\_weight](#)
  - Weight GtkWidget.*
- GtkWidget \* [spin\\_weight](#)
  - Weight GtkWidget.*
- GtkWidget \* [check\\_template](#) [MAX\_NINPUTS]
  - Array of GtkWidgetButtons to set the input templates.*
- GtkWidget \* [button\\_template](#) [MAX\_NINPUTS]
  - Array of GtkFileChooserButtons 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.*

### 3.8.1 Detailed Description

Struct to define the main window.

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

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

- [interface.h](#)



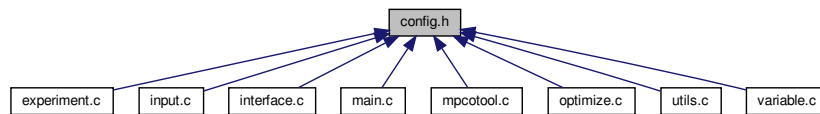
## Chapter 4

# File Documentation

### 4.1 config.h File Reference

Configuration header file.

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



### Macros

- `#define _(string) (gettext(string))`
- `#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 "adaptation"  
*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.*

### 4.1.1 Detailed Description

Configuration header file.

#### Authors

Javier Burguete and Borja Latorre.

#### Copyright

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

### 4.1.2 Enumeration Type Documentation

#### 4.1.2.1 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 126 of file [config.h](#).

```

00127 {
00128     INPUT_TYPE_XML = 0,
00129     INPUT_TYPE_JSON = 1
00130 };

```

## 4.2 config.h

```

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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00017     2. Redistributions in binary form must reproduce the above copyright notice,
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00023 MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
00024 SHALL AUTHORS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
00025 SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,
00026 PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
00027 BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
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
00039 #ifndef CONFIG__H
00040 #define CONFIG__H 1
00041
00042 // Gettext simplification
00043 #define _(string) (gettext(string))
00044
00045 // Array sizes
00046
00047 #define MAX_NINPUTS 8
00048 #define NALGORITHMS 4
00050 #define NCLIMBINGS 2
00051 #define NNORMS 4
00052 #define NPRECISIONS 15
00053
00054 // Default choices
00055
00056 #define DEFAULT_PRECISION (NPRECISIONS - 1)
00057 #define DEFAULT_RANDOM_SEED 7007
00058 #define DEFAULT_RELAXATION 1.
00059
00060 // Interface labels
00061
00062 #define LOCALE_DIR "locales"
00063 #define PROGRAM_INTERFACE "mpcotool"
00064
00065 // Labels
00066
00067 #define LABEL_ABSOLUTE_MINIMUM "absolute_minimum"
00068 #define LABEL_ABSOLUTE_MAXIMUM "absolute_maximum"
00070 #define LABEL_ADAPTATION "adaptation"
00072 #define LABEL_ALGORITHM "algorithm"
00073 #define LABEL_CLIMBING "climbing"
00074 #define LABEL_COORDINATES "coordinates"
00075 #define LABEL_EUCLIDIAN "euclidian"
00076 #define LABEL_EVALUATOR "evaluator"
00077 #define LABEL_EXPERIMENT "experiment"
00078 #define LABEL_EXPERIMENTS "experiments"
00079 #define LABEL_GENETIC "genetic"
00080 #define LABEL_MINIMUM "minimum"
00081 #define LABEL_MAXIMUM "maximum"
00082 #define LABEL_MONTE_CARLO "Monte-Carlo"
00083 #define LABEL_MUTATION "mutation"
00084 #define LABEL_NAME "name"

```

```

00085 #define LABEL_NBEST "nbest"
00086 #define LABEL_NBITS "nbits"
00087 #define LABEL_NESTIMATES "nestimates"
00088 #define LABEL_NGENERATIONS "ngenerations"
00089 #define LABEL_NITERATIONS "niterations"
00090 #define LABEL_NORM "norm"
00091 #define LABEL_NPOPULATION "npopulation"
00092 #define LABEL_NSIMULATIONS "nsimulations"
00093 #define LABEL_NSTEPS "nsteps"
00094 #define LABEL_NSWEEPS "nsweeps"
00095 #define LABEL_OPTIMIZE "optimize"
00096 #define LABEL_ORTHOGONAL "orthogonal"
00097 #define LABEL_P "p"
00098 #define LABEL_PRECISION "precision"
00099 #define LABEL_RANDOM "random"
00100 #define LABEL_RELAXATION "relaxation"
00101 #define LABEL_REPRODUCTION "reproduction"
00102 #define LABEL_RESULT_FILE "result_file"
00103 #define LABEL_SIMULATOR "simulator"
00104 #define LABEL_SEED "seed"
00105 #define LABEL_STEP "step"
00106 #define LABEL_SWEEP "sweep"
00107 #define LABEL_TAXICAB "taxicab"
00108 #define LABEL_TEMPLATE1 "template1"
00109 #define LABEL_TEMPLATE2 "template2"
00110 #define LABEL_TEMPLATE3 "template3"
00111 #define LABEL_TEMPLATE4 "template4"
00112 #define LABEL_TEMPLATE5 "template5"
00113 #define LABEL_TEMPLATE6 "template6"
00114 #define LABEL_TEMPLATE7 "template7"
00115 #define LABEL_TEMPLATE8 "template8"
00116 #define LABEL_THRESHOLD "threshold"
00117 #define LABEL_TOLERANCE "tolerance"
00118 #define LABEL_VARIABLE "variable"
00119 #define LABEL_VARIABLES "variables"
00120 #define LABEL_VARIABLES_FILE "variables_file"
00121 #define LABEL_WEIGHT "weight"
00122
00123 // Enumerations
00124
00126 enum INPUT_TYPE
00127 {
00128     INPUT_TYPE_XML = 0,
00129     INPUT_TYPE_JSON = 1
00130 };
00131
00132 #endif

```

### 4.3 experiment.c File Reference

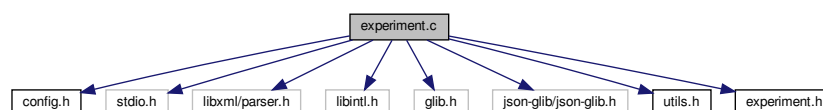
Source file to define the experiment data.

```

#include "config.h"
#include <stdio.h>
#include <libxml/parser.h>
#include <libintl.h>
#include <glib.h>
#include <json-glib/json-glib.h>
#include "utils.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.*

### 4.3.1 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](#).

### 4.3.2 Function Documentation

#### 4.3.2.1 [experiment\\_error\(\)](#)

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

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

## Parameters

<i>experiment</i>	<a href="#">Experiment</a> struct.
<i>message</i>	Error message.

Definition at line 109 of file [experiment.c](#).

```

00111 {
00112     char buffer[64];
00113     if (!experiment->name)
00114         snprintf (buffer, 64, "%s: %s", _("Experiment"), message);
00115     else
00116         snprintf (buffer, 64, "%s %s: %s", _("Experiment"),
00117                 experiment->name, message);
00118     error_message = g_strdup (buffer);
00119 }
```

4.3.2.2 `experiment_free()`

```

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

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

## Parameters

<i>experiment</i>	<a href="#">Experiment</a> struct.
<i>type</i>	Type of input file.

Definition at line 80 of file [experiment.c](#).

```

00082 {
00083     unsigned int i;
00084     #if DEBUG_EXPERIMENT
00085     fprintf (stderr, "experiment_free: start\n");
00086     #endif
00087     if (type == INPUT_TYPE_XML)
00088     {
00089         for (i = 0; i < experiment->ninputs; ++i)
00090             xmlFree (experiment->stencil[i]);
00091         xmlFree (experiment->name);
00092     }
00093     else
00094     {
00095         for (i = 0; i < experiment->ninputs; ++i)
00096             g_free (experiment->stencil[i]);
00097         g_free (experiment->name);
00098     }
00099     experiment->ninputs = 0;
00100     #if DEBUG_EXPERIMENT
00101     fprintf (stderr, "experiment_free: end\n");
00102     #endif
00103 }
```



## 4.3.2.3 experiment\_new()

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

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

## Parameters

<i>experiment</i>	<a href="#">Experiment</a> struct.
-------------------	------------------------------------

Definition at line 61 of file [experiment.c](#).

```
00062 {
00063     unsigned int i;
00064     #if DEBUG_EXPERIMENT
00065         fprintf (stderr, "experiment_new: start\n");
00066     #endif
00067     experiment->name = NULL;
00068     experiment->ninputs = 0;
00069     for (i = 0; i < MAX_NINPUTS; ++i)
00070         experiment->stencil[i] = NULL;
00071     #if DEBUG_EXPERIMENT
00072         fprintf (stderr, "input_new: end\n");
00073     #endif
00074 }
```

## 4.3.2.4 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>	<a href="#">Experiment</a> struct.
<i>node</i>	JSON node.
<i>ninputs</i>	Number of the simulator input files.

Definition at line 231 of file [experiment.c](#).

```
00235 {
00236     char buffer[64];
00237     JsonObject *object;
00238     const char *name;
00239     int error_code;
```

```

00240     unsigned int i;
00241
00242     #if DEBUG_EXPERIMENT
00243         fprintf (stderr, "experiment_open_json: start\n");
00244     #endif
00245
00246     // Resetting experiment data
00247     experiment_new (experiment);
00248
00249     // Getting JSON object
00250     object = json_node_get_object (node);
00251
00252     // Reading the experimental data
00253     name = json_object_get_string_member (object, LABEL_NAME);
00254     if (!name)
00255     {
00256         experiment_error (experiment, _("no data file name"));
00257         goto exit_on_error;
00258     }
00259     experiment->name = g_strdup (name);
00260     #if DEBUG_EXPERIMENT
00261         fprintf (stderr, "experiment_open_json: name=%s\n", experiment->name);
00262     #endif
00263     experiment->weight
00264     = json_object_get_float_with_default (object,
00265     LABEL_WEIGHT, 1.,
00266     &error_code);
00267     if (error_code)
00268     {
00269         experiment_error (experiment, _("bad weight"));
00270         goto exit_on_error;
00271     }
00272     #if DEBUG_EXPERIMENT
00273         fprintf (stderr, "experiment_open_json: weight=%lg\n", experiment->weight);
00274     #endif
00275     name = json_object_get_string_member (object, stencil[0]);
00276     if (name)
00277     {
00278         #if DEBUG_EXPERIMENT
00279             fprintf (stderr, "experiment_open_json: experiment=%s template1=%s\n",
00280             name, stencil[0]);
00281         #endif
00282         ++experiment->ninputs;
00283     }
00284     else
00285     {
00286         experiment_error (experiment, _("no template"));
00287         goto exit_on_error;
00288     }
00289     experiment->stencil[0] = g_strdup (name);
00290     for (i = 1; i < MAX_NINPUTS; ++i)
00291     {
00292         #if DEBUG_EXPERIMENT
00293             fprintf (stderr, "experiment_open_json: stencil%u\n", i + 1);
00294         #endif
00295         if (json_object_get_member (object, stencil[i]))
00296         {
00297             if (ninputs && ninputs <= i)
00298             {
00299                 experiment_error (experiment, _("bad templates number"));
00300                 goto exit_on_error;
00301             }
00302             name = json_object_get_string_member (object, stencil[i]);
00303             #if DEBUG_EXPERIMENT
00304                 fprintf (stderr,
00305                 "experiment_open_json: experiment=%s stencil%u=%s\n",
00306                 experiment->nexperiments, name, stencil[i]);
00307             #endif
00308             experiment->stencil[i] = g_strdup (name);
00309             ++experiment->ninputs;
00310         }
00311         else if (ninputs && ninputs > i)
00312         {
00313             snprintf (buffer, 64, "%s%u", _("no template"), i + 1);
00314             experiment_error (experiment, buffer);
00315             goto exit_on_error;
00316         }
00317         else
00318             break;
00319     }
00320     #if DEBUG_EXPERIMENT
00321         fprintf (stderr, "experiment_open_json: end\n");
00322     #endif
00323     return 1;
00324
00325 exit_on_error:

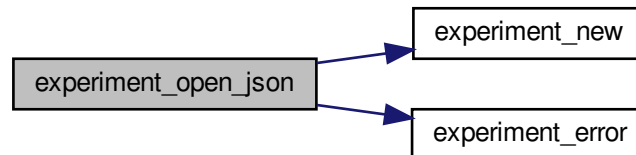
```

```

00326     experiment_free (experiment, INPUT_TYPE_JSON);
00327     #if DEBUG_EXPERIMENT
00328     fprintf (stderr, "experiment_open_json: end\n");
00329     #endif
00330     return 0;
00331 }

```

Here is the call graph for this function:



#### 4.3.2.5 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>	<a href="#">Experiment</a> struct.
<i>node</i>	XML node.
<i>ninputs</i>	Number of the simulator input files.

Definition at line 127 of file [experiment.c](#).

```

00131 {
00132     char buffer[64];
00133     int error_code;
00134     unsigned int i;
00135
00136     #if DEBUG_EXPERIMENT
00137     fprintf (stderr, "experiment_open_xml: start\n");
00138     #endif
00139
00140     // Resetting experiment data
00141     experiment_new (experiment);

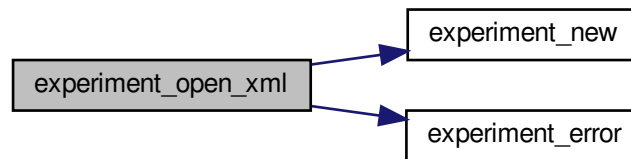
```

```

00142
00143 // Reading the experimental data
00144 experiment->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00145 if (!experiment->name)
00146 {
00147     experiment_error (experiment, _("no data file name"));
00148     goto exit_on_error;
00149 }
00150 #if DEBUG_EXPERIMENT
00151 fprintf (stderr, "experiment_open_xml: name=%s\n", experiment->name);
00152 #endif
00153 experiment->weight
00154 =
00155     xml_node_get_float_with_default (node, (const xmlChar *)
LABEL_WEIGHT, 1.,
00156                                     &error_code);
00157 if (error_code)
00158 {
00159     experiment_error (experiment, _("bad weight"));
00160     goto exit_on_error;
00161 }
00162 #if DEBUG_EXPERIMENT
00163 fprintf (stderr, "experiment_open_xml: weight=%lg\n", experiment->weight);
00164 #endif
00165 experiment->stencil[0]
00166 = (char *) xmlGetProp (node, (const xmlChar *) stencil[0]);
00167 if (experiment->stencil[0])
00168 {
00169     #if DEBUG_EXPERIMENT
00170         fprintf (stderr, "experiment_open_xml: experiment=%s stencil=%s\n",
00171                 experiment->name, stencil[0]);
00172     #endif
00173     ++experiment->ninputs;
00174 }
00175 else
00176 {
00177     experiment_error (experiment, _("no template"));
00178     goto exit_on_error;
00179 }
00180 for (i = 1; i < MAX_NINPUTS; ++i)
00181 {
00182     #if DEBUG_EXPERIMENT
00183         fprintf (stderr, "experiment_open_xml: stencil%u\n", i + 1);
00184     #endif
00185     if (xmlHasProp (node, (const xmlChar *) stencil[i]))
00186     {
00187         if (ninputs && ninputs <= i)
00188         {
00189             experiment_error (experiment, _("bad templates number"));
00190             goto exit_on_error;
00191         }
00192         experiment->stencil[i]
00193         = (char *) xmlGetProp (node, (const xmlChar *) stencil[i]);
00194     #if DEBUG_EXPERIMENT
00195         fprintf (stderr,
00196                 "experiment_open_xml: experiment=%s stencil%u=%s\n",
00197                 experiment->nexperiments, experiment->name,
00198                 experiment->stencil[i]);
00199     #endif
00200     ++experiment->ninputs;
00201 }
00202 else if (ninputs && ninputs > i)
00203 {
00204     snprintf (buffer, 64, "%s%u", _("no template"), i + 1);
00205     experiment_error (experiment, buffer);
00206     goto exit_on_error;
00207 }
00208 else
00209     break;
00210 }
00211
00212 #if DEBUG_EXPERIMENT
00213 fprintf (stderr, "experiment_open_xml: end\n");
00214 #endif
00215 return 1;
00216
00217 exit_on_error:
00218     experiment_free (experiment, INPUT_TYPE_XML);
00219 #if DEBUG_EXPERIMENT
00220     fprintf (stderr, "experiment_open_xml: end\n");
00221 #endif
00222     return 0;
00223 }

```

Here is the call graph for this function:



### 4.3.3 Variable Documentation

#### 4.3.3.1 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 50 of file [experiment.c](#).

## 4.4 experiment.c

```

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 2012-2018, 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 "utils.h"
00040 #include "experiment.h"
00041
00042 #define DEBUG_EXPERIMENT 0
00043
00044 const char *stencil[MAX_NINPUTS] = {
00045     LABEL_TEMPLATE1, LABEL_TEMPLATE2,
00046     LABEL_TEMPLATE3, LABEL_TEMPLATE4,
00047     LABEL_TEMPLATE5, LABEL_TEMPLATE6,
00048     LABEL_TEMPLATE7, LABEL_TEMPLATE8
00049 };
00050
00051 static void
00052 experiment_new (Experiment * experiment)
00053 {
00054     unsigned int i;
00055     #if DEBUG_EXPERIMENT
00056         fprintf (stderr, "experiment_new: start\n");
00057     #endif
00058     experiment->name = NULL;
00059     experiment->ninputs = 0;
00060     for (i = 0; i < MAX_NINPUTS; ++i)
00061         experiment->stencil[i] = NULL;
00062     #if DEBUG_EXPERIMENT
00063         fprintf (stderr, "input_new: end\n");
00064     #endif
00065 }
00066
00067 void
00068 experiment_free (Experiment * experiment,
00069                 unsigned int type)
00070 {
00071     unsigned int i;
00072     #if DEBUG_EXPERIMENT
00073         fprintf (stderr, "experiment_free: start\n");
00074     #endif
00075     if (type == INPUT_TYPE_XML)
00076     {
00077         for (i = 0; i < experiment->ninputs; ++i)
00078             xmlFree (experiment->stencil[i]);
00079         xmlFree (experiment->name);
00080     }
00081     else
00082     {
00083         for (i = 0; i < experiment->ninputs; ++i)
00084             g_free (experiment->stencil[i]);
00085         g_free (experiment->name);
00086     }
00087     experiment->ninputs = 0;
00088     #if DEBUG_EXPERIMENT
00089         fprintf (stderr, "experiment_free: end\n");
00090     #endif
00091 }
00092
00093 void
00094 experiment_error (Experiment * experiment,
00095                  char *message)
00096 {
00097     char buffer[64];
00098     if (!experiment->name)
00099         snprintf (buffer, 64, "%s: %s", _("Experiment"), message);
00100     else
00101         snprintf (buffer, 64, "%s %s: %s", _("Experiment"),
00102                  experiment->name, message);
00103     error_message = g_strdup (buffer);
00104 }
00105
00106 int
00107 experiment_open_xml (Experiment * experiment,

```

```

00128             xmlNode * node,
00129             unsigned int ninputs)
00131 {
00132     char buffer[64];
00133     int error_code;
00134     unsigned int i;
00135
00136     #if DEBUG_EXPERIMENT
00137         fprintf (stderr, "experiment_open_xml: start\n");
00138     #endif
00139
00140     // Resetting experiment data
00141     experiment_new (experiment);
00142
00143     // Reading the experimental data
00144     experiment->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00145     if (!experiment->name)
00146     {
00147         experiment_error (experiment, _("no data file name"));
00148         goto exit_on_error;
00149     }
00150     #if DEBUG_EXPERIMENT
00151         fprintf (stderr, "experiment_open_xml: name=%s\n", experiment->name);
00152     #endif
00153     experiment->weight
00154     =
00155     xml_node_get_float_with_default (node, (const xmlChar *)
00156     LABEL_WEIGHT, 1.,
00157                                     &error_code);
00158     if (error_code)
00159     {
00160         experiment_error (experiment, _("bad weight"));
00161         goto exit_on_error;
00162     }
00163     #if DEBUG_EXPERIMENT
00164         fprintf (stderr, "experiment_open_xml: weight=%lg\n", experiment->weight);
00165     #endif
00166     experiment->stencil[0]
00167     = (char *) xmlGetProp (node, (const xmlChar *) stencil[0]);
00168     if (experiment->stencil[0])
00169     {
00170         #if DEBUG_EXPERIMENT
00171             fprintf (stderr, "experiment_open_xml: experiment=%s stencil=%s\n",
00172                     experiment->name, stencil[0]);
00173         #endif
00174         ++experiment->ninputs;
00175     }
00176     else
00177     {
00178         experiment_error (experiment, _("no template"));
00179         goto exit_on_error;
00180     }
00181     for (i = 1; i < MAX_NINPUTS; ++i)
00182     {
00183         #if DEBUG_EXPERIMENT
00184             fprintf (stderr, "experiment_open_xml: stencil%u\n", i + 1);
00185         #endif
00186         if (xmlHasProp (node, (const xmlChar *) stencil[i]))
00187         {
00188             if (ninputs && ninputs <= i)
00189             {
00190                 experiment_error (experiment, _("bad templates number"));
00191                 goto exit_on_error;
00192             }
00193             experiment->stencil[i]
00194             = (char *) xmlGetProp (node, (const xmlChar *) stencil[i]);
00195             #if DEBUG_EXPERIMENT
00196                 fprintf (stderr,
00197                         "experiment_open_xml: experiment=%s stencil%u=%s\n",
00198                         experiment->nexperiments, experiment->name,
00199                         experiment->stencil[i]);
00200             #endif
00201             ++experiment->ninputs;
00202         }
00203         else if (ninputs && ninputs > i)
00204         {
00205             snprintf (buffer, 64, "%s%u", _("no template"), i + 1);
00206             experiment_error (experiment, buffer);
00207             goto exit_on_error;
00208         }
00209         else
00210             break;
00211     }
00212     #if DEBUG_EXPERIMENT
00213         fprintf (stderr, "experiment_open_xml: end\n");
00214     #endif

```

```

00215     return 1;
00216
00217 exit_on_error:
00218     experiment_free (experiment, INPUT_TYPE_XML);
00219     #if DEBUG_EXPERIMENT
00220     fprintf (stderr, "experiment_open_xml: end\n");
00221     #endif
00222     return 0;
00223 }
00224
00225 int
00231 experiment_open_json (Experiment * experiment,
00232                      JsonNode * node,
00233                      unsigned int ninputs)
00234 {
00235     char buffer[64];
00236     JsonObject *object;
00237     const char *name;
00238     int error_code;
00239     unsigned int i;
00240
00241     #if DEBUG_EXPERIMENT
00242     fprintf (stderr, "experiment_open_json: start\n");
00243     #endif
00244
00245     // Resetting experiment data
00246     experiment_new (experiment);
00247
00248     // Getting JSON object
00249     object = json_node_get_object (node);
00250
00251     // Reading the experimental data
00252     name = json_object_get_string_member (object, LABEL_NAME);
00253     if (!name)
00254     {
00255         experiment_error (experiment, _("no data file name"));
00256         goto exit_on_error;
00257     }
00258     experiment->name = g_strdup (name);
00259     #if DEBUG_EXPERIMENT
00260     fprintf (stderr, "experiment_open_json: name=%s\n", experiment->name);
00261     #endif
00262     experiment->weight
00263     = json_object_get_float_with_default (object,
00264     LABEL_WEIGHT, 1.,
00265     &error_code);
00266     if (error_code)
00267     {
00268         experiment_error (experiment, _("bad weight"));
00269         goto exit_on_error;
00270     }
00271     #if DEBUG_EXPERIMENT
00272     fprintf (stderr, "experiment_open_json: weight=%lg\n", experiment->weight);
00273     #endif
00274     name = json_object_get_string_member (object, stencil[0]);
00275     if (name)
00276     {
00277         #if DEBUG_EXPERIMENT
00278         fprintf (stderr, "experiment_open_json: experiment=%s templatel=%s\n",
00279         name, stencil[0]);
00280         #endif
00281         ++experiment->ninputs;
00282     }
00283     else
00284     {
00285         experiment_error (experiment, _("no template"));
00286         goto exit_on_error;
00287     }
00288     experiment->stencil[0] = g_strdup (name);
00289     for (i = 1; i < MAX_NINPUTS; ++i)
00290     {
00291         #if DEBUG_EXPERIMENT
00292         fprintf (stderr, "experiment_open_json: stencil%u\n", i + 1);
00293         #endif
00294         if (json_object_get_member (object, stencil[i]))
00295         {
00296             if (ninputs && ninputs <= i)
00297             {
00298                 experiment_error (experiment, _("bad templates number"));
00299                 goto exit_on_error;
00300             }
00301             name = json_object_get_string_member (object, stencil[i]);
00302             #if DEBUG_EXPERIMENT
00303             fprintf (stderr,
00304             "experiment_open_json: experiment=%s stencil%u=%s\n",
00305             experiment->nexperiments, name, stencil[i]);
00306             #endif

```



```

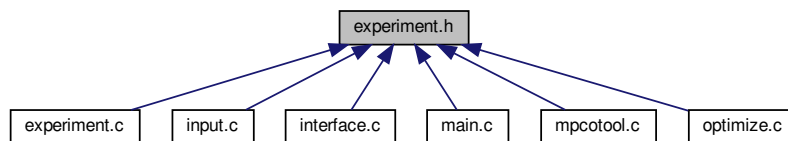
00307         experiment->stencil[i] = g_strdup (name);
00308         ++experiment->ninputs;
00309     }
00310     else if (ninputs && ninputs > i)
00311     {
00312         snprintf (buffer, 64, "%s%u", _("no template"), i + 1);
00313         experiment_error (experiment, buffer);
00314         goto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

```

## 4.5 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.

### 4.5.1 Detailed Description

Header file to define the experiment data.

#### Authors

Javier Burguete.

#### Copyright

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

### 4.5.2 Function Documentation

#### 4.5.2.1 `experiment_error()`

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

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

#### Parameters

<i>experiment</i>	<a href="#">Experiment</a> struct.
<i>message</i>	Error message.

Definition at line 109 of file [experiment.c](#).

```
00111 {  
00112     char buffer[64];  
00113     if (!experiment->name)  
00114         snprintf (buffer, 64, "%s: %s", _("Experiment"), message);  
00115     else  
00116         snprintf (buffer, 64, "%s %s: %s", _("Experiment"),  
00117                     experiment->name, message);  
00118     error_message = g_strdup (buffer);  
00119 }
```

#### 4.5.2.2 `experiment_free()`

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

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

## Parameters

<i>experiment</i>	<a href="#">Experiment</a> struct.
<i>type</i>	Type of input file.

Definition at line 80 of file [experiment.c](#).

```

00082 {
00083     unsigned int i;
00084     #if DEBUG_EXPERIMENT
00085         fprintf (stderr, "experiment_free: start\n");
00086     #endif
00087     if (type == INPUT_TYPE_XML)
00088     {
00089         for (i = 0; i < experiment->ninputs; ++i)
00090             xmlFree (experiment->stencil[i]);
00091         xmlFree (experiment->name);
00092     }
00093     else
00094     {
00095         for (i = 0; i < experiment->ninputs; ++i)
00096             g_free (experiment->stencil[i]);
00097         g_free (experiment->name);
00098     }
00099     experiment->ninputs = 0;
00100     #if DEBUG_EXPERIMENT
00101         fprintf (stderr, "experiment_free: end\n");
00102     #endif
00103 }
```

## 4.5.2.3 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>	<a href="#">Experiment</a> struct.
<i>node</i>	JSON node.
<i>ninputs</i>	Number of the simulator input files.

Definition at line 231 of file [experiment.c](#).

```

00235 {
00236     char buffer[64];
00237     JsonObject *object;
00238     const char *name;
00239     int error_code;
00240     unsigned int i;
```

```

00241
00242 #if DEBUG_EXPERIMENT
00243     fprintf (stderr, "experiment_open_json: start\n");
00244 #endif
00245
00246     // Resetting experiment data
00247     experiment_new (experiment);
00248
00249     // Getting JSON object
00250     object = json_node_get_object (node);
00251
00252     // Reading the experimental data
00253     name = json_object_get_string_member (object, LABEL_NAME);
00254     if (!name)
00255     {
00256         experiment_error (experiment, _("no data file name"));
00257         goto exit_on_error;
00258     }
00259     experiment->name = g_strdup (name);
00260 #if DEBUG_EXPERIMENT
00261     fprintf (stderr, "experiment_open_json: name=%s\n", experiment->name);
00262 #endif
00263     experiment->weight
00264     = json_object_get_float_with_default (object,
00265     LABEL_WEIGHT, 1.,
00266     &error_code);
00267     if (error_code)
00268     {
00269         experiment_error (experiment, _("bad weight"));
00270         goto exit_on_error;
00271     }
00272 #if DEBUG_EXPERIMENT
00273     fprintf (stderr, "experiment_open_json: weight=%lg\n", experiment->weight);
00274 #endif
00275     name = json_object_get_string_member (object, stencil[0]);
00276     if (name)
00277     {
00278         #if DEBUG_EXPERIMENT
00279             fprintf (stderr, "experiment_open_json: experiment=%s template1=%s\n",
00280             name, stencil[0]);
00281         #endif
00282         ++experiment->ninputs;
00283     }
00284     else
00285     {
00286         experiment_error (experiment, _("no template"));
00287         goto exit_on_error;
00288     }
00289     experiment->stencil[0] = g_strdup (name);
00290     for (i = 1; i < MAX_NINPUTS; ++i)
00291     {
00292         #if DEBUG_EXPERIMENT
00293             fprintf (stderr, "experiment_open_json: stencil%u\n", i + 1);
00294         #endif
00295         if (json_object_get_member (object, stencil[i]))
00296         {
00297             if (ninputs && ninputs <= i)
00298             {
00299                 experiment_error (experiment, _("bad templates number"));
00300                 goto exit_on_error;
00301             }
00302             name = json_object_get_string_member (object, stencil[i]);
00303             #if DEBUG_EXPERIMENT
00304                 fprintf (stderr,
00305                 "experiment_open_json: experiment=%s stencil%u=%s\n",
00306                 experiment->nexperiments, name, stencil[i]);
00307             #endif
00308             experiment->stencil[i] = g_strdup (name);
00309             ++experiment->ninputs;
00310         }
00311         else if (ninputs && ninputs > i)
00312         {
00313             snprintf (buffer, 64, "%s%u", _("no template"), i + 1);
00314             experiment_error (experiment, buffer);
00315             goto exit_on_error;
00316         }
00317         else
00318             break;
00319     }
00320 #if DEBUG_EXPERIMENT
00321     fprintf (stderr, "experiment_open_json: end\n");
00322 #endif
00323     return 1;
00324
00325 exit_on_error:
00326     experiment_free (experiment, INPUT_TYPE_JSON);

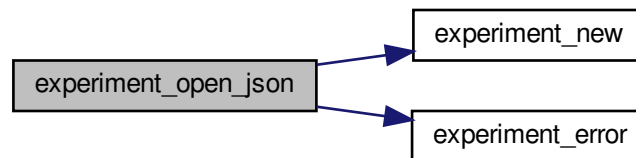
```

```

00327 #if DEBUG_EXPERIMENT
00328     fprintf (stderr, "experiment_open_json: end\n");
00329 #endif
00330     return 0;
00331 }

```

Here is the call graph for this function:



#### 4.5.2.4 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>	<a href="#">Experiment</a> struct.
<i>node</i>	XML node.
<i>ninputs</i>	Number of the simulator input files.

Definition at line [127](#) of file [experiment.c](#).

```

00131 {
00132     char buffer[64];
00133     int error_code;
00134     unsigned int i;
00135
00136     #if DEBUG_EXPERIMENT
00137         fprintf (stderr, "experiment_open_xml: start\n");
00138     #endif
00139
00140     // Resetting experiment data
00141     experiment\_new (experiment);
00142

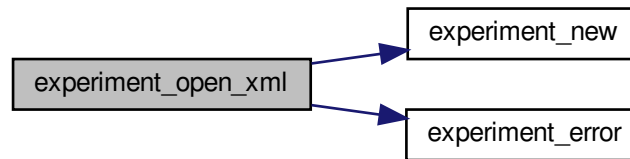
```

```

00143 // Reading the experimental data
00144 experiment->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00145 if (!experiment->name)
00146 {
00147     experiment_error (experiment, _("no data file name"));
00148     goto exit_on_error;
00149 }
00150 #if DEBUG_EXPERIMENT
00151 fprintf (stderr, "experiment_open_xml: name=%s\n", experiment->name);
00152 #endif
00153 experiment->weight
00154 =
00155     xml_node_get_float_with_default (node, (const xmlChar *)
00156     LABEL_WEIGHT, 1.,
00157                                     &error_code);
00158 if (error_code)
00159 {
00160     experiment_error (experiment, _("bad weight"));
00161     goto exit_on_error;
00162 }
00163 #if DEBUG_EXPERIMENT
00164 fprintf (stderr, "experiment_open_xml: weight=%lg\n", experiment->weight);
00165 #endif
00166 experiment->stencil[0]
00167 = (char *) xmlGetProp (node, (const xmlChar *) stencil[0]);
00168 if (experiment->stencil[0])
00169 {
00170     #if DEBUG_EXPERIMENT
00171         fprintf (stderr, "experiment_open_xml: experiment=%s stencil=%s\n",
00172                 experiment->name, stencil[0]);
00173     #endif
00174     ++experiment->ninputs;
00175 }
00176 else
00177 {
00178     experiment_error (experiment, _("no template"));
00179     goto exit_on_error;
00180 }
00181 for (i = 1; i < MAX_NINPUTS; ++i)
00182 {
00183     #if DEBUG_EXPERIMENT
00184         fprintf (stderr, "experiment_open_xml: stencil%u\n", i + 1);
00185     #endif
00186     if (xmlHasProp (node, (const xmlChar *) stencil[i]))
00187     {
00188         if (ninputs && ninputs <= i)
00189         {
00190             experiment_error (experiment, _("bad templates number"));
00191             goto exit_on_error;
00192         }
00193         experiment->stencil[i]
00194         = (char *) xmlGetProp (node, (const xmlChar *) stencil[i]);
00195     }
00196     #if DEBUG_EXPERIMENT
00197         fprintf (stderr,
00198                 "experiment_open_xml: experiment=%s stencil%u=%s\n",
00199                 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 #if DEBUG_EXPERIMENT
00214 fprintf (stderr, "experiment_open_xml: end\n");
00215 #endif
00216 return 1;
00217 exit_on_error:
00218 experiment_free (experiment, INPUT_TYPE_XML);
00219 #if DEBUG_EXPERIMENT
00220 fprintf (stderr, "experiment_open_xml: end\n");
00221 #endif
00222 return 0;
00223 }

```

Here is the call graph for this function:



## 4.6 experiment.h

```

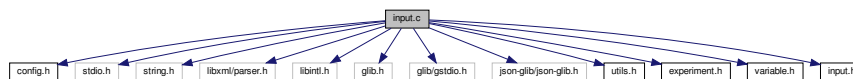
00001 /*
00002 MPCOTool:
00003 The Multi-Purposes Calibration and Optimization Tool. A software to perform
00004 calibrations or optimizations of empirical parameters.
00005
00006 AUTHORS: Javier Burguete and Borja Latorre.
00007
00008 Copyright 2012-2018, AUTHORS.
00009
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00016 2. Redistributions in binary form must reproduce the above copyright notice,
00017    this list of conditions and the following disclaimer in the
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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,
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_NINPUTS];
00039     double weight;
00040     unsigned int ninputs;
00041 } Experiment;
00042
00043 extern const char *stencil[MAX_NINPUTS];
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
  
```

## 4.7 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 "utils.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](#) ()
- void [input\\_error](#) (char \*message)
- int [input\\_open\\_xml](#) (xmlDoc \*doc)
- 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.



### 4.7.1 Detailed Description

Source file to define the input functions.

#### Authors

Javier Burguete and Borja Latorre.

#### Copyright

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

### 4.7.2 Function Documentation

#### 4.7.2.1 input\_error()

```
void input_error (
    char * message )
```

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

#### Parameters

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

Definition at line 119 of file [input.c](#).

```
00120 {
00121     char buffer[64];
00122     snprintf (buffer, 64, "%s: %s\n", _("Input"), message);
00123     error\_message = g_strdup (buffer);
00124 }
```

#### 4.7.2.2 input\_free()

```
void input_free ( )
```

Function to free the memory of the input file data.

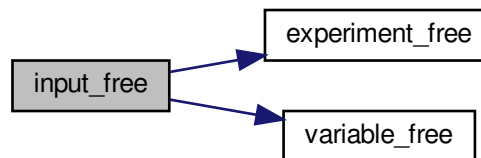
Definition at line 81 of file [input.c](#).

```

00082 {
00083     unsigned int i;
00084     #if DEBUG_INPUT
00085     fprintf (stderr, "input_free: start\n");
00086     #endif
00087     g_free (input->name);
00088     g_free (input->directory);
00089     for (i = 0; i < input->nexperiments; ++i)
00090         experiment_free (input->experiment + i, input->
type);
00091     for (i = 0; i < input->nvariables; ++i)
00092         variable_free (input->variable + i, input->
type);
00093     g_free (input->experiment);
00094     g_free (input->variable);
00095     if (input->type == INPUT_TYPE_XML)
00096     {
00097         xmlFree (input->evaluator);
00098         xmlFree (input->simulator);
00099         xmlFree (input->result);
00100         xmlFree (input->variables);
00101     }
00102     else
00103     {
00104         g_free (input->evaluator);
00105         g_free (input->simulator);
00106         g_free (input->result);
00107         g_free (input->variables);
00108     }
00109     input->nexperiments = input->nvariables =
input->nsteps = 0;
00110     #if DEBUG_INPUT
00111     fprintf (stderr, "input_free: end\n");
00112     #endif
00113 }

```

Here is the call graph for this function:



#### 4.7.2.3 input\_new()

```
void input_new ( )
```

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

Definition at line 63 of file [input.c](#).

```

00064 {
00065     #if DEBUG_INPUT
00066     fprintf (stderr, "input_new: start\n");
00067     #endif
00068     input->nvariables = input->nexperiments =
input->nsteps = 0;

```

```

00069     input->simulator = input->evaluator = input->
        directory = input->name = NULL;
00070     input->experiment = NULL;
00071     input->variable = NULL;
00072     #if DEBUG_INPUT
00073         fprintf (stderr, "input_new: end\n");
00074     #endif
00075 }

```

#### 4.7.2.4 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 957 of file [input.c](#).

```

00958 {
00959     xmlDoc *doc;
00960     JsonParser *parser;
00961
00962     #if DEBUG_INPUT
00963         fprintf (stderr, "input_open: start\n");
00964     #endif
00965
00966     // Resetting input data
00967     input_new ();
00968
00969     // Opening input file
00970     #if DEBUG_INPUT
00971         fprintf (stderr, "input_open: opening the input file %s\n", filename);
00972         fprintf (stderr, "input_open: trying XML format\n");
00973     #endif
00974     doc = xmlParseFile (filename);
00975     if (!doc)
00976     {
00977         #if DEBUG_INPUT
00978             fprintf (stderr, "input_open: trying JSON format\n");
00979         #endif
00980         parser = json_parser_new ();
00981         if (!json_parser_load_from_file (parser, filename, NULL))
00982         {
00983             input_error (_("Unable to parse the input file"));
00984             goto exit_on_error;
00985         }
00986         if (!input_open_json (parser))
00987             goto exit_on_error;
00988     }
00989     else if (!input_open_xml (doc))
00990         goto exit_on_error;
00991
00992     // Getting the working directory
00993     input->directory = g_path_get_dirname (filename);
00994     input->name = g_path_get_basename (filename);
00995
00996     #if DEBUG_INPUT
00997         fprintf (stderr, "input_open: end\n");

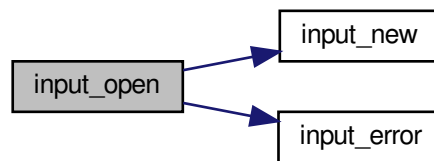
```

```

00998 #endif
00999     return 1;
01000
01001 exit_on_error:
01002     show_error (error_message);
01003     g_free (error_message);
01004     input_free ();
01005     #if DEBUG_INPUT
01006     fprintf (stderr, "input_open: end\n");
01007 #endif
01008     return 0;
01009 }

```

Here is the call graph for this function:



#### 4.7.2.5 input\_open\_json()

```

int input_open_json (
    JsonParser * parser )

```

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 568 of file [input.c](#).

```

00569 {
00570     JsonNode *node, *child;
00571     JsonObject *object;
00572     JsonArray *array;
00573     const char *buffer;
00574     int error_code;
00575     unsigned int i, n;
00576
00577     #if DEBUG_INPUT
00578     fprintf (stderr, "input_open_json: start\n");
00579     #endif

```

```

00580
00581 // Resetting input data
00582 input->type = INPUT_TYPE_JSON;
00583
00584 // Getting the root node
00585 #if DEBUG_INPUT
00586 fprintf (stderr, "input_open_json: getting the root node\n");
00587 #endif
00588 node = json_parser_get_root (parser);
00589 object = json_node_get_object (node);
00590
00591 // Getting result and variables file names
00592 if (!input->result)
00593 {
00594     buffer = json_object_get_string_member (object, LABEL_RESULT_FILE);
00595     if (!buffer)
00596         buffer = result_name;
00597     input->result = g_strdup (buffer);
00598 }
00599 else
00600     input->result = g_strdup (result_name);
00601 if (!input->variables)
00602 {
00603     buffer = json_object_get_string_member (object, LABEL_VARIABLES_FILE);
00604     if (!buffer)
00605         buffer = variables_name;
00606     input->variables = g_strdup (buffer);
00607 }
00608 else
00609     input->variables = g_strdup (variables_name);
00610
00611 // Opening simulator program name
00612 buffer = json_object_get_string_member (object, LABEL_SIMULATOR);
00613 if (!buffer)
00614 {
00615     input_error (_("Bad simulator program"));
00616     goto exit_on_error;
00617 }
00618 input->simulator = g_strdup (buffer);
00619
00620 // Opening evaluator program name
00621 buffer = json_object_get_string_member (object, LABEL_EVALUATOR);
00622 if (buffer)
00623     input->evaluator = g_strdup (buffer);
00624
00625 // Obtaining pseudo-random numbers generator seed
00626 input->seed
00627 = json_object_get_uint_with_default (object,
LABEL_SEED,
                                DEFAULT_RANDOM_SEED, &error_code);
00628
00629 if (error_code)
00630 {
00631     input_error (_("Bad pseudo-random numbers generator seed"));
00632     goto exit_on_error;
00633 }
00634
00635 // Opening algorithm
00636 buffer = json_object_get_string_member (object, LABEL_ALGORITHM);
00637 if (!strcmp (buffer, LABEL_MONTE_CARLO))
00638 {
00639     input->algorithm = ALGORITHM_MONTE_CARLO;
00640
00641     // Obtaining simulations number
00642     input->nsimulations
00643 = json_object_get_int (object, LABEL_NSIMULATIONS, &error_code
);
00644     if (error_code)
00645     {
00646         input_error (_("Bad simulations number"));
00647         goto exit_on_error;
00648     }
00649 }
00650 else if (!strcmp (buffer, LABEL_SWEEP))
00651     input->algorithm = ALGORITHM_SWEEP;
00652 else if (!strcmp (buffer, LABEL_ORTHOGONAL))
00653     input->algorithm = ALGORITHM_ORTHOGONAL;
00654 else if (!strcmp (buffer, LABEL_GENETIC))
00655 {
00656     input->algorithm = ALGORITHM_GENETIC;
00657
00658     // Obtaining population
00659     if (json_object_get_member (object, LABEL_NPOPULATION))
00660     {
00661         input->nsimulations
00662 = json_object_get_uint (object,
LABEL_NPOPULATION, &error_code);
00663         if (error_code || input->nsimulations < 3)

```

```

00664         {
00665             input_error (_("Invalid population number"));
00666             goto exit_on_error;
00667         }
00668     }
00669     else
00670     {
00671         input_error (_("No population number"));
00672         goto exit_on_error;
00673     }
00674
00675     // Obtaining generations
00676     if (json_object_get_member (object, LABEL_NGENERATIONS))
00677     {
00678         input->niterations
00679         = json_object_get_uint (object,
00680 LABEL_NGENERATIONS, &error_code);
00681         if (error_code || !input->niterations)
00682         {
00683             input_error (_("Invalid generations number"));
00684             goto exit_on_error;
00685         }
00686     }
00687     else
00688     {
00689         input_error (_("No generations number"));
00690         goto exit_on_error;
00691     }
00692
00693     // Obtaining mutation probability
00694     if (json_object_get_member (object, LABEL_MUTATION))
00695     {
00696         input->mutation_ratio
00697         = json_object_get_float (object, LABEL_MUTATION, &error_code
00698 );
00699         if (error_code || input->mutation_ratio < 0.
00700             || input->mutation_ratio >= 1.)
00701         {
00702             input_error (_("Invalid mutation probability"));
00703             goto exit_on_error;
00704         }
00705     }
00706     else
00707     {
00708         input_error (_("No mutation probability"));
00709         goto exit_on_error;
00710     }
00711
00712     // Obtaining reproduction probability
00713     if (json_object_get_member (object, LABEL_REPRODUCTION))
00714     {
00715         input->reproduction_ratio
00716         = json_object_get_float (object,
00717 LABEL_REPRODUCTION, &error_code);
00718         if (error_code || input->reproduction_ratio < 0.
00719             || input->reproduction_ratio >= 1.0)
00720         {
00721             input_error (_("Invalid reproduction probability"));
00722             goto exit_on_error;
00723         }
00724     }
00725     else
00726     {
00727         input_error (_("No reproduction probability"));
00728         goto exit_on_error;
00729     }
00730
00731     // Obtaining adaptation probability
00732     if (json_object_get_member (object, LABEL_ADAPTATION))
00733     {
00734         input->adaptation_ratio
00735         = json_object_get_float (object,
00736 LABEL_ADAPTATION, &error_code);
00737         if (error_code || input->adaptation_ratio < 0.
00738             || input->adaptation_ratio >= 1.)
00739         {
00740             input_error (_("Invalid adaptation probability"));
00741             goto exit_on_error;
00742         }
00743     }
00744     else
00745     {
00746         input_error (_("No adaptation probability"));
00747         goto exit_on_error;
00748     }
00749
00750     // Checking survivals

```

```

00747     i = input->mutation_ratio * input->nsimulations;
00748     i += input->reproduction_ratio * input->
nsimulations;
00749     i += input->adaptation_ratio * input->
nsimulations;
00750     if (i > input->nsimulations - 2)
00751     {
00752         input_error
00753         (_("No enough survival entities to reproduce the population"));
00754         goto exit_on_error;
00755     }
00756 }
00757 else
00758 {
00759     input_error (_("Unknown algorithm"));
00760     goto exit_on_error;
00761 }
00762
00763 if (input->algorithm == ALGORITHM_MONTE_CARLO
00764 || input->algorithm == ALGORITHM_SWEEP
00765 || input->algorithm == ALGORITHM_ORTHOGONAL)
00766 {
00767     // Obtaining iterations number
00768     input->niterations
00769     = json_object_get_uint (object, LABEL_NITERATIONS, &error_code
00770 );
00771     if (error_code == 1)
00772         input->niterations = 1;
00773     else if (error_code)
00774     {
00775         input_error (_("Bad iterations number"));
00776         goto exit_on_error;
00777     }
00778     // Obtaining best number
00779     input->nbest
00780     = json_object_get_uint_with_default (object,
00781 LABEL_NBEST, 1,
00782                                     &error_code);
00783     if (error_code || !input->nbest)
00784     {
00785         input_error (_("Invalid best number"));
00786         goto exit_on_error;
00787     }
00788     // Obtaining tolerance
00789     input->tolerance
00790     = json_object_get_float_with_default (object,
00791 LABEL_TOLERANCE, 0.,
00792                                     &error_code);
00793     if (error_code || input->tolerance < 0.)
00794     {
00795         input_error (_("Invalid tolerance"));
00796         goto exit_on_error;
00797     }
00798     // Getting hill climbing method parameters
00799     if (json_object_get_member (object, LABEL_NSTEPS))
00800     {
00801         input->nsteps
00802         = json_object_get_uint (object, LABEL_NSTEPS, &error_code);
00803         if (error_code)
00804         {
00805             input_error (_("Invalid steps number"));
00806             goto exit_on_error;
00807         }
00808         buffer = json_object_get_string_member (object, LABEL_CLIMBING);
00809         if (!strcmp (buffer, LABEL_COORDINATES))
00810             input->climbing = CLIMBING_METHOD_COORDINATES;
00811         else if (!strcmp (buffer, LABEL_RANDOM))
00812         {
00813             input->climbing = CLIMBING_METHOD_RANDOM;
00814             input->nestimates
00815             = json_object_get_uint (object,
00816 LABEL_NESTIMATES, &error_code);
00817             if (error_code || !input->nestimates)
00818             {
00819                 input_error (_("Invalid estimates number"));
00820                 goto exit_on_error;
00821             }
00822         }
00823     }
00824     else
00825     {
00826         input_error (_("Unknown method to estimate the hill climbing"));
00827         goto exit_on_error;
00828     }

```

```

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

```



```

00905
00906 // Obtaining the error norm
00907 if (json_object_get_member (object, LABEL_NORM))
00908 {
00909     buffer = json_object_get_string_member (object, LABEL_NORM);
00910     if (!strcmp (buffer, LABEL_EUCLIDIAN))
00911         input->norm = ERROR_NORM_EUCLIDIAN;
00912     else if (!strcmp (buffer, LABEL_MAXIMUM))
00913         input->norm = ERROR_NORM_MAXIMUM;
00914     else if (!strcmp (buffer, LABEL_P))
00915     {
00916         input->norm = ERROR_NORM_P;
00917         input->p = json_object_get_float (object,
00918 LABEL_P, &error_code);
00919         if (!error_code)
00920         {
00921             input_error (_("Bad P parameter"));
00922             goto exit_on_error;
00923         }
00924     else if (!strcmp (buffer, LABEL_TAXICAB))
00925         input->norm = ERROR_NORM_TAXICAB;
00926     else
00927     {
00928         input_error (_("Unknown error norm"));
00929         goto exit_on_error;
00930     }
00931 }
00932 else
00933     input->norm = ERROR_NORM_EUCLIDIAN;
00934
00935 // Closing the JSON document
00936 g_object_unref (parser);
00937
00938 #if DEBUG_INPUT
00939 fprintf (stderr, "input_open_json: end\n");
00940 #endif
00941 return 1;
00942
00943 exit_on_error:
00944 g_object_unref (parser);
00945 #if DEBUG_INPUT
00946 fprintf (stderr, "input_open_json: end\n");
00947 #endif
00948 return 0;
00949 }

```

Here is the call graph for this function:



#### 4.7.2.6 input\_open\_xml()

```

int input_open_xml (
    xmlDoc * doc )

```

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 132 of file [input.c](#).

```

00133 {
00134     char buffer2[64];
00135     xmlNode *node, *child;
00136     xmlChar *buffer;
00137     int error_code;
00138     unsigned int i;
00139
00140     #if DEBUG_INPUT
00141         fprintf (stderr, "input_open_xml: start\n");
00142     #endif
00143
00144     // Resetting input data
00145     buffer = NULL;
00146     input->type = INPUT_TYPE_XML;
00147
00148     // Getting the root node
00149     #if DEBUG_INPUT
00150         fprintf (stderr, "input_open_xml: getting the root node\n");
00151     #endif
00152     node = xmlDocGetRootElement (doc);
00153     if (xmlStrcmp (node->name, (const xmlChar *) LABEL_OPTIMIZE))
00154     {
00155         input_error (_("Bad root XML node"));
00156         goto exit_on_error;
00157     }
00158
00159     // Getting result and variables file names
00160     if (!input->result)
00161     {
00162         input->result =
00163             (char *) xmlGetProp (node, (const xmlChar *) LABEL_RESULT_FILE);
00164         if (!input->result)
00165             input->result = (char *) xmlStrdup ((const xmlChar *)
00166 result_name);
00167     }
00168     #if DEBUG_INPUT
00169         fprintf (stderr, "input_open_xml: result file=%s\n", input->result);
00170     #endif
00171     if (!input->variables)
00172     {
00173         input->variables =
00174             (char *) xmlGetProp (node, (const xmlChar *) LABEL_VARIABLES_FILE);
00175         if (!input->variables)
00176             input->variables =
00177                 (char *) xmlStrdup ((const xmlChar *) variables_name);
00178     }
00179     #if DEBUG_INPUT
00180         fprintf (stderr, "input_open_xml: variables file=%s\n", input->variables);
00181     #endif
00182
00183     // Opening simulator program name
00184     input->simulator =
00185         (char *) xmlGetProp (node, (const xmlChar *) LABEL_SIMULATOR);
00186     if (!input->simulator)
00187     {
00188         input_error (_("Bad simulator program"));
00189         goto exit_on_error;
00190     }
00191
00192     // Opening evaluator program name
00193     input->evaluator =
00194         (char *) xmlGetProp (node, (const xmlChar *) LABEL_EVALUATOR);
00195
00196     // Obtaining pseudo-random numbers generator seed
00197     input->seed
00198         = xml_node_get_uint_with_default (node, (const xmlChar *)
00199 LABEL_SEED,
00200                                     DEFAULT_RANDOM_SEED, &error_code);
00201     if (error_code)
00202     {
00203         input_error (_("Bad pseudo-random numbers generator seed"));
00204         goto exit_on_error;
00205     }
00206
00207     // Opening algorithm
00208     buffer = xmlGetProp (node, (const xmlChar *) LABEL_ALGORITHM);

```

```

00207     if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_MONTE_CARLO))
00208     {
00209         input->algorithm = ALGORITHM_MONTE_CARLO;
00210
00211         // Obtaining simulations number
00212         input->nsimulations
00213         = xml_node_get_int (node, (const xmlChar *)
00214         LABEL_NSIMULATIONS,
00215                             &error_code);
00216         if (error_code)
00217         {
00218             input_error (_("Bad simulations number"));
00219             goto exit_on_error;
00220         }
00221     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_SWEEP))
00222         input->algorithm = ALGORITHM_SWEEP;
00223     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_ORTHOGONAL))
00224         input->algorithm = ALGORITHM_ORTHOGONAL;
00225     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_GENETIC))
00226     {
00227         input->algorithm = ALGORITHM_GENETIC;
00228
00229         // Obtaining population
00230         if (xmlHasProp (node, (const xmlChar *) LABEL_NPOPULATION))
00231         {
00232             input->nsimulations
00233             = xml_node_get_uint (node, (const xmlChar *) LABEL_NPOPULATION,
00234                                 &error_code);
00235             if (error_code || input->nsimulations < 3)
00236             {
00237                 input_error (_("Invalid population number"));
00238                 goto exit_on_error;
00239             }
00240         }
00241     else
00242     {
00243         input_error (_("No population number"));
00244         goto exit_on_error;
00245     }
00246
00247     // Obtaining generations
00248     if (xmlHasProp (node, (const xmlChar *) LABEL_NGENERATIONS))
00249     {
00250         input->niterations
00251         = xml_node_get_uint (node, (const xmlChar *) LABEL_NGENERATIONS,
00252                             &error_code);
00253         if (error_code || !input->niterations)
00254         {
00255             input_error (_("Invalid generations number"));
00256             goto exit_on_error;
00257         }
00258     }
00259     else
00260     {
00261         input_error (_("No generations number"));
00262         goto exit_on_error;
00263     }
00264
00265     // Obtaining mutation probability
00266     if (xmlHasProp (node, (const xmlChar *) LABEL_MUTATION))
00267     {
00268         input->mutation_ratio
00269         = xml_node_get_float (node, (const xmlChar *) LABEL_MUTATION,
00270                             &error_code);
00271         if (error_code || input->mutation_ratio < 0.
00272             || input->mutation_ratio >= 1.)
00273         {
00274             input_error (_("Invalid mutation probability"));
00275             goto exit_on_error;
00276         }
00277     }
00278     else
00279     {
00280         input_error (_("No mutation probability"));
00281         goto exit_on_error;
00282     }
00283
00284     // Obtaining reproduction probability
00285     if (xmlHasProp (node, (const xmlChar *) LABEL_REPRODUCTION))
00286     {
00287         input->reproduction_ratio
00288         = xml_node_get_float (node, (const xmlChar *) LABEL_REPRODUCTION,
00289                             &error_code);
00290         if (error_code || input->reproduction_ratio < 0.
00291             || input->reproduction_ratio >= 1.0)
00292         {

```

```

00293         input_error (_("Invalid reproduction probability"));
00294         goto exit_on_error;
00295     }
00296 }
00297 else
00298 {
00299     input_error (_("No reproduction probability"));
00300     goto exit_on_error;
00301 }
00302
00303 // Obtaining adaptation probability
00304 if (xmlHasProp (node, (const xmlChar *) LABEL_ADAPTATION))
00305 {
00306     input->adaptation_ratio
00307     = xml_node_get_float (node, (const xmlChar *) LABEL_ADAPTATION,
00308                           &error_code);
00309     if (error_code || input->adaptation_ratio < 0.
00310         || input->adaptation_ratio >= 1.)
00311     {
00312         input_error (_("Invalid adaptation probability"));
00313         goto exit_on_error;
00314     }
00315 }
00316 else
00317 {
00318     input_error (_("No adaptation probability"));
00319     goto exit_on_error;
00320 }
00321
00322 // Checking survivals
00323 i = input->mutation_ratio * input->nsimulations;
00324 i += input->reproduction_ratio * input->
00325 nsimulations;
00326 i += input->adaptation_ratio * input->
00327 nsimulations;
00328 if (i > input->nsimulations - 2)
00329 {
00330     input_error
00331     (_("No enough survival entities to reproduce the population"));
00332     goto exit_on_error;
00333 }
00334 else
00335 {
00336     input_error (_("Unknown algorithm"));
00337     goto exit_on_error;
00338 }
00339 xmlFree (buffer);
00340 buffer = NULL;
00341
00342 if (input->algorithm == ALGORITHM_MONTE_CARLO
00343     || input->algorithm == ALGORITHM_SWEEP
00344     || input->algorithm == ALGORITHM_ORTHOGONAL)
00345 {
00346     // Obtaining iterations number
00347     input->niterations
00348     = xml_node_get_uint (node, (const xmlChar *)
00349 LABEL_NITERATIONS,
00350                           &error_code);
00351     if (error_code == 1)
00352         input->niterations = 1;
00353     else if (error_code)
00354     {
00355         input_error (_("Bad iterations number"));
00356         goto exit_on_error;
00357     }
00358 }
00359 // Obtaining best number
00360 input->nbest
00361 = xml_node_get_uint_with_default (node, (const xmlChar *)
00362 LABEL_NBEST,
00363                                   1, &error_code);
00364 if (error_code || !input->nbest)
00365 {
00366     input_error (_("Invalid best number"));
00367     goto exit_on_error;
00368 }
00369 // Obtaining tolerance
00370 input->tolerance
00371 = xml_node_get_float_with_default (node,
00372                                     (const xmlChar *) LABEL_TOLERANCE,
00373                                     0., &error_code);
00374 if (error_code || input->tolerance < 0.)
00375 {
00376     input_error (_("Invalid tolerance"));
00377 }

```

```

00376         goto exit_on_error;
00377     }
00378
00379     // Getting hill climbing method parameters
00380     if (xmlHasProp (node, (const xmlChar *) LABEL_NSTEPS))
00381     {
00382         input->nsteps =
00383             xml_node_get_uint (node, (const xmlChar *) LABEL_NSTEPS,
00384                               &error_code);
00385         if (error_code)
00386         {
00387             input_error (_("Invalid steps number"));
00388             goto exit_on_error;
00389         }
00390 #if DEBUG_INPUT
00391         fprintf (stderr, "input_open_xml: nsteps=%u\n", input->nsteps);
00392 #endif
00393         buffer = xmlGetProp (node, (const xmlChar *) LABEL_CLIMBING);
00394         if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_COORDINATES))
00395             input->climbing = CLIMBING_METHOD_COORDINATES;
00396         else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_RANDOM))
00397         {
00398             input->climbing = CLIMBING_METHOD_RANDOM;
00399             input->nestimates
00400                 = xml_node_get_uint (node, (const xmlChar *)
00401                                     LABEL_NESTIMATES,
00402                                     &error_code);
00403             if (error_code || !input->nestimates)
00404             {
00405                 input_error (_("Invalid estimates number"));
00406                 goto exit_on_error;
00407             }
00408         }
00409         else
00410         {
00411             input_error (_("Unknown method to estimate the hill climbing"));
00412             goto exit_on_error;
00413         }
00414         xmlFree (buffer);
00415         buffer = NULL;
00416         input->relaxation
00417             = xml_node_get_float_with_default (node,
00418                                               (const xmlChar *)
00419                                               LABEL_RELAXATION,
00420                                               DEFAULT_RELAXATION, &error_code);
00421         if (error_code || input->relaxation < 0. || input->
00422             relaxation > 2.)
00423         {
00424             input_error (_("Invalid relaxation parameter"));
00425             goto exit_on_error;
00426         }
00427         else
00428             input->nsteps = 0;
00429         // Obtaining the threshold
00430         input->threshold =
00431             xml_node_get_float_with_default (node, (const xmlChar *)
00432                                             LABEL_THRESHOLD,
00433                                             0., &error_code);
00434         if (error_code)
00435         {
00436             input_error (_("Invalid threshold"));
00437             goto exit_on_error;
00438         }
00439         // Reading the experimental data
00440         for (child = node->children; child; child = child->next)
00441         {
00442             if (xmlStrcmp (child->name, (const xmlChar *) LABEL_EXPERIMENT))
00443                 break;
00444 #if DEBUG_INPUT
00445             fprintf (stderr, "input_open_xml: nexperiments=%u\n",
00446                     input->nexperiments);
00447 #endif
00448             input->experiment = (Experiment *)
00449                 g_realloc (input->experiment,
00450                           (1 + input->nexperiments) * sizeof (
00451                               Experiment));
00452             if (!input->nexperiments)
00453             {
00454                 if (!experiment_open_xml (input->experiment, child, 0))
00455                     goto exit_on_error;
00456             }
00457             else
00458             {
00459                 if (!experiment_open_xml (input->experiment +

```

```

    input->nexperiments,
00459         child, input->experiment->
ninputs))
00460         goto exit_on_error;
00461     }
00462     ++input->nexperiments;
00463 #if DEBUG_INPUT
00464     fprintf (stderr, "input_open_xml: nexperiments=%u\n",
00465             input->nexperiments);
00466 #endif
00467 }
00468 if (!input->nexperiments)
00469 {
00470     input_error (_("No optimization experiments"));
00471     goto exit_on_error;
00472 }
00473 buffer = NULL;
00474
00475 // Reading the variables data
00476 if (input->algorithm == ALGORITHM_SWEEP
00477     || input->algorithm == ALGORITHM_ORTHOGONAL)
00478     input->nsimulations = 1;
00479 for (; child; child = child->next)
00480 {
00481 #if DEBUG_INPUT
00482     fprintf (stderr, "input_open_xml: nvariables=%u\n", input->nvariables);
00483 #endif
00484     if (xmlStrcmp (child->name, (const xmlChar *) LABEL_VARIABLE))
00485     {
00486         snprintf (buffer2, 64, "%s %u: %s",
00487                 _("Variable"), input->nvariables + 1, _("bad XML node"));
00488         input_error (buffer2);
00489         goto exit_on_error;
00490     }
00491     input->variable = (Variable *)
00492         g_realloc (input->variable,
00493                 (1 + input->nvariables) * sizeof (Variable));
00494     if (!variable_open_xml (input->variable +
input->nvariables, child,
input->algorithm, input->nsteps))
00495         goto exit_on_error;
00496     if (input->algorithm == ALGORITHM_SWEEP
00497         || input->algorithm == ALGORITHM_ORTHOGONAL)
00498         input->nsimulations *= input->variable[
input->nvariables].nsweeps;
00500     ++input->nvariables;
00501 }
00502 if (!input->nvariables)
00503 {
00504     input_error (_("No optimization variables"));
00505     goto exit_on_error;
00506 }
00507 if (input->nbest > input->nsimulations)
00508 {
00509     input_error (_("Best number higher than simulations number"));
00510     goto exit_on_error;
00511 }
00512 buffer = NULL;
00513
00514 // Obtaining the error norm
00515 if (xmlHasProp (node, (const xmlChar *) LABEL_NORM))
00516 {
00517     buffer = xmlGetProp (node, (const xmlChar *) LABEL_NORM);
00518     if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_EUCLIDIAN))
00519         input->norm = ERROR_NORM_EUCLIDIAN;
00520     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_MAXIMUM))
00521         input->norm = ERROR_NORM_MAXIMUM;
00522     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_P))
00523     {
00524         input->norm = ERROR_NORM_P;
00525         input->p
00526             = xml_node_get_float (node, (const xmlChar *) LABEL_P, &error_code);
00527         if (error_code)
00528         {
00529             input_error (_("Bad P parameter"));
00530             goto exit_on_error;
00531         }
00532     }
00533     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_TAXICAB))
00534         input->norm = ERROR_NORM_TAXICAB;
00535     else
00536     {
00537         input_error (_("Unknown error norm"));
00538         goto exit_on_error;
00539     }
00540     xmlFree (buffer);
00541 }

```

```

00542     else
00543         input->norm = ERROR_NORM_EUCLIDIAN;
00544
00545     // Closing the XML document
00546     xmlFreeDoc (doc);
00547
00548     #if DEBUG_INPUT
00549     fprintf (stderr, "input_open_xml: end\n");
00550     #endif
00551     return 1;
00552
00553 exit_on_error:
00554     xmlFree (buffer);
00555     xmlFreeDoc (doc);
00556     #if DEBUG_INPUT
00557     fprintf (stderr, "input_open_xml: end\n");
00558     #endif
00559     return 0;
00560 }

```

Here is the call graph for this function:



## 4.8 input.c

```

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 2012-2018, AUTHORS.
00009
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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,
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00018        documentation and/or other materials provided with the distribution.
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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 #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>

```

```

00047 #include "utils.h"
00048 #include "experiment.h"
00049 #include "variable.h"
00050 #include "input.h"
00051
00052 #define DEBUG_INPUT 0
00053
00054 Input input[1];
00055
00056 const char *result_name = "result";
00057 const char *variables_name = "variables";
00058
00062 void
00063 input_new ()
00064 {
00065     #if DEBUG_INPUT
00066         fprintf (stderr, "input_new: start\n");
00067     #endif
00068     input->nvariables = input->nexperiments = input->nsteps = 0;
00069     input->simulator = input->evaluator = input->directory = input->
        name = NULL;
00070     input->experiment = NULL;
00071     input->variable = NULL;
00072     #if DEBUG_INPUT
00073         fprintf (stderr, "input_new: end\n");
00074     #endif
00075 }
00076
00080 void
00081 input_free ()
00082 {
00083     unsigned int i;
00084     #if DEBUG_INPUT
00085         fprintf (stderr, "input_free: start\n");
00086     #endif
00087     g_free (input->name);
00088     g_free (input->directory);
00089     for (i = 0; i < input->nexperiments; ++i)
00090         experiment_free (input->experiment + i, input->type);
00091     for (i = 0; i < input->nvariables; ++i)
00092         variable_free (input->variable + i, input->type);
00093     g_free (input->experiment);
00094     g_free (input->variable);
00095     if (input->type == INPUT_TYPE_XML)
00096     {
00097         xmlFree (input->evaluator);
00098         xmlFree (input->simulator);
00099         xmlFree (input->result);
00100         xmlFree (input->variables);
00101     }
00102     else
00103     {
00104         g_free (input->evaluator);
00105         g_free (input->simulator);
00106         g_free (input->result);
00107         g_free (input->variables);
00108     }
00109     input->nexperiments = input->nvariables = input->nsteps = 0;
00110     #if DEBUG_INPUT
00111         fprintf (stderr, "input_free: end\n");
00112     #endif
00113 }
00114
00118 void
00119 input_error (char *message)
00120 {
00121     char buffer[64];
00122     snprintf (buffer, 64, "%s: %s\n", _("Input"), message);
00123     error_message = g_strdup (buffer);
00124 }
00125
00131 int
00132 input_open_xml (xmlDoc * doc)
00133 {
00134     char buffer2[64];
00135     xmlNode *node, *child;
00136     xmlChar *buffer;
00137     int error_code;
00138     unsigned int i;
00139
00140     #if DEBUG_INPUT
00141         fprintf (stderr, "input_open_xml: start\n");
00142     #endif
00143
00144     // Resetting input data
00145     buffer = NULL;
00146     input->type = INPUT_TYPE_XML;

```



```

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

```

```

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

```

```

00319         goto exit_on_error;
00320     }
00321
00322     // Checking survivals
00323     i = input->mutation_ratio * input->nsimulations;
00324     i += input->reproduction_ratio * input->nsimulations;
00325     i += input->adaptation_ratio * input->nsimulations;
00326     if (i > input->nsimulations - 2)
00327     {
00328         input_error
00329             (_("No enough survival entities to reproduce the population"));
00330         goto exit_on_error;
00331     }
00332 }
00333 else
00334 {
00335     input_error (_("Unknown algorithm"));
00336     goto exit_on_error;
00337 }
00338 xmlFree (buffer);
00339 buffer = NULL;
00340
00341 if (input->algorithm == ALGORITHM_MONTE_CARLO
00342     || input->algorithm == ALGORITHM_SWEEP
00343     || input->algorithm == ALGORITHM_ORTHOGONAL)
00344 {
00345
00346     // Obtaining iterations number
00347     input->niterations
00348         = xml_node_get_uint (node, (const xmlChar *)
00349 LABEL_NITERATIONS,
00350                             &error_code);
00351     if (error_code == 1)
00352         input->niterations = 1;
00353     else if (error_code)
00354     {
00355         input_error (_("Bad iterations number"));
00356         goto exit_on_error;
00357     }
00358
00359     // Obtaining best number
00360     input->nbest
00361         = xml_node_get_uint_with_default (node, (const xmlChar *)
00362 LABEL_NBEST,
00363                                         1, &error_code);
00364     if (error_code || !input->nbest)
00365     {
00366         input_error (_("Invalid best number"));
00367         goto exit_on_error;
00368     }
00369
00370     // Obtaining tolerance
00371     input->tolerance
00372         = xml_node_get_float_with_default (node,
00373                                         (const xmlChar *) LABEL_TOLERANCE,
00374                                         0., &error_code);
00375     if (error_code || input->tolerance < 0.)
00376     {
00377         input_error (_("Invalid tolerance"));
00378         goto exit_on_error;
00379     }
00380
00381     // Getting hill climbing method parameters
00382     if (xmlHasProp (node, (const xmlChar *) LABEL_NSTEPS))
00383     {
00384         input->nsteps =
00385             xml_node_get_uint (node, (const xmlChar *) LABEL_NSTEPS,
00386                               &error_code);
00387         if (error_code)
00388         {
00389             input_error (_("Invalid steps number"));
00390             goto exit_on_error;
00391         }
00392     }
00393
00394     #if DEBUG_INPUT
00395     fprintf (stderr, "input_open_xml: nsteps=%u\n", input->nsteps);
00396     #endif
00397
00398     buffer = xmlGetProp (node, (const xmlChar *) LABEL_CLIMBING);
00399     if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_COORDINATES))
00400         input->climbing = CLIMBING_METHOD_COORDINATES;
00401     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_RANDOM))
00402     {
00403         input->climbing = CLIMBING_METHOD_RANDOM;
00404         input->nestimates
00405             = xml_node_get_uint (node, (const xmlChar *)
00406 LABEL_NESTIMATES,
00407                                 &error_code);
00408         if (error_code || !input->nestimates)

```

```

00403         {
00404             input_error (_("Invalid estimates number"));
00405             goto exit_on_error;
00406         }
00407     }
00408     else
00409     {
00410         input_error (_("Unknown method to estimate the hill climbing"));
00411         goto exit_on_error;
00412     }
00413     xmlFree (buffer);
00414     buffer = NULL;
00415     input->relaxation
00416         = xml_node_get_float_with_default (node,
00417                                           (const xmlChar *)
00418                                           LABEL_RELAXATION,
00419                                           DEFAULT_RELAXATION, &error_code);
00420     if (error_code || input->relaxation < 0. || input->
relaxation > 2.)
00421     {
00422         input_error (_("Invalid relaxation parameter"));
00423         goto exit_on_error;
00424     }
00425 }
00426     else
00427         input->nsteps = 0;
00428 }
00429 // Obtaining the threshold
00430 input->threshold =
00431     xml_node_get_float_with_default (node, (const xmlChar *)
LABEL_THRESHOLD,
00432                                     0., &error_code);
00433     if (error_code)
00434     {
00435         input_error (_("Invalid threshold"));
00436         goto exit_on_error;
00437     }
00438
00439 // Reading the experimental data
00440 for (child = node->children; child; child = child->next)
00441 {
00442     if (xmlStrcmp (child->name, (const xmlChar *) LABEL_EXPERIMENT))
00443         break;
00444 #if DEBUG_INPUT
00445     fprintf (stderr, "input_open_xml: nexperiments=%u\n",
00446             input->nexperiments);
00447 #endif
00448     input->experiment = (Experiment *)
00449         g_realloc (input->experiment,
00450                   (1 + input->nexperiments) * sizeof (Experiment));
00451     if (!input->nexperiments)
00452     {
00453         if (!experiment_open_xml (input->experiment, child, 0))
00454             goto exit_on_error;
00455     }
00456     else
00457     {
00458         if (!experiment_open_xml (input->experiment + input->
nexperiments,
00459                                 child, input->experiment->ninputs))
00460             goto exit_on_error;
00461     }
00462     ++input->nexperiments;
00463 #if DEBUG_INPUT
00464     fprintf (stderr, "input_open_xml: nexperiments=%u\n",
00465             input->nexperiments);
00466 #endif
00467 }
00468     if (!input->nexperiments)
00469     {
00470         input_error (_("No optimization experiments"));
00471         goto exit_on_error;
00472     }
00473     buffer = NULL;
00474
00475 // Reading the variables data
00476 if (input->algorithm == ALGORITHM_SWEEP
00477     || input->algorithm == ALGORITHM_ORTHOGONAL)
00478     input->nsimulations = 1;
00479 for (; child; child = child->next)
00480 {
00481 #if DEBUG_INPUT
00482     fprintf (stderr, "input_open_xml: nvariables=%u\n", input->nvariables);
00483 #endif
00484     if (xmlStrcmp (child->name, (const xmlChar *) LABEL_VARIABLE))
00485     {
00486         snprintf (buffer2, 64, "%s %u: %s",

```

```

00487         _("Variable"), input->nvariables + 1, _("bad XML node"));
00488         input_error (buffer2);
00489         goto exit_on_error;
00490     }
00491     input->variable = (Variable *)
00492         g_realloc (input->variable,
00493             (1 + input->nvariables) * sizeof (Variable));
00494     if (!variable_open_xml (input->variable + input->
nvariables, child,
00495         input->algorithm, input->nsteps))
00496         goto exit_on_error;
00497     if (input->algorithm == ALGORITHM_SWEEP
00498         || input->algorithm == ALGORITHM_ORTHOGONAL)
00499         input->nsimulations *= input->variable[input->
nvariables].nsweeps;
00500     ++input->nvariables;
00501 }
00502 if (!input->nvariables)
00503 {
00504     input_error (_("No optimization variables"));
00505     goto exit_on_error;
00506 }
00507 if (input->nbest > input->nsimulations)
00508 {
00509     input_error (_("Best number higher than simulations number"));
00510     goto exit_on_error;
00511 }
00512 buffer = NULL;
00513 // Obtaining the error norm
00514 if (xmlHasProp (node, (const xmlChar *) LABEL_NORM))
00515 {
00516     buffer = xmlGetProp (node, (const xmlChar *) LABEL_NORM);
00517     if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_EUCLIDIAN))
00518         input->norm = ERROR_NORM_EUCLIDIAN;
00519     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_MAXIMUM))
00520         input->norm = ERROR_NORM_MAXIMUM;
00521     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_P))
00522     {
00523         input->norm = ERROR_NORM_P;
00524         input->p
00525             = xml_node_get_float (node, (const xmlChar *) LABEL_P, &error_code);
00526         if (error_code)
00527         {
00528             input_error (_("Bad P parameter"));
00529             goto exit_on_error;
00530         }
00531     }
00532     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_TAXICAB))
00533         input->norm = ERROR_NORM_TAXICAB;
00534     else
00535     {
00536         input_error (_("Unknown error norm"));
00537         goto exit_on_error;
00538     }
00539     xmlFree (buffer);
00540 }
00541 else
00542     input->norm = ERROR_NORM_EUCLIDIAN;
00543 // Closing the XML document
00544 xmlFreeDoc (doc);
00545 #if DEBUG_INPUT
00546 fprintf (stderr, "input_open_xml: end\n");
00547 #endif
00548 return 1;
00549
00550 exit_on_error:
00551 xmlFree (buffer);
00552 xmlFreeDoc (doc);
00553 #if DEBUG_INPUT
00554 fprintf (stderr, "input_open_xml: end\n");
00555 #endif
00556 return 0;
00557 }
00558
00559 int
00560 input_open_json (JsonParser * parser)
00561 {
00562     JsonNode *node, *child;
00563     JsonObject *object;
00564     JsonArray *array;
00565     const char *buffer;
00566     int error_code;
00567     unsigned int i, n;
00568 }

```

```

00577 #if DEBUG_INPUT
00578     fprintf (stderr, "input_open_json: start\n");
00579 #endif
00580
00581     // Resetting input data
00582     input->type = INPUT_TYPE_JSON;
00583
00584     // Getting the root node
00585 #if DEBUG_INPUT
00586     fprintf (stderr, "input_open_json: getting the root node\n");
00587 #endif
00588     node = json_parser_get_root (parser);
00589     object = json_node_get_object (node);
00590
00591     // Getting result and variables file names
00592     if (!input->result)
00593     {
00594         buffer = json_object_get_string_member (object, LABEL_RESULT_FILE);
00595         if (!buffer)
00596             buffer = result_name;
00597         input->result = g_strdup (buffer);
00598     }
00599     else
00600         input->result = g_strdup (result_name);
00601     if (!input->variables)
00602     {
00603         buffer = json_object_get_string_member (object, LABEL_VARIABLES_FILE);
00604         if (!buffer)
00605             buffer = variables_name;
00606         input->variables = g_strdup (buffer);
00607     }
00608     else
00609         input->variables = g_strdup (variables_name);
00610
00611     // Opening simulator program name
00612     buffer = json_object_get_string_member (object, LABEL_SIMULATOR);
00613     if (!buffer)
00614     {
00615         input_error (_("Bad simulator program"));
00616         goto exit_on_error;
00617     }
00618     input->simulator = g_strdup (buffer);
00619
00620     // Opening evaluator program name
00621     buffer = json_object_get_string_member (object, LABEL_EVALUATOR);
00622     if (buffer)
00623         input->evaluator = g_strdup (buffer);
00624
00625     // Obtaining pseudo-random numbers generator seed
00626     input->seed
00627     = json_object_get_uint_with_default (object,
00628     LABEL_SEED,
00629     DEFAULT_RANDOM_SEED, &error_code);
00629     if (error_code)
00630     {
00631         input_error (_("Bad pseudo-random numbers generator seed"));
00632         goto exit_on_error;
00633     }
00634
00635     // Opening algorithm
00636     buffer = json_object_get_string_member (object, LABEL_ALGORITHM);
00637     if (!strcmp (buffer, LABEL_MONTE_CARLO))
00638     {
00639         input->algorithm = ALGORITHM_MONTE_CARLO;
00640
00641         // Obtaining simulations number
00642         input->nsimulations
00643         = json_object_get_int (object, LABEL_NSIMULATIONS, &error_code
00644 );
00644         if (error_code)
00645         {
00646             input_error (_("Bad simulations number"));
00647             goto exit_on_error;
00648         }
00649     }
00650     else if (!strcmp (buffer, LABEL_SWEEP))
00651         input->algorithm = ALGORITHM_SWEEP;
00652     else if (!strcmp (buffer, LABEL_ORTHOGONAL))
00653         input->algorithm = ALGORITHM_ORTHOGONAL;
00654     else if (!strcmp (buffer, LABEL_GENETIC))
00655     {
00656         input->algorithm = ALGORITHM_GENETIC;
00657
00658         // Obtaining population
00659         if (json_object_get_member (object, LABEL_NPOPULATION))
00660         {
00661             input->nsimulations

```

```

00662         = json_object_get_uint (object,
00663 LABEL_NPOPULATION, &error_code);
00664         if (error_code || input->nsimulations < 3)
00665         {
00666             input_error (_("Invalid population number"));
00667             goto exit_on_error;
00668         }
00669     else
00670     {
00671         input_error (_("No population number"));
00672         goto exit_on_error;
00673     }
00674
00675     // Obtaining generations
00676     if (json_object_get_member (object, LABEL_NGENERATIONS))
00677     {
00678         input->niterations
00679         = json_object_get_uint (object,
00680 LABEL_NGENERATIONS, &error_code);
00681         if (error_code || !input->niterations)
00682         {
00683             input_error (_("Invalid generations number"));
00684             goto exit_on_error;
00685         }
00686     else
00687     {
00688         input_error (_("No generations number"));
00689         goto exit_on_error;
00690     }
00691
00692     // Obtaining mutation probability
00693     if (json_object_get_member (object, LABEL_MUTATION))
00694     {
00695         input->mutation_ratio
00696         = json_object_get_float (object, LABEL_MUTATION, &error_code
00697 );
00698         if (error_code || input->mutation_ratio < 0.
00699             || input->mutation_ratio >= 1.)
00700         {
00701             input_error (_("Invalid mutation probability"));
00702             goto exit_on_error;
00703         }
00704     else
00705     {
00706         input_error (_("No mutation probability"));
00707         goto exit_on_error;
00708     }
00709
00710     // Obtaining reproduction probability
00711     if (json_object_get_member (object, LABEL_REPRODUCTION))
00712     {
00713         input->reproduction_ratio
00714         = json_object_get_float (object,
00715 LABEL_REPRODUCTION, &error_code);
00716         if (error_code || input->reproduction_ratio < 0.
00717             || input->reproduction_ratio >= 1.0)
00718         {
00719             input_error (_("Invalid reproduction probability"));
00720             goto exit_on_error;
00721         }
00722     else
00723     {
00724         input_error (_("No reproduction probability"));
00725         goto exit_on_error;
00726     }
00727
00728     // Obtaining adaptation probability
00729     if (json_object_get_member (object, LABEL_ADAPTATION))
00730     {
00731         input->adaptation_ratio
00732         = json_object_get_float (object,
00733 LABEL_ADAPTATION, &error_code);
00734         if (error_code || input->adaptation_ratio < 0.
00735             || input->adaptation_ratio >= 1.)
00736         {
00737             input_error (_("Invalid adaptation probability"));
00738             goto exit_on_error;
00739         }
00740     else
00741     {
00742         input_error (_("No adaptation probability"));
00743         goto exit_on_error;

```

```

00744     }
00745
00746     // Checking survivals
00747     i = input->mutation_ratio * input->nsimulations;
00748     i += input->reproduction_ratio * input->nsimulations;
00749     i += input->adaptation_ratio * input->nsimulations;
00750     if (i > input->nsimulations - 2)
00751     {
00752         input_error
00753         (_("No enough survival entities to reproduce the population"));
00754         goto exit_on_error;
00755     }
00756 }
00757 else
00758 {
00759     input_error (_("Unknown algorithm"));
00760     goto exit_on_error;
00761 }
00762
00763 if (input->algorithm == ALGORITHM_MONTE_CARLO
00764     || input->algorithm == ALGORITHM_SWEEP
00765     || input->algorithm == ALGORITHM_ORTHOGONAL)
00766 {
00767
00768     // Obtaining iterations number
00769     input->niterations
00770     = json_object_get_uint (object, LABEL_NITERATIONS, &error_code
00771 );
00772     if (error_code == 1)
00773         input->niterations = 1;
00774     else if (error_code)
00775     {
00776         input_error (_("Bad iterations number"));
00777         goto exit_on_error;
00778     }
00779
00780     // Obtaining best number
00781     input->nbest
00782     = json_object_get_uint_with_default (object,
00783 LABEL_NBEST, 1,
00784                                         &error_code);
00785     if (error_code || !input->nbest)
00786     {
00787         input_error (_("Invalid best number"));
00788         goto exit_on_error;
00789     }
00790
00791     // Obtaining tolerance
00792     input->tolerance
00793     = json_object_get_float_with_default (object,
00794 LABEL_TOLERANCE, 0.,
00795                                         &error_code);
00796     if (error_code || input->tolerance < 0.)
00797     {
00798         input_error (_("Invalid tolerance"));
00799         goto exit_on_error;
00800     }
00801
00802     // Getting hill climbing method parameters
00803     if (json_object_get_member (object, LABEL_NSTEPS))
00804     {
00805         input->nsteps
00806         = json_object_get_uint (object, LABEL_NSTEPS, &error_code);
00807         if (error_code)
00808         {
00809             input_error (_("Invalid steps number"));
00810             goto exit_on_error;
00811         }
00812         buffer = json_object_get_string_member (object, LABEL_CLIMBING);
00813         if (!strcmp (buffer, LABEL_COORDINATES))
00814             input->climbing = CLIMBING_METHOD_COORDINATES;
00815         else if (!strcmp (buffer, LABEL_RANDOM))
00816         {
00817             input->climbing = CLIMBING_METHOD_RANDOM;
00818             input->nestimates
00819             = json_object_get_uint (object,
00820 LABEL_NESTIMATES, &error_code);
00821             if (error_code || !input->nestimates)
00822             {
00823                 input_error (_("Invalid estimates number"));
00824                 goto exit_on_error;
00825             }
00826         }
00827     }
00828     else
00829     {
00830         input_error (_("Unknown method to estimate the hill climbing"));
00831         goto exit_on_error;
00832     }

```



```

00827         }
00828         input->relaxation
00829         = json_object_get_float_with_default (object,
00830         LABEL_RELAXATION,
00831         DEFAULT_RELAXATION,
00832         &error_code);
00833         if (error_code || input->relaxation < 0. || input->
00834         relaxation > 2.)
00835         {
00836             input_error (_("Invalid relaxation parameter"));
00837             goto exit_on_error;
00838         }
00839         else
00840             input->nsteps = 0;
00841         // Obtaining the threshold
00842         input->threshold
00843         = json_object_get_float_with_default (object,
00844         LABEL_THRESHOLD, 0.,
00845         &error_code);
00846         if (error_code)
00847         {
00848             input_error (_("Invalid threshold"));
00849             goto exit_on_error;
00850         }
00851         // Reading the experimental data
00852         array = json_object_get_array_member (object, LABEL_EXPERIMENTS);
00853         n = json_array_get_length (array);
00854         input->experiment = (Experiment *) g_malloc (n * sizeof (
00855         Experiment));
00856         for (i = 0; i < n; ++i)
00857         {
00858             #if DEBUG_INPUT
00859             fprintf (stderr, "input_open_json: nexperiments=%u\n",
00860             input->nexperiments);
00861             #endif
00862             child = json_array_get_element (array, i);
00863             if (!input->nexperiments)
00864             {
00865                 if (!experiment_open_json (input->experiment, child, 0))
00866                     goto exit_on_error;
00867             }
00868             else
00869             {
00870                 if (!experiment_open_json (input->experiment + input->
00871                 nexperiments,
00872                 child, input->experiment->ninputs))
00873                     goto exit_on_error;
00874             }
00875             ++input->nexperiments;
00876             #if DEBUG_INPUT
00877             fprintf (stderr, "input_open_json: nexperiments=%u\n",
00878             input->nexperiments);
00879             #endif
00880             if (!input->nexperiments)
00881             {
00882                 input_error (_("No optimization experiments"));
00883                 goto exit_on_error;
00884             }
00885             // Reading the variables data
00886             array = json_object_get_array_member (object, LABEL_VARIABLES);
00887             n = json_array_get_length (array);
00888             input->variable = (Variable *) g_malloc (n * sizeof (Variable));
00889             for (i = 0; i < n; ++i)
00890             {
00891                 #if DEBUG_INPUT
00892                 fprintf (stderr, "input_open_json: nvariables=%u\n", input->nvariables);
00893                 #endif
00894                 child = json_array_get_element (array, i);
00895                 if (!variable_open_json (input->variable + input->
00896                 nvariables, child,
00897                 input->algorithm, input->nsteps))
00898                     goto exit_on_error;
00899                 ++input->nvariables;
00900             }
00901             if (!input->nvariables)
00902             {
00903                 input_error (_("No optimization variables"));
00904                 goto exit_on_error;
00905             }
00906             // Obtaining the error norm
00907             if (json_object_get_member (object, LABEL_NORM))

```

```

00908     {
00909         buffer = json_object_get_string_member (object, LABEL_NORM);
00910         if (!strcmp (buffer, LABEL_EUCLIDIAN))
00911             input->norm = ERROR_NORM_EUCLIDIAN;
00912         else if (!strcmp (buffer, LABEL_MAXIMUM))
00913             input->norm = ERROR_NORM_MAXIMUM;
00914         else if (!strcmp (buffer, LABEL_P))
00915             {
00916                 input->norm = ERROR_NORM_P;
00917                 input->p = json_object_get_float (object,
00918 LABEL_P, &error_code);
00919                 if (!error_code)
00920                     {
00921                         input_error (_("Bad P parameter"));
00922                         goto exit_on_error;
00923                     }
00924                 else if (!strcmp (buffer, LABEL_TAXICAB))
00925                     input->norm = ERROR_NORM_TAXICAB;
00926                 else
00927                     {
00928                         input_error (_("Unknown error norm"));
00929                         goto exit_on_error;
00930                     }
00931             }
00932         else
00933             input->norm = ERROR_NORM_EUCLIDIAN;
00934
00935         // Closing the JSON document
00936         g_object_unref (parser);
00937
00938         #if DEBUG_INPUT
00939             fprintf (stderr, "input_open_json: end\n");
00940         #endif
00941         return 1;
00942     }
00943 exit_on_error:
00944     g_object_unref (parser);
00945     #if DEBUG_INPUT
00946         fprintf (stderr, "input_open_json: end\n");
00947     #endif
00948     return 0;
00949 }
00950
00951 int
00952 input_open (char *filename)
00953 {
00954     xmlDoc *doc;
00955     JsonParser *parser;
00956
00957     #if DEBUG_INPUT
00958         fprintf (stderr, "input_open: start\n");
00959     #endif
00960
00961     // Resetting input data
00962     input_new ();
00963
00964     // Opening input file
00965     #if DEBUG_INPUT
00966         fprintf (stderr, "input_open: opening the input file %s\n", filename);
00967         fprintf (stderr, "input_open: trying XML format\n");
00968     #endif
00969     doc = xmlParseFile (filename);
00970     if (!doc)
00971     {
00972         #if DEBUG_INPUT
00973             fprintf (stderr, "input_open: trying JSON format\n");
00974         #endif
00975         parser = json_parser_new ();
00976         if (!json_parser_load_from_file (parser, filename, NULL))
00977         {
00978             input_error (_("Unable to parse the input file"));
00979             goto exit_on_error;
00980         }
00981         if (!input_open_json (parser))
00982             goto exit_on_error;
00983     }
00984     else if (!input_open_xml (doc))
00985         goto exit_on_error;
00986
00987     // Getting the working directory
00988     input->directory = g_path_get_dirname (filename);
00989     input->name = g_path_get_basename (filename);
00990
00991     #if DEBUG_INPUT
00992         fprintf (stderr, "input_open: end\n");
00993     #endif

```

```

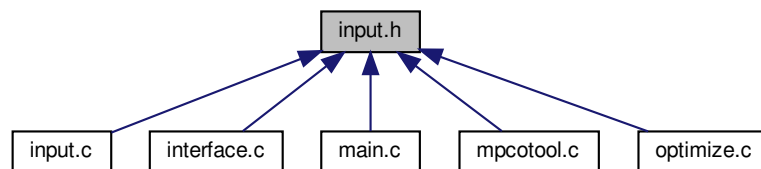
00999     return 1;
01000
01001 exit_on_error:
01002     show_error (error_message);
01003     g_free (error_message);
01004     input_free ();
01005 #if DEBUG_INPUT
01006     fprintf (stderr, "input_open: end\n");
01007 #endif
01008     return 0;
01009 }

```

## 4.9 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](#) ()
- void [input\\_error](#) (char \*message)
- int [input\\_open\\_xml](#) (xmlDoc \*doc)
- 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](#)  
*Name of the result file.*
- const char \* [variables\\_name](#)  
*Name of the variables file.*

### 4.9.1 Detailed Description

Header file to define the input functions.

#### Authors

Javier Burguete.

#### Copyright

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

### 4.9.2 Enumeration Type Documentation

#### 4.9.2.1 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 };
```

## 4.9.2.2 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 };
```

## 4.9.3 Function Documentation

## 4.9.3.1 input\_error()

```
void input_error (
    char * message )
```

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

## Parameters

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

Definition at line 119 of file [input.c](#).

```
00120 {
00121     char buffer[64];
00122     snprintf (buffer, 64, "%s: %s\n", _("Input"), message);
00123     error_message = g_strdup (buffer);
00124 }
```

#### 4.9.3.2 input\_free()

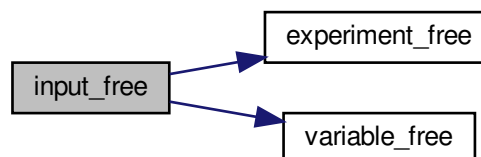
```
void input_free ( )
```

Function to free the memory of the input file data.

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

```
00082 {
00083     unsigned int i;
00084     #if DEBUG_INPUT
00085         fprintf (stderr, "input_free: start\n");
00086     #endif
00087     g_free (input->name);
00088     g_free (input->directory);
00089     for (i = 0; i < input->nexperiments; ++i)
00090         experiment_free (input->experiment + i, input->
type);
00091     for (i = 0; i < input->nvariables; ++i)
00092         variable_free (input->variable + i, input->
type);
00093     g_free (input->experiment);
00094     g_free (input->variable);
00095     if (input->type == INPUT_TYPE_XML)
00096     {
00097         xmlFree (input->evaluator);
00098         xmlFree (input->simulator);
00099         xmlFree (input->result);
00100         xmlFree (input->variables);
00101     }
00102     else
00103     {
00104         g_free (input->evaluator);
00105         g_free (input->simulator);
00106         g_free (input->result);
00107         g_free (input->variables);
00108     }
00109     input->nexperiments = input->nvariables =
input->nsteps = 0;
00110     #if DEBUG_INPUT
00111         fprintf (stderr, "input_free: end\n");
00112     #endif
00113 }
```

Here is the call graph for this function:



## 4.9.3.3 input\_new()

```
void input_new ( )
```

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

Definition at line 63 of file [input.c](#).

```
00064 {
00065     #if DEBUG_INPUT
00066         fprintf (stderr, "input_new: start\n");
00067     #endif
00068     input->nvariables = input->nexperiments =
        input->nsteps = 0;
00069     input->simulator = input->evaluator = input->
        directory = input->name = NULL;
00070     input->experiment = NULL;
00071     input->variable = NULL;
00072     #if DEBUG_INPUT
00073         fprintf (stderr, "input_new: end\n");
00074     #endif
00075 }
```

## 4.9.3.4 input\_open()

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

Function to open the input file.

## Returns

1\_on\_success, 0\_on\_error.

## Parameters

<i>filename</i>	<a href="#">Input</a> data file name.
-----------------	---------------------------------------

Definition at line 957 of file [input.c](#).

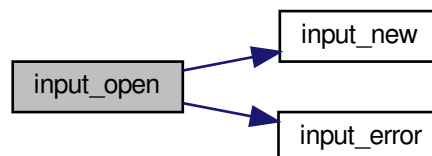
```
00958 {
00959     xmlDoc *doc;
00960     JsonParser *parser;
00961
00962     #if DEBUG_INPUT
00963         fprintf (stderr, "input_open: start\n");
00964     #endif
00965
00966     // Resetting input data
00967     input_new ();
00968
00969     // Opening input file
00970     #if DEBUG_INPUT
00971         fprintf (stderr, "input_open: opening the input file %s\n", filename);
00972         fprintf (stderr, "input_open: trying XML format\n");
00973     #endif
00974     doc = xmlParseFile (filename);
00975     if (!doc)
00976     {
00977         #if DEBUG_INPUT
```

```

00978     fprintf (stderr, "input_open: trying JSON format\n");
00979 #endif
00980     parser = json_parser_new ();
00981     if (!json_parser_load_from_file (parser, filename, NULL))
00982     {
00983         input_error (_("Unable to parse the input file"));
00984         goto exit_on_error;
00985     }
00986     if (!input_open_json (parser))
00987         goto exit_on_error;
00988 }
00989 else if (!input_open_xml (doc))
00990     goto exit_on_error;
00991
00992 // Getting the working directory
00993 input->directory = g_path_get_dirname (filename);
00994 input->name = g_path_get_basename (filename);
00995
00996 #if DEBUG_INPUT
00997     fprintf (stderr, "input_open: end\n");
00998 #endif
00999     return 1;
01000
01001 exit_on_error:
01002     show_error (error_message);
01003     g_free (error_message);
01004     input_free ();
01005 #if DEBUG_INPUT
01006     fprintf (stderr, "input_open: end\n");
01007 #endif
01008     return 0;
01009 }

```

Here is the call graph for this function:



#### 4.9.3.5 input\_open\_json()

```

int input_open_json (
    JsonParser * parser )

```

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 568 of file [input.c](#).

```

00569 {
00570     JsonNode *node, *child;
00571     JsonObject *object;
00572     JsonArray *array;
00573     const char *buffer;
00574     int error_code;
00575     unsigned int i, n;
00576
00577     #if DEBUG_INPUT
00578     fprintf (stderr, "input_open_json: start\n");
00579     #endif
00580
00581     // Resetting input data
00582     input->type = INPUT_TYPE_JSON;
00583
00584     // Getting the root node
00585     #if DEBUG_INPUT
00586     fprintf (stderr, "input_open_json: getting the root node\n");
00587     #endif
00588     node = json_parser_get_root (parser);
00589     object = json_node_get_object (node);
00590
00591     // Getting result and variables file names
00592     if (!input->result)
00593     {
00594         buffer = json_object_get_string_member (object, LABEL_RESULT_FILE);
00595         if (!buffer)
00596             buffer = result_name;
00597         input->result = g_strdup (buffer);
00598     }
00599     else
00600         input->result = g_strdup (result_name);
00601     if (!input->variables)
00602     {
00603         buffer = json_object_get_string_member (object, LABEL_VARIABLES_FILE);
00604         if (!buffer)
00605             buffer = variables_name;
00606         input->variables = g_strdup (buffer);
00607     }
00608     else
00609         input->variables = g_strdup (variables_name);
00610
00611     // Opening simulator program name
00612     buffer = json_object_get_string_member (object, LABEL_SIMULATOR);
00613     if (!buffer)
00614     {
00615         input_error (_("Bad simulator program"));
00616         goto exit_on_error;
00617     }
00618     input->simulator = g_strdup (buffer);
00619
00620     // Opening evaluator program name
00621     buffer = json_object_get_string_member (object, LABEL_EVALUATOR);
00622     if (buffer)
00623         input->evaluator = g_strdup (buffer);
00624
00625     // Obtaining pseudo-random numbers generator seed
00626     input->seed
00627     = json_object_get_uint_with_default (object,
00628     LABEL_SEED,
00629     DEFAULT_RANDOM_SEED, &error_code);
00630     if (error_code)
00631     {
00632         input_error (_("Bad pseudo-random numbers generator seed"));
00633         goto exit_on_error;
00634     }
00635
00636     // Opening algorithm
00637     buffer = json_object_get_string_member (object, LABEL_ALGORITHM);
00638     if (!strcmp (buffer, LABEL_MONTE_CARLO))
00639     {
00640         input->algorithm = ALGORITHM_MONTE_CARLO;
00641
00642         // Obtaining simulations number
00643         input->nsimulations
00644         = json_object_get_int (object, LABEL_NSIMULATIONS, &error_code);
00645     }
00646     else if (!strcmp (buffer, LABEL_SWEEP))

```

```

00651     input->algorithm = ALGORITHM_SWEEP;
00652 else if (!strcmp (buffer, LABEL_ORTHOGONAL))
00653     input->algorithm = ALGORITHM_ORTHOGONAL;
00654 else if (!strcmp (buffer, LABEL_GENETIC))
00655     {
00656         input->algorithm = ALGORITHM_GENETIC;
00657
00658         // Obtaining population
00659         if (json_object_get_member (object, LABEL_NPOPULATION))
00660         {
00661             input->nsimulations
00662             = json_object_get_uint (object,
00663 LABEL_NPOPULATION, &error_code);
00664             if (error_code || input->nsimulations < 3)
00665             {
00666                 input_error (_("Invalid population number"));
00667                 goto exit_on_error;
00668             }
00669         }
00670         else
00671         {
00672             input_error (_("No population number"));
00673             goto exit_on_error;
00674         }
00675
00676         // Obtaining generations
00677         if (json_object_get_member (object, LABEL_NGENERATIONS))
00678         {
00679             input->niterations
00680             = json_object_get_uint (object,
00681 LABEL_NGENERATIONS, &error_code);
00682             if (error_code || !input->niterations)
00683             {
00684                 input_error (_("Invalid generations number"));
00685                 goto exit_on_error;
00686             }
00687         }
00688         else
00689         {
00690             input_error (_("No generations number"));
00691             goto exit_on_error;
00692         }
00693
00694         // Obtaining mutation probability
00695         if (json_object_get_member (object, LABEL_MUTATION))
00696         {
00697             input->mutation_ratio
00698             = json_object_get_float (object, LABEL_MUTATION, &error_code
00699 );
00700             if (error_code || input->mutation_ratio < 0.
00701 || input->mutation_ratio >= 1.)
00702             {
00703                 input_error (_("Invalid mutation probability"));
00704                 goto exit_on_error;
00705             }
00706         }
00707         else
00708         {
00709             input_error (_("No mutation probability"));
00710             goto exit_on_error;
00711         }
00712
00713         // Obtaining reproduction probability
00714         if (json_object_get_member (object, LABEL_REPRODUCTION))
00715         {
00716             input->reproduction_ratio
00717             = json_object_get_float (object,
00718 LABEL_REPRODUCTION, &error_code);
00719             if (error_code || input->reproduction_ratio < 0.
00720 || input->reproduction_ratio >= 1.0)
00721             {
00722                 input_error (_("Invalid reproduction probability"));
00723                 goto exit_on_error;
00724             }
00725         }
00726         else
00727         {
00728             input_error (_("No reproduction probability"));
00729             goto exit_on_error;
00730         }
00731
00732         // Obtaining adaptation probability
00733         if (json_object_get_member (object, LABEL_ADAPTATION))
00734         {
00735             input->adaptation_ratio
00736             = json_object_get_float (object,
00737 LABEL_ADAPTATION, &error_code);

```

```

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

```

```

00815         input->nestimates
00816         = json_object_get_uint (object,
LABEL_NESTIMATES, &error_code);
00817         if (error_code || !input->nestimates)
00818         {
00819             input_error (_("Invalid estimates number"));
00820             goto exit_on_error;
00821         }
00822     }
00823     else
00824     {
00825         input_error (_("Unknown method to estimate the hill climbing"));
00826         goto exit_on_error;
00827     }
00828     input->relaxation
00829     = json_object_get_float_with_default (object,
LABEL_RELAXATION,
00830                                           DEFAULT_RELAXATION,
00831                                           &error_code);
00832     if (error_code || input->relaxation < 0. || input->
relaxation > 2.)
00833     {
00834         input_error (_("Invalid relaxation parameter"));
00835         goto exit_on_error;
00836     }
00837 }
00838 else
00839     input->nsteps = 0;
00840 }
00841 // Obtaining the threshold
00842 input->threshold
00843 = json_object_get_float_with_default (object,
LABEL_THRESHOLD, 0.,
00844                                       &error_code);
00845 if (error_code)
00846 {
00847     input_error (_("Invalid threshold"));
00848     goto exit_on_error;
00849 }
00850
00851 // Reading the experimental data
00852 array = json_object_get_array_member (object, LABEL_EXPERIMENTS);
00853 n = json_array_get_length (array);
00854 input->experiment = (Experiment *) g_malloc (n * sizeof (
Experiment));
00855 for (i = 0; i < n; ++i)
00856 {
00857     #if DEBUG_INPUT
00858         fprintf (stderr, "input_open_json: nexperiments=%u\n",
00859                 input->nexperiments);
00860     #endif
00861     child = json_array_get_element (array, i);
00862     if (!input->nexperiments)
00863     {
00864         if (!experiment_open_json (input->experiment, child, 0))
00865             goto exit_on_error;
00866     }
00867     else
00868     {
00869         if (!experiment_open_json (input->experiment +
input->nexperiments,
00870                                   child, input->experiment->
ninputs))
00871             goto exit_on_error;
00872     }
00873     ++input->nexperiments;
00874     #if DEBUG_INPUT
00875         fprintf (stderr, "input_open_json: nexperiments=%u\n",
00876                 input->nexperiments);
00877     #endif
00878 }
00879 if (!input->nexperiments)
00880 {
00881     input_error (_("No optimization experiments"));
00882     goto exit_on_error;
00883 }
00884
00885 // Reading the variables data
00886 array = json_object_get_array_member (object, LABEL_VARIABLES);
00887 n = json_array_get_length (array);
00888 input->variable = (Variable *) g_malloc (n * sizeof (
Variable));
00889 for (i = 0; i < n; ++i)
00890 {
00891     #if DEBUG_INPUT
00892         fprintf (stderr, "input_open_json: nvariables=%u\n", input->
nvariables);

```

```

00893 #endif
00894     child = json_array_get_element (array, i);
00895     if (!variable_open_json (input->variable +
input->nvariables, child,
00896                             input->algorithm, input->
nsteps))
00897         goto exit_on_error;
00898     ++input->nvariables;
00899 }
00900 if (!input->nvariables)
00901 {
00902     input_error (_("No optimization variables"));
00903     goto exit_on_error;
00904 }
00905
00906 // Obtaining the error norm
00907 if (json_object_get_member (object, LABEL_NORM))
00908 {
00909     buffer = json_object_get_string_member (object, LABEL_NORM);
00910     if (!strcmp (buffer, LABEL_EUCLIDIAN))
00911         input->norm = ERROR_NORM_EUCLIDIAN;
00912     else if (!strcmp (buffer, LABEL_MAXIMUM))
00913         input->norm = ERROR_NORM_MAXIMUM;
00914     else if (!strcmp (buffer, LABEL_P))
00915     {
00916         input->norm = ERROR_NORM_P;
00917         input->p = json_object_get_float (object,
LABEL_P, &error_code);
00918         if (!error_code)
00919         {
00920             input_error (_("Bad P parameter"));
00921             goto exit_on_error;
00922         }
00923     }
00924     else if (!strcmp (buffer, LABEL_TAXICAB))
00925         input->norm = ERROR_NORM_TAXICAB;
00926     else
00927     {
00928         input_error (_("Unknown error norm"));
00929         goto exit_on_error;
00930     }
00931 }
00932 else
00933     input->norm = ERROR_NORM_EUCLIDIAN;
00934
00935 // Closing the JSON document
00936 g_object_unref (parser);
00937
00938 #if DEBUG_INPUT
00939 fprintf (stderr, "input_open_json: end\n");
00940 #endif
00941 return 1;
00942
00943 exit_on_error:
00944 g_object_unref (parser);
00945 #if DEBUG_INPUT
00946 fprintf (stderr, "input_open_json: end\n");
00947 #endif
00948 return 0;
00949 }

```

Here is the call graph for this function:



#### 4.9.3.6 input\_open\_xml()

```
int input_open_xml (
    xmlDoc * doc )
```

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 132 of file [input.c](#).

```
00133 {
00134     char buffer2[64];
00135     xmlNode *node, *child;
00136     xmlChar *buffer;
00137     int error_code;
00138     unsigned int i;
00139
00140     #if DEBUG_INPUT
00141         fprintf (stderr, "input_open_xml: start\n");
00142     #endif
00143
00144     // Resetting input data
00145     buffer = NULL;
00146     input->type = INPUT_TYPE_XML;
00147
00148     // Getting the root node
00149     #if DEBUG_INPUT
00150         fprintf (stderr, "input_open_xml: getting the root node\n");
00151     #endif
00152     node = xmlDocGetRootElement (doc);
00153     if (xmlStrcmp (node->name, (const xmlChar *) LABEL_OPTIMIZE))
00154     {
00155         input_error (_("Bad root XML node"));
00156         goto exit_on_error;
00157     }
00158
00159     // Getting result and variables file names
00160     if (!input->result)
00161     {
00162         input->result =
00163             (char *) xmlGetProp (node, (const xmlChar *) LABEL_RESULT_FILE);
00164         if (!input->result)
00165             input->result = (char *) xmlStrdup ((const xmlChar *)
00166             result_name);
00167     }
00168     #if DEBUG_INPUT
00169         fprintf (stderr, "input_open_xml: result file=%s\n", input->result);
00170     #endif
00171     if (!input->variables)
00172     {
00173         input->variables =
00174             (char *) xmlGetProp (node, (const xmlChar *) LABEL_VARIABLES_FILE);
00175         if (!input->variables)
00176             input->variables =
00177                 (char *) xmlStrdup ((const xmlChar *) variables_name);
00178     }
00179     #if DEBUG_INPUT
00180         fprintf (stderr, "input_open_xml: variables file=%s\n", input->variables);
00181     #endif
00182
00183     // Opening simulator program name
00184     input->simulator =
00185         (char *) xmlGetProp (node, (const xmlChar *) LABEL_SIMULATOR);
00186     if (!input->simulator)
00187     {
00188         input_error (_("Bad simulator program"));
00189         goto exit_on_error;
00190     }
00191 }
```

```

00189     }
00190
00191     // Opening evaluator program name
00192     input->evaluator =
00193         (char *) xmlGetProp (node, (const xmlChar *) LABEL_EVALUATOR);
00194
00195     // Obtaining pseudo-random numbers generator seed
00196     input->seed
00197     = xml_node_get_uint_with_default (node, (const xmlChar *)
00198     LABEL_SEED,
00199                                     DEFAULT_RANDOM_SEED, &error_code);
00200     if (error_code)
00201     {
00202         input_error (_("Bad pseudo-random numbers generator seed"));
00203         goto exit_on_error;
00204     }
00205
00206     // Opening algorithm
00207     buffer = xmlGetProp (node, (const xmlChar *) LABEL_ALGORITHM);
00208     if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_MONTE_CARLO))
00209     {
00210         input->algorithm = ALGORITHM_MONTE_CARLO;
00211
00212         // Obtaining simulations number
00213         input->nsimulations
00214         = xml_node_get_int (node, (const xmlChar *)
00215         LABEL_NSIMULATIONS,
00216                             &error_code);
00217         if (error_code)
00218         {
00219             input_error (_("Bad simulations number"));
00220             goto exit_on_error;
00221         }
00222     }
00223     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_SWEEP))
00224     {
00225         input->algorithm = ALGORITHM_SWEEP;
00226     }
00227     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_ORTHOGONAL))
00228     {
00229         input->algorithm = ALGORITHM_ORTHOGONAL;
00230     }
00231     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_GENETIC))
00232     {
00233         input->algorithm = ALGORITHM_GENETIC;
00234     }
00235
00236     // Obtaining population
00237     if (xmlHasProp (node, (const xmlChar *) LABEL_NPOPULATION))
00238     {
00239         input->nsimulations
00240         = xml_node_get_uint (node, (const xmlChar *) LABEL_NPOPULATION,
00241                             &error_code);
00242         if (error_code || input->nsimulations < 3)
00243         {
00244             input_error (_("Invalid population number"));
00245             goto exit_on_error;
00246         }
00247     }
00248     else
00249     {
00250         input_error (_("No population number"));
00251         goto exit_on_error;
00252     }
00253
00254     // Obtaining generations
00255     if (xmlHasProp (node, (const xmlChar *) LABEL_NGENERATIONS))
00256     {
00257         input->niterations
00258         = xml_node_get_uint (node, (const xmlChar *) LABEL_NGENERATIONS,
00259                             &error_code);
00260         if (error_code || !input->niterations)
00261         {
00262             input_error (_("Invalid generations number"));
00263             goto exit_on_error;
00264         }
00265     }
00266     else
00267     {
00268         input_error (_("No generations number"));
00269         goto exit_on_error;
00270     }
00271
00272     // Obtaining mutation probability
00273     if (xmlHasProp (node, (const xmlChar *) LABEL_MUTATION))
00274     {
00275         input->mutation_ratio
00276         = xml_node_get_float (node, (const xmlChar *) LABEL_MUTATION,
00277                             &error_code);
00278         if (error_code || input->mutation_ratio < 0.
00279             || input->mutation_ratio >= 1.)
00280         {

```

```

00274         input_error (_("Invalid mutation probability"));
00275         goto exit_on_error;
00276     }
00277 }
00278 else
00279 {
00280     input_error (_("No mutation probability"));
00281     goto exit_on_error;
00282 }
00283
00284 // Obtaining reproduction probability
00285 if (xmlHasProp (node, (const xmlChar *) LABEL_REPRODUCTION))
00286 {
00287     input->reproduction_ratio
00288     = xml_node_get_float (node, (const xmlChar *) LABEL_REPRODUCTION,
00289                          &error_code);
00290     if (error_code || input->reproduction_ratio < 0.
00291         || input->reproduction_ratio >= 1.0)
00292     {
00293         input_error (_("Invalid reproduction probability"));
00294         goto exit_on_error;
00295     }
00296 }
00297 else
00298 {
00299     input_error (_("No reproduction probability"));
00300     goto exit_on_error;
00301 }
00302
00303 // Obtaining adaptation probability
00304 if (xmlHasProp (node, (const xmlChar *) LABEL_ADAPTATION))
00305 {
00306     input->adaptation_ratio
00307     = xml_node_get_float (node, (const xmlChar *) LABEL_ADAPTATION,
00308                          &error_code);
00309     if (error_code || input->adaptation_ratio < 0.
00310         || input->adaptation_ratio >= 1.)
00311     {
00312         input_error (_("Invalid adaptation probability"));
00313         goto exit_on_error;
00314     }
00315 }
00316 else
00317 {
00318     input_error (_("No adaptation probability"));
00319     goto exit_on_error;
00320 }
00321
00322 // Checking survivals
00323 i = input->mutation_ratio * input->nsimulations;
00324 i += input->reproduction_ratio * input->
00325 nsimulations;
00326 i += input->adaptation_ratio * input->
00327 nsimulations;
00328 if (i > input->nsimulations - 2)
00329 {
00330     input_error
00331     (_("No enough survival entities to reproduce the population"));
00332     goto exit_on_error;
00333 }
00334 else
00335 {
00336     input_error (_("Unknown algorithm"));
00337     goto exit_on_error;
00338 }
00339 xmlFree (buffer);
00340 buffer = NULL;
00341
00342 if (input->algorithm == ALGORITHM_MONTE_CARLO
00343     || input->algorithm == ALGORITHM_SWEEP
00344     || input->algorithm == ALGORITHM_ORTHOGONAL)
00345 {
00346     // Obtaining iterations number
00347     input->niterations
00348     = xml_node_get_uint (node, (const xmlChar *)
00349 LABEL_NITERATIONS,
00350                          &error_code);
00351     if (error_code == 1)
00352         input->niterations = 1;
00353     else if (error_code)
00354     {
00355         input_error (_("Bad iterations number"));
00356         goto exit_on_error;
00357     }

```



```

00358     // Obtaining best number
00359     input->nbest
00360     = xml_node_get_uint_with_default (node, (const xmlChar *)
LABEL_NBEST,
00361                                     1, &error_code);
00362     if (error_code || !input->nbest)
00363     {
00364         input_error (_("Invalid best number"));
00365         goto exit_on_error;
00366     }
00367
00368     // Obtaining tolerance
00369     input->tolerance
00370     = xml_node_get_float_with_default (node,
00371                                     (const xmlChar *) LABEL_TOLERANCE,
00372                                     0., &error_code);
00373     if (error_code || input->tolerance < 0.)
00374     {
00375         input_error (_("Invalid tolerance"));
00376         goto exit_on_error;
00377     }
00378
00379     // Getting hill climbing method parameters
00380     if (xmlHasProp (node, (const xmlChar *) LABEL_NSTEPS))
00381     {
00382         input->nsteps =
00383             xml_node_get_uint (node, (const xmlChar *) LABEL_NSTEPS,
00384                               &error_code);
00385         if (error_code)
00386         {
00387             input_error (_("Invalid steps number"));
00388             goto exit_on_error;
00389         }
00390 #if DEBUG_INPUT
00391         fprintf (stderr, "input_open_xml: nsteps=%u\n", input->nsteps);
00392 #endif
00393         buffer = xmlGetProp (node, (const xmlChar *) LABEL_CLIMBING);
00394         if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_COORDINATES))
00395             input->climbing = CLIMBING_METHOD_COORDINATES;
00396         else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_RANDOM))
00397         {
00398             input->climbing = CLIMBING_METHOD_RANDOM;
00399             input->nestimates
00400             = xml_node_get_uint (node, (const xmlChar *)
LABEL_NESTIMATES,
00401                               &error_code);
00402             if (error_code || !input->nestimates)
00403             {
00404                 input_error (_("Invalid estimates number"));
00405                 goto exit_on_error;
00406             }
00407             else
00408             {
00409                 input_error (_("Unknown method to estimate the hill climbing"));
00410                 goto exit_on_error;
00411             }
00412             xmlFree (buffer);
00413             buffer = NULL;
00414             input->relaxation
00415             = xml_node_get_float_with_default (node,
00416                                               (const xmlChar *)
LABEL_RELAXATION,
00417                                               DEFAULT_RELAXATION, &error_code);
00420             if (error_code || input->relaxation < 0. || input->
relaxation > 2.)
00421             {
00422                 input_error (_("Invalid relaxation parameter"));
00423                 goto exit_on_error;
00424             }
00425             else
00426                 input->nsteps = 0;
00427         }
00428     }
00429     // Obtaining the threshold
00430     input->threshold =
00431         xml_node_get_float_with_default (node, (const xmlChar *)
LABEL_THRESHOLD,
00432                                         0., &error_code);
00433     if (error_code)
00434     {
00435         input_error (_("Invalid threshold"));
00436         goto exit_on_error;
00437     }
00438
00439     // Reading the experimental data
00440     for (child = node->children; child; child = child->next)

```

```

00441     {
00442         if (xmlStrcmp (child->name, (const xmlChar *) LABEL_EXPERIMENT))
00443             break;
00444 #if DEBUG_INPUT
00445     fprintf (stderr, "input_open_xml: nexperiments=%u\n",
00446             input->nexperiments);
00447 #endif
00448     input->experiment = (Experiment *)
00449         g_realloc (input->experiment,
00450             (1 + input->nexperiments) * sizeof (
00451 Experiment));
00452     if (!input->nexperiments)
00453     {
00454         if (!experiment_open_xml (input->experiment, child, 0))
00455             goto exit_on_error;
00456     }
00457     else
00458     {
00459         if (!experiment_open_xml (input->experiment +
00460 input->nexperiments,
00461 child, input->experiment->
00462 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     if (!input->nexperiments)
00471     {
00472         input_error (_("No optimization experiments"));
00473         goto exit_on_error;
00474     }
00475     buffer = NULL;
00476     // Reading the variables data
00477     if (input->algorithm == ALGORITHM_SWEEP
00478         || input->algorithm == ALGORITHM_ORTHOGONAL)
00479         input->nsimulations = 1;
00480     for (; child; child = child->next)
00481     {
00482 #if DEBUG_INPUT
00483         fprintf (stderr, "input_open_xml: nvariables=%u\n", input->nvariables);
00484 #endif
00485         if (xmlStrcmp (child->name, (const xmlChar *) LABEL_VARIABLE))
00486         {
00487             snprintf (buffer2, 64, "%s %u: %s",
00488                 _("Variable"), input->nvariables + 1, _("bad XML node"));
00489             input_error (buffer2);
00490             goto exit_on_error;
00491         }
00492         input->variable = (Variable *)
00493             g_realloc (input->variable,
00494                 (1 + input->nvariables) * sizeof (Variable));
00495         if (!variable_open_xml (input->variable +
00496 input->nvariables, child,
00497 input->algorithm, input->nsteps))
00498             goto exit_on_error;
00499         if (input->algorithm == ALGORITHM_SWEEP
00500             || input->algorithm == ALGORITHM_ORTHOGONAL)
00501             input->nsimulations *= input->variable[
00502 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     // Obtaining the error norm
00517     if (xmlHasProp (node, (const xmlChar *) LABEL_NORM))
00518     {
00519         buffer = xmlGetProp (node, (const xmlChar *) LABEL_NORM);
00520         if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_EUCLIDIAN))
00521             input->norm = ERROR_NORM_EUCLIDIAN;
00522         else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_MAXIMUM))
00523             input->norm = ERROR_NORM_MAXIMUM;
00524         else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_P))

```

```

00523     {
00524         input->norm = ERROR_NORM_P;
00525         input->p
00526         = xml_node_get_float (node, (const xmlChar *) LABEL_P, &error_code);
00527         if (error_code)
00528         {
00529             input_error (_("Bad P parameter"));
00530             goto exit_on_error;
00531         }
00532     }
00533     else if (!xmlStrcmp (buffer, (const xmlChar *) LABEL_TAXICAB))
00534         input->norm = ERROR_NORM_TAXICAB;
00535     else
00536     {
00537         input_error (_("Unknown error norm"));
00538         goto exit_on_error;
00539     }
00540     xmlFree (buffer);
00541 }
00542 else
00543     input->norm = ERROR_NORM_EUCLIDIAN;
00544
00545 // Closing the XML document
00546 xmlFreeDoc (doc);
00547
00548 #if DEBUG_INPUT
00549 fprintf (stderr, "input_open_xml: end\n");
00550 #endif
00551 return 1;
00552
00553 exit_on_error:
00554     xmlFree (buffer);
00555     xmlFreeDoc (doc);
00556 #if DEBUG_INPUT
00557 fprintf (stderr, "input_open_xml: end\n");
00558 #endif
00559 return 0;
00560 }

```

Here is the call graph for this function:



## 4.10 input.h

```

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 2012-2018, 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 #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;
00067     unsigned int nvariables;
00068     unsigned int nexperiments;
00069     unsigned int nsimulations;
00070     unsigned int algorithm;
00071     unsigned int nsteps;
00072     unsigned int climbing;
00073     unsigned int nestimates;
00074     unsigned int niterations;
00075     unsigned int nbest;
00076     unsigned int norm;
00077     unsigned int type;
00078 } Input;
00079
00080 extern Input input[1];
00081 extern const char *result_name;
00082 extern const char *variables_name;
00083
00084 // Public functions
00085 void input_new ();
00086 void input_free ();
00087 void input_error (char *message);
00088 int input_open_xml (xmlDoc * doc);
00089 int input_open_json (JsonParser * parser);
00090 int input_open (char *filename);
00091
00092 #endif

```

## 4.11 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 "genetic/genetic.h"
#include "utils.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 0`  
Macro to debug interface functions.
- `#define INPUT\_FILE "test-ga.xml"`  
Macro to define the initial input file.

## Functions

- void [input\\_save\\_climbing\\_xml](#) (xmlNode \*node)
- void [input\\_save\\_climbing\\_json](#) (JsonNode \*node)
- void [input\\_save\\_xml](#) (xmlDoc \*doc)
- void [input\\_save\\_json](#) (JsonGenerator \*generator)
- void [input\\_save](#) (char \*filename)
- void [options\\_new](#) ()
- void [running\\_new](#) ()
- unsigned int [window\\_get\\_algorithm](#) ()
- unsigned int [window\\_get\\_climbing](#) ()
- unsigned int [window\\_get\\_norm](#) ()
- void [window\\_save\\_climbing](#) ()
- int [window\\_save](#) ()
- void [window\\_run](#) ()
- void [window\\_help](#) ()
- void [window\\_about](#) ()
- void [window\\_update\\_climbing](#) ()
- void [window\\_update](#) ()
- void [window\\_set\\_algorithm](#) ()
- void [window\\_set\\_experiment](#) ()
- void [window\\_remove\\_experiment](#) ()

- void [window\\_add\\_experiment](#) ()
- void [window\\_name\\_experiment](#) ()
- void [window\\_weight\\_experiment](#) ()
- void [window\\_inputs\\_experiment](#) ()
- void [window\\_template\\_experiment](#) (void \*data)
- void [window\\_set\\_variable](#) ()
- void [window\\_remove\\_variable](#) ()
- void [window\\_add\\_variable](#) ()
- void [window\\_label\\_variable](#) ()
- void [window\\_precision\\_variable](#) ()
- void [window\\_rangemin\\_variable](#) ()
- void [window\\_rangemax\\_variable](#) ()
- void [window\\_rangeminabs\\_variable](#) ()
- void [window\\_rangemaxabs\\_variable](#) ()
- void [window\\_step\\_variable](#) ()
- void [window\\_update\\_variable](#) ()
- int [window\\_read](#) (char \*filename)
- void [window\\_open](#) ()
- void [window\\_new](#) (GtkApplication \*application)

## Variables

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

### 4.11.1 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](#).

### 4.11.2 Function Documentation

#### 4.11.2.1 [input\\_save\(\)](#)

```
void input_save (
    char * filename )
```

Function to save the input file.

## Parameters

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

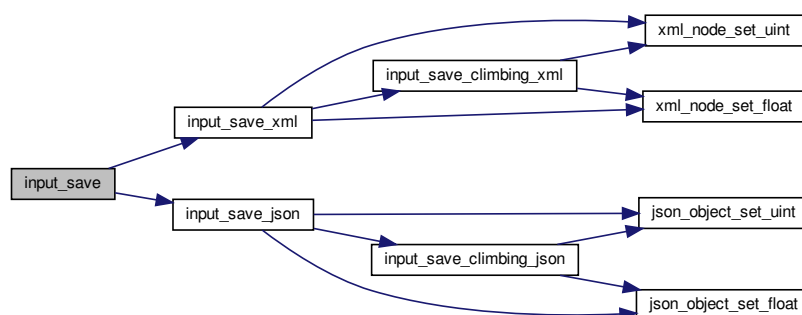
Definition at line 584 of file [interface.c](#).

```

00585 {
00586     xmlDoc *doc;
00587     JsonGenerator *generator;
00588
00589 #if DEBUG_INTERFACE
00590     fprintf (stderr, "input_save: start\n");
00591 #endif
00592
00593     // Getting the input file directory
00594     input->name = g_path_get_basename (filename);
00595     input->directory = g_path_get_dirname (filename);
00596
00597     if (input->type == INPUT_TYPE_XML)
00598     {
00599         // Opening the input file
00600         doc = xmlNewDoc ((const xmlChar *) "1.0");
00601         input_save_xml (doc);
00602
00603         // Saving the XML file
00604         xmlSaveFormatFile (filename, doc, 1);
00605
00606         // Freeing memory
00607         xmlFreeDoc (doc);
00608     }
00609     else
00610     {
00611         // Opening the input file
00612         generator = json_generator_new ();
00613         json_generator_set_pretty (generator, TRUE);
00614         input_save_json (generator);
00615
00616         // Saving the JSON file
00617         json_generator_to_file (generator, filename, NULL);
00618
00619         // Freeing memory
00620         g_object_unref (generator);
00621     }
00622
00623 #if DEBUG_INTERFACE
00624     fprintf (stderr, "input_save: end\n");
00625 #endif
00626 }

```

Here is the call graph for this function:



#### 4.11.2.2 input\_save\_climbing\_json()

```
void input_save_climbing_json (
    JsonNode * node )
```

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

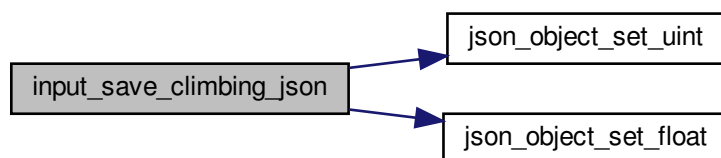
##### Parameters

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

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

```
00202 {
00203     JsonObject *object;
00204     #if DEBUG_INTERFACE
00205     fprintf (stderr, "input_save_climbing_json: start\n");
00206     #endif
00207     object = json_node_get_object (node);
00208     if (input->nsteps)
00209     {
00210         json_object_set_uint (object, LABEL_NSTEPS,
00211             input->nsteps);
00212         if (input->relaxation != DEFAULT_RELAXATION)
00213             json_object_set_float (object, LABEL_RELAXATION,
00214                 input->relaxation);
00215         switch (input->climbing)
00216         {
00217             case CLIMBING_METHOD_COORDINATES:
00218                 json_object_set_string_member (object, LABEL_CLIMBING,
00219                     LABEL_COORDINATES);
00220                 break;
00221             default:
00222                 json_object_set_string_member (object, LABEL_CLIMBING,
00223                     LABEL_RANDOM);
00224         }
00225         json_object_set_uint (object, LABEL_NESTIMATES,
00226             input->nestimates);
00227     }
00228     #if DEBUG_INTERFACE
00229     fprintf (stderr, "input_save_climbing_json: end\n");
00230     #endif
00231 }
```

Here is the call graph for this function:





#### 4.11.2.3 input\_save\_climbing\_xml()

```
void input_save_climbing_xml (
    xmlNode * node )
```

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

## Parameters

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

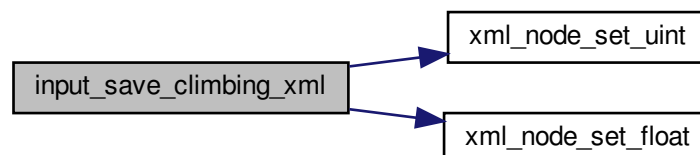
Definition at line 168 of file [interface.c](#).

```

00169 {
00170     #if DEBUG_INTERFACE
00171         fprintf (stderr, "input_save_climbing_xml: start\n");
00172     #endif
00173     if (input->nsteps)
00174     {
00175         xml_node_set_uint (node, (const xmlChar *) LABEL_NSTEPS,
00176             input->nsteps);
00177         if (input->relaxation != DEFAULT_RELAXATION)
00178             xml_node_set_float (node, (const xmlChar *)
00179                 LABEL_RELAXATION,
00180                 input->relaxation);
00181         switch (input->climbing)
00182         {
00183             case CLIMBING_METHOD_COORDINATES:
00184                 xmlSetProp (node, (const xmlChar *) LABEL_CLIMBING,
00185                     (const xmlChar *) LABEL_COORDINATES);
00186                 break;
00187             default:
00188                 xmlSetProp (node, (const xmlChar *) LABEL_CLIMBING,
00189                     (const xmlChar *) LABEL_RANDOM);
00190                 xml_node_set_uint (node, (const xmlChar *)
00191                     LABEL_NESTIMATES,
00192                     input->nestimates);
00193         }
00194     }
00195     #if DEBUG_INTERFACE
00196         fprintf (stderr, "input_save_climbing_xml: end\n");
00197     #endif
00198 }

```

Here is the call graph for this function:



#### 4.11.2.4 input\_save\_json()

```

void input_save_json (
    JsonGenerator * generator )

```

Function to save the input file in JSON format.

## Parameters

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

Definition at line 413 of file [interface.c](#).

```

00414 {
00415     unsigned int i, j;
00416     char *buffer;
00417     JsonNode *node, *child;
00418     JsonObject *object;
00419     JsonArray *array;
00420     GFile *file, *file2;
00421
00422     #if DEBUG_INTERFACE
00423         fprintf (stderr, "input_save_json: start\n");
00424     #endif
00425
00426     // Setting root JSON node
00427     node = json_node_new (JSON_NODE_OBJECT);
00428     object = json_node_get_object (node);
00429     json_generator_set_root (generator, node);
00430
00431     // Adding properties to the root JSON node
00432     if (strcmp (input->result, result_name))
00433         json_object_set_string_member (object, LABEL_RESULT_FILE,
input->result);
00434     if (strcmp (input->variables, variables_name))
00435         json_object_set_string_member (object, LABEL_VARIABLES_FILE,
input->variables);
00436
00437     file = g_file_new_for_path (input->directory);
00438     file2 = g_file_new_for_path (input->simulator);
00439     buffer = g_file_get_relative_path (file, file2);
00440     g_object_unref (file2);
00441     json_object_set_string_member (object, LABEL_SIMULATOR, buffer);
00442     g_free (buffer);
00443     if (input->evaluator)
00444     {
00445         file2 = g_file_new_for_path (input->evaluator);
00446         buffer = g_file_get_relative_path (file, file2);
00447         g_object_unref (file2);
00448         if (strlen (buffer))
00449             json_object_set_string_member (object, LABEL_EVALUATOR, buffer);
00450         g_free (buffer);
00451     }
00452     if (input->seed != DEFAULT_RANDOM_SEED)
00453         json_object_set_uint (object, LABEL_SEED,
input->seed);
00454
00455     // Setting the algorithm
00456     buffer = (char *) g_slice_alloc (64);
00457     switch (input->algorithm)
00458     {
00459     case ALGORITHM_MONTE_CARLO:
00460         json_object_set_string_member (object, LABEL_ALGORITHM,
LABEL_MONTE_CARLO);
00461         snprintf (buffer, 64, "%u", input->nsimulations);
00462         json_object_set_string_member (object, LABEL_NSIMULATIONS, buffer);
00463         snprintf (buffer, 64, "%u", input->niterations);
00464         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);
00465         snprintf (buffer, 64, "%.3lg", input->tolerance);
00466         json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00467         snprintf (buffer, 64, "%u", input->nbest);
00468         json_object_set_string_member (object, LABEL_NBEST, buffer);
00469         input_save_climbing_json (node);
00470         break;
00471     case ALGORITHM_SWEEP:
00472         json_object_set_string_member (object, LABEL_ALGORITHM,
LABEL_SWEEP);
00473         snprintf (buffer, 64, "%u", input->niterations);
00474         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);
00475         snprintf (buffer, 64, "%.3lg", input->tolerance);
00476         json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00477         snprintf (buffer, 64, "%u", input->nbest);
00478         json_object_set_string_member (object, LABEL_NBEST, buffer);
00479         input_save_climbing_json (node);
00480         break;
00481     case ALGORITHM_ORTHOGONAL:
00482         json_object_set_string_member (object, LABEL_ALGORITHM,
LABEL_ORTHOGONAL);
00483         snprintf (buffer, 64, "%u", input->niterations);
00484         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);

```

```

00486     snprintf (buffer, 64, "%.3lg", input->tolerance);
00487     json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00488     snprintf (buffer, 64, "%u", input->nbest);
00489     json_object_set_string_member (object, LABEL_NBEST, buffer);
00490     input_save_climbing_json (node);
00491     break;
00492 default:
00493     json_object_set_string_member (object, LABEL_ALGORITHM,
00494 LABEL_GENETIC);
00495     snprintf (buffer, 64, "%u", input->nsimulations);
00496     json_object_set_string_member (object, LABEL_NPOPULATION, buffer);
00497     snprintf (buffer, 64, "%u", input->niterations);
00498     json_object_set_string_member (object, LABEL_NGENERATIONS, buffer);
00499     snprintf (buffer, 64, "%.3lg", input->mutation_ratio);
00500     json_object_set_string_member (object, LABEL_MUTATION, buffer);
00501     snprintf (buffer, 64, "%.3lg", input->reproduction_ratio);
00502     json_object_set_string_member (object, LABEL_REPRODUCTION, buffer);
00503     snprintf (buffer, 64, "%.3lg", input->adaptation_ratio);
00504     json_object_set_string_member (object, LABEL_ADAPTATION, buffer);
00505     break;
00506 }
00507 g_slice_free1 (64, buffer);
00508 if (input->threshold != 0.)
00509     json_object_set_float (object, LABEL_THRESHOLD,
00510 input->threshold);
00511 // Setting the experimental data
00512 array = json_array_new ();
00513 for (i = 0; i < input->nexperiments; ++i)
00514 {
00515     child = json_node_new (JSON_NODE_OBJECT);
00516     object = json_node_get_object (child);
00517     json_object_set_string_member (object, LABEL_NAME,
00518 input->experiment[i].name);
00519     if (input->experiment[i].weight != 1.)
00520         json_object_set_float (object, LABEL_WEIGHT,
00521 input->experiment[i].weight);
00522     for (j = 0; j < input->experiment->ninputs; ++j)
00523         json_object_set_string_member (object, stencil[j],
00524 input->experiment[i].
00525 stencil[j]);
00526     json_array_add_element (array, child);
00527 }
00528 json_object_set_array_member (object, LABEL_EXPERIMENTS, array);
00529 // Setting the variables data
00530 array = json_array_new ();
00531 for (i = 0; i < input->nvariables; ++i)
00532 {
00533     child = json_node_new (JSON_NODE_OBJECT);
00534     object = json_node_get_object (child);
00535     json_object_set_string_member (object, LABEL_NAME,
00536 input->variable[i].name);
00537     json_object_set_float (object, LABEL_MINIMUM,
00538 input->variable[i].rangemin);
00539     if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
00540         json_object_set_float (object,
00541 LABEL_ABSOLUTE_MINIMUM,
00542 input->variable[i].rangeminabs);
00543     json_object_set_float (object, LABEL_MAXIMUM,
00544 input->variable[i].rangemax);
00545     if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
00546         json_object_set_float (object,
00547 LABEL_ABSOLUTE_MAXIMUM,
00548 input->variable[i].rangemaxabs);
00549     if (input->variable[i].precision !=
00550 DEFAULT_PRECISION)
00551         json_object_set_uint (object, LABEL_PRECISION,
00552 input->variable[i].precision);
00553     if (input->algorithm == ALGORITHM_SWEEP
00554 || input->algorithm == ALGORITHM_ORTHOGONAL)
00555         json_object_set_uint (object, LABEL_NSWEEPS,
00556 input->variable[i].nsweeps);
00557     else if (input->algorithm == ALGORITHM_GENETIC)
00558         json_object_set_uint (object, LABEL_NBITS,
00559 input->variable[i].nbits);
00560     if (input->nsteps)
00561         json_object_set_float (object, LABEL_STEP,
00562 input->variable[i].step);
00563     json_array_add_element (array, child);
00564 }
00565 json_object_set_array_member (object, LABEL_VARIABLES, array);
00566 // Saving the error norm
00567 switch (input->norm)
00568 {
00569     case ERROR_NORM_MAXIMUM:

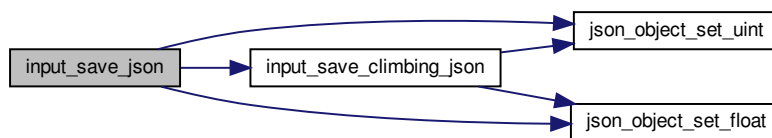
```

```

00565     json_object_set_string_member (object, LABEL_NORM, LABEL_MAXIMUM);
00566     break;
00567 case ERROR_NORM_P:
00568     json_object_set_string_member (object, LABEL_NORM, LABEL_P);
00569     json_object_set_float (object, LABEL_P, input->
p);
00570     break;
00571 case ERROR_NORM_TAXICAB:
00572     json_object_set_string_member (object, LABEL_NORM, LABEL_TAXICAB);
00573     }
00574
00575 #if DEBUG_INTERFACE
00576     fprintf (stderr, "input_save_json: end\n");
00577 #endif
00578 }

```

Here is the call graph for this function:



#### 4.11.2.5 input\_save\_xml()

```

void input_save_xml (
    xmlDoc * doc )

```

Function to save the input file in XML format.

##### Parameters

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

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

```

00234 {
00235     unsigned int i, j;
00236     char *buffer;
00237     xmlNode *node, *child;
00238     GFile *file, *file2;
00239
00240 #if DEBUG_INTERFACE
00241     fprintf (stderr, "input_save_xml: start\n");
00242 #endif
00243
00244     // Setting root XML node
00245     node = xmlNewDocNode (doc, 0, (const xmlChar *) LABEL_OPTIMIZE, 0);
00246     xmlDocSetRootElement (doc, node);
00247
00248     // Adding properties to the root XML node
00249     if (xmlStrcmp
00250         ((const xmlChar *) input->result, (const xmlChar *) result_name))
00251         xmlSetProp (node, (const xmlChar *) LABEL_RESULT_FILE,
00252             (xmlChar *) input->result);
00253     if (xmlStrcmp

```

```

00254     ((const xmlChar *) input->variables, (const xmlChar *)
variables_name))
00255     xmlSetProp (node, (const xmlChar *) LABEL_VARIABLES_FILE,
00256                 (xmlChar *) input->variables);
00257     file = g_file_new_for_path (input->directory);
00258     file2 = g_file_new_for_path (input->simulator);
00259     buffer = g_file_get_relative_path (file, file2);
00260     g_object_unref (file2);
00261     xmlSetProp (node, (const xmlChar *) LABEL_SIMULATOR, (xmlChar *) buffer);
00262     g_free (buffer);
00263     if (input->evaluator)
00264     {
00265         file2 = g_file_new_for_path (input->evaluator);
00266         buffer = g_file_get_relative_path (file, file2);
00267         g_object_unref (file2);
00268         if (xmlStrlen ((xmlChar *) buffer))
00269             xmlSetProp (node, (const xmlChar *) LABEL_EVALUATOR,
00270                         (xmlChar *) buffer);
00271         g_free (buffer);
00272     }
00273     if (input->seed != DEFAULT_RANDOM_SEED)
00274         xml_node_set_uint (node, (const xmlChar *) LABEL_SEED,
input->seed);
00275
00276     // Setting the algorithm
00277     buffer = (char *) g_slice_alloc (64);
00278     switch (input->algorithm)
00279     {
00280     case ALGORITHM_MONTE_CARLO:
00281         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00282                     (const xmlChar *) LABEL_MONTE_CARLO);
00283         snprintf (buffer, 64, "%u", input->nsimulations);
00284         xmlSetProp (node, (const xmlChar *) LABEL_NSIMULATIONS,
00285                     (xmlChar *) buffer);
00286         snprintf (buffer, 64, "%u", input->niterations);
00287         xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00288                     (xmlChar *) buffer);
00289         snprintf (buffer, 64, "%.3lg", input->tolerance);
00290         xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00291         snprintf (buffer, 64, "%u", input->nbest);
00292         xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00293         input_save_climbing_xml (node);
00294         break;
00295     case ALGORITHM_SWEEP:
00296         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00297                     (const xmlChar *) LABEL_SWEEP);
00298         snprintf (buffer, 64, "%u", input->niterations);
00299         xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00300                     (xmlChar *) buffer);
00301         snprintf (buffer, 64, "%.3lg", input->tolerance);
00302         xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00303         snprintf (buffer, 64, "%u", input->nbest);
00304         xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00305         input_save_climbing_xml (node);
00306         break;
00307     case ALGORITHM_ORTHOGONAL:
00308         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00309                     (const xmlChar *) LABEL_ORTHOGONAL);
00310         snprintf (buffer, 64, "%u", input->niterations);
00311         xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00312                     (xmlChar *) buffer);
00313         snprintf (buffer, 64, "%.3lg", input->tolerance);
00314         xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00315         snprintf (buffer, 64, "%u", input->nbest);
00316         xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00317         input_save_climbing_xml (node);
00318         break;
00319     default:
00320         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00321                     (const xmlChar *) LABEL_GENETIC);
00322         snprintf (buffer, 64, "%u", input->nsimulations);
00323         xmlSetProp (node, (const xmlChar *) LABEL_NPOPULATION,
00324                     (xmlChar *) buffer);
00325         snprintf (buffer, 64, "%u", input->niterations);
00326         xmlSetProp (node, (const xmlChar *) LABEL_NGENERATIONS,
00327                     (xmlChar *) buffer);
00328         snprintf (buffer, 64, "%.3lg", input->mutation_ratio);
00329         xmlSetProp (node, (const xmlChar *) LABEL_MUTATION, (xmlChar *) buffer);
00330         snprintf (buffer, 64, "%.3lg", input->reproduction_ratio);
00331         xmlSetProp (node, (const xmlChar *) LABEL_REPRODUCTION,
00332                     (xmlChar *) buffer);
00333         snprintf (buffer, 64, "%.3lg", input->adaptation_ratio);
00334         xmlSetProp (node, (const xmlChar *) LABEL_ADAPTATION, (xmlChar *) buffer);
00335         break;
00336     }
00337     g_slice_free1 (64, buffer);
00338     if (input->threshold != 0.)

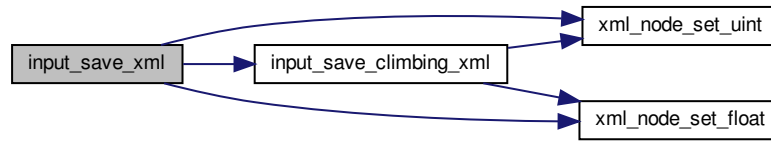
```

```

00339     xml_node_set_float (node, (const xmlChar *)
LABEL_THRESHOLD,
00340                         input->threshold);
00341
00342     // Setting the experimental data
00343     for (i = 0; i < input->nexperiments; ++i)
00344     {
00345         child = xmlNewChild (node, 0, (const xmlChar *) LABEL_EXPERIMENT, 0);
00346         xmlSetProp (child, (const xmlChar *) LABEL_NAME,
00347                     (xmlChar *) input->experiment[i].name);
00348         if (input->experiment[i].weight != 1.)
00349             xml_node_set_float (child, (const xmlChar *)
LABEL_WEIGHT,
00350                                 input->experiment[i].weight);
00351         for (j = 0; j < input->experiment->ninputs; ++j)
00352             xmlSetProp (child, (const xmlChar *) stencil[j],
00353                         (xmlChar *) input->experiment[i].stencil[j]);
00354     }
00355
00356     // Setting the variables data
00357     for (i = 0; i < input->nvariables; ++i)
00358     {
00359         child = xmlNewChild (node, 0, (const xmlChar *) LABEL_VARIABLE, 0);
00360         xmlSetProp (child, (const xmlChar *) LABEL_NAME,
00361                     (xmlChar *) input->variable[i].name);
00362         xml_node_set_float (child, (const xmlChar *)
LABEL_MINIMUM,
00363                             input->variable[i].rangemin);
00364         if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
00365             xml_node_set_float (child, (const xmlChar *)
LABEL_ABSOLUTE_MINIMUM,
00366                                 input->variable[i].rangeminabs);
00367         xml_node_set_float (child, (const xmlChar *)
LABEL_MAXIMUM,
00368                             input->variable[i].rangemax);
00369         if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
00370             xml_node_set_float (child, (const xmlChar *)
LABEL_ABSOLUTE_MAXIMUM,
00371                                 input->variable[i].rangemaxabs);
00372         if (input->variable[i].precision !=
DEFAULT_PRECISION)
00373             xml_node_set_uint (child, (const xmlChar *)
LABEL_PRECISION,
00374                                 input->variable[i].precision);
00375         if (input->algorithm == ALGORITHM_SWEEP
00376             || input->algorithm == ALGORITHM_ORTHOGONAL)
00377             xml_node_set_uint (child, (const xmlChar *)
LABEL_NSWEEPS,
00378                                 input->variable[i].nsweeps);
00379         else if (input->algorithm == ALGORITHM_GENETIC)
00380             xml_node_set_uint (child, (const xmlChar *) LABEL_NBITS,
00381                                 input->variable[i].nbits);
00382         if (input->nsteps)
00383             xml_node_set_float (child, (const xmlChar *)
LABEL_STEP,
00384                                 input->variable[i].step);
00385     }
00386
00387     // Saving the error norm
00388     switch (input->norm)
00389     {
00390     case ERROR_NORM_MAXIMUM:
00391         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00392                     (const xmlChar *) LABEL_MAXIMUM);
00393         break;
00394     case ERROR_NORM_P:
00395         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00396                     (const xmlChar *) LABEL_P);
00397         xml_node_set_float (node, (const xmlChar *) LABEL_P,
input->p);
00398         break;
00399     case ERROR_NORM_TAXICAB:
00400         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00401                     (const xmlChar *) LABEL_TAXICAB);
00402     }
00403
00404     #if DEBUG_INTERFACE
00405     fprintf (stderr, "input_save: end\n");
00406     #endif
00407 }

```

Here is the call graph for this function:



#### 4.11.2.6 options\_new()

```
void options_new ( )
```

Function to open the options dialog.

Definition at line 632 of file [interface.c](#).

```

00633 {
00634 #if DEBUG_INTERFACE
00635     fprintf (stderr, "options_new: start\n");
00636 #endif
00637     options->label_seed = (GtkLabel *)
00638         gtk_label_new (_("Pseudo-random numbers generator seed"));
00639     options->spin_seed = (GtkSpinButton *)
00640         gtk_spin_button_new_with_range (0., (gdouble) G_MAXULONG, 1.);
00641     gtk_widget_set_tooltip_text
00642         (GTK_WIDGET (options->spin_seed),
00643          _("Seed to init the pseudo-random numbers generator"));
00644     gtk_spin_button_set_value (options->spin_seed, (gdouble) input->
seed);
00645     options->label_threads = (GtkLabel *)
00646         gtk_label_new (_("Threads number for the stochastic algorithm"));
00647     options->spin_threads
00648         = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
00649     gtk_widget_set_tooltip_text
00650         (GTK_WIDGET (options->spin_threads),
00651          _("Number of threads to perform the calibration/optimization for "
00652            "the stochastic algorithm"));
00653     gtk_spin_button_set_value (options->spin_threads, (gdouble)
nthreads);
00654     options->label_climbing = (GtkLabel *)
00655         gtk_label_new (_("Threads number for the hill climbing method"));
00656     options->spin_climbing =
00657         (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
00658     gtk_widget_set_tooltip_text
00659         (GTK_WIDGET (options->spin_climbing),
00660          _("Number of threads to perform the calibration/optimization for the "
00661            "hill climbing method"));
00662     gtk_spin_button_set_value (options->spin_climbing,
00663                               (gdouble) nthreads_climbing);
00664     options->grid = (GtkGrid *) gtk_grid_new ();
00665     gtk_grid_attach (options->grid, GTK_WIDGET (options->
label_seed), 0, 0, 1, 1);
00666     gtk_grid_attach (options->grid, GTK_WIDGET (options->
spin_seed), 1, 0, 1, 1);
00667     gtk_grid_attach (options->grid, GTK_WIDGET (options->
label_threads),
00668                     0, 1, 1, 1);
00669     gtk_grid_attach (options->grid, GTK_WIDGET (options->
spin_threads),
00670                     1, 1, 1, 1);
00671     gtk_grid_attach (options->grid, GTK_WIDGET (options->
label_climbing), 0, 2, 1,
00672                    1);
00673     gtk_grid_attach (options->grid, GTK_WIDGET (options->

```



```

    spin_climbing), 1, 2, 1,
00674         1);
00675     gtk_widget_show_all (GTK_WIDGET (options->grid));
00676     options->dialog = (GtkDialog *)
00677         gtk_dialog_new_with_buttons (_("Options"),
00678                                     window->window,
00679                                     GTK_DIALOG_MODAL,
00680                                     _("_OK"), GTK_RESPONSE_OK,
00681                                     _("_Cancel"), GTK_RESPONSE_CANCEL, NULL);
00682     gtk_container_add
00683         (GTK_CONTAINER (gtk_dialog_get_content_area (options->dialog)),
00684          GTK_WIDGET (options->grid));
00685     if (gtk_dialog_run (options->dialog) == GTK_RESPONSE_OK)
00686     {
00687         input->seed
00688             = (unsigned long int) gtk_spin_button_get_value (options->
00689 spin_seed);
00689         nthreads = gtk_spin_button_get_value_as_int (options->
00690 spin_threads);
00690         nthreads_climbing
00691             = gtk_spin_button_get_value_as_int (options->spin_climbing);
00692     }
00693     gtk_widget_destroy (GTK_WIDGET (options->dialog));
00694     #if DEBUG_INTERFACE
00695     fprintf (stderr, "options_new: end\n");
00696     #endif
00697 }

```

#### 4.11.2.7 running\_new()

```
void running_new ( )
```

Function to open the running dialog.

Definition at line 703 of file [interface.c](#).

```

00704 {
00705     #if DEBUG_INTERFACE
00706     fprintf (stderr, "running_new: start\n");
00707     #endif
00708     running->label = (GtkLabel *) gtk_label_new (_("Calculating ..."));
00709     running->spinner = (GtkSpinner *) gtk_spinner_new ();
00710     running->grid = (GtkGrid *) gtk_grid_new ();
00711     gtk_grid_attach (running->grid, GTK_WIDGET (running->label), 0, 0, 1, 1);
00712     gtk_grid_attach (running->grid, GTK_WIDGET (running->spinner), 0, 1, 1, 1);
00713     running->dialog = (GtkDialog *)
00714         gtk_dialog_new_with_buttons (_("Calculating"),
00715                                     window->window, GTK_DIALOG_MODAL, NULL, NULL);
00716     gtk_container_add (GTK_CONTAINER
00717         (gtk_dialog_get_content_area (running->dialog)),
00718          GTK_WIDGET (running->grid));
00719     gtk_spinner_start (running->spinner);
00720     gtk_widget_show_all (GTK_WIDGET (running->dialog));
00721     #if DEBUG_INTERFACE
00722     fprintf (stderr, "running_new: end\n");
00723     #endif
00724 }

```

#### 4.11.2.8 window\_about()

```
void window_about ( )
```

Function to show an about dialog.

Definition at line 1057 of file [interface.c](#).

```

01058 {
01059     static const gchar *authors[] = {
01060         "Javier Burguete Tolosa <jburguete@eead.csic.es>",
01061         "Borja Latorre Garcés <borja.latorre@csic.es>",
01062         NULL
01063     };
01064     #if DEBUG_INTERFACE
01065     fprintf (stderr, "window_about: start\n");
01066     #endif
01067     gtk_show_about_dialog
01068     (window->window,
01069      "program_name", "MPCOTool",
01070      "comments",
01071      _("The Multi-Purposes Calibration and Optimization Tool.\n"
01072       "A software to perform calibrations or optimizations of empirical "
01073       "parameters"),
01074      "authors", authors,
01075      "translator-credits",
01076      "Javier Burguete Tolosa <jburguete@eead.csic.es> "
01077       "(english, french and spanish)\n"
01078       "Uğur Çayoğlu (german)",
01079      "version", "4.0.1",
01080      "copyright", "Copyright 2012-2018 Javier Burguete Tolosa",
01081      "logo", window->logo,
01082      "website", "https://github.com/jburguete/mpcotool",
01083      "license-type", GTK_LICENSE_BSD, NULL);
01084     #if DEBUG_INTERFACE
01085     fprintf (stderr, "window_about: end\n");
01086     #endif
01087 }

```

#### 4.11.2.9 window\_add\_experiment()

```
void window_add_experiment ( )
```

Function to add an experiment in the main window.

Definition at line 1392 of file [interface.c](#).

```

01393 {
01394     unsigned int i, j;
01395     #if DEBUG_INTERFACE
01396     fprintf (stderr, "window_add_experiment: start\n");
01397     #endif
01398     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01399     g_signal_handler_block (window->combo_experiment, window->
01400     id_experiment);
01401     gtk_combo_box_text_insert_text
01402     (window->combo_experiment, i, input->experiment[i].
01403     name);
01404     g_signal_handler_unblock (window->combo_experiment,
01405     window->id_experiment);
01406     input->experiment = (Experiment *) g_realloc
01407     (input->experiment, (input->nexperiments + 1) * sizeof (
01408     Experiment));
01409     for (j = input->nexperiments - 1; j > i; --j)
01410     memcpy (input->experiment + j + 1, input->experiment + j,
01411     sizeof (Experiment));
01412     input->experiment[j + 1].weight = input->experiment[j].
01413     weight;
01414     input->experiment[j + 1].ninputs = input->
01415     experiment[j].ninputs;
01416     if (input->type == INPUT_TYPE_XML)
01417     {
01418         input->experiment[j + 1].name
01419         = (char *) xmlStrdup ((xmlChar *) input->experiment[j].
01420         name);
01421         for (j = 0; j < input->experiment->ninputs; ++j)
01422             input->experiment[i + 1].stencil[j]
01423             = (char *) xmlStrdup ((xmlChar *) input->experiment[i].
01424             stencil[j]);
01425     }
01426     else
01427     {
01428         input->experiment[j + 1].name = g_strdup (input->

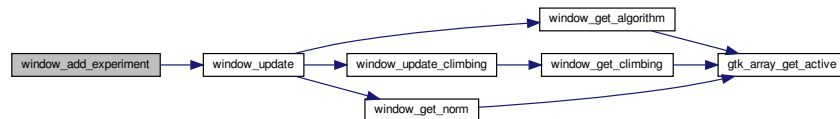
```

```

    experiment[j].name);
01421     for (j = 0; j < input->experiment->ninputs; ++j)
01422         input->experiment[i + 1].stencil[j]
01423         = g_strdup (input->experiment[i].stencil[j]);
01424     }
01425     ++input->nexperiments;
01426     for (j = 0; j < input->experiment->ninputs; ++j)
01427         g_signal_handler_block (window->button_template[j],
window->id_input[j]);
01428     g_signal_handler_block
01429     (window->button_experiment, window->
id_experiment_name);
01430     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i + 1);
01431     g_signal_handler_unblock
01432     (window->button_experiment, window->
id_experiment_name);
01433     for (j = 0; j < input->experiment->ninputs; ++j)
01434         g_signal_handler_unblock (window->button_template[j],
window->id_input[j]);
01435     window_update ();
01436     #if DEBUG_INTERFACE
01437     fprintf (stderr, "window_add_experiment: end\n");
01438     #endif
01439 }

```

Here is the call graph for this function:



#### 4.11.2.10 window\_add\_variable()

```
void window_add_variable ( )
```

Function to add a variable in the main window.

Definition at line 1655 of file [interface.c](#).

```

01656 {
01657     unsigned int i, j;
01658     #if DEBUG_INTERFACE
01659     fprintf (stderr, "window_add_variable: start\n");
01660     #endif
01661     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01662     g_signal_handler_block (window->combo_variable, window->
id_variable);
01663     gtk_combo_box_text_insert_text (window->combo_variable, i,
01664                                     input->variable[i].name);
01665     g_signal_handler_unblock (window->combo_variable, window->
id_variable);
01666     input->variable = (Variable *) g_realloc
01667     (input->variable, (input->nvariables + 1) * sizeof (
Variable));
01668     for (j = input->nvariables - 1; j > i; --j)
01669         memcpy (input->variable + j + 1, input->variable + j, sizeof (
Variable));
01670     memcpy (input->variable + j + 1, input->variable + j, sizeof (
Variable));
01671     if (input->type == INPUT_TYPE_XML)
01672         input->variable[j + 1].name
01673         = (char *) xmlStrdup ((xmlChar *) input->variable[j].name);
01674     else
01675         input->variable[j + 1].name = g_strdup (input->

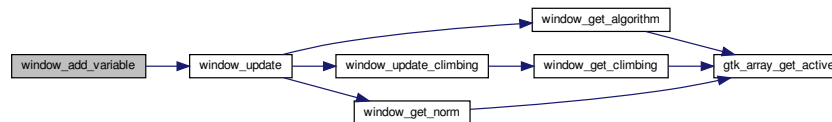
```

```

        variable[j].name);
01676     ++input->nvariables;
01677     g_signal_handler_block (window->entry_variable, window->
        id_variable_label);
01678     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i + 1);
01679     g_signal_handler_unblock (window->entry_variable, window->
        id_variable_label);
01680     window_update ();
01681     #if DEBUG_INTERFACE
01682     fprintf (stderr, "window_add_variable: end\n");
01683     #endif
01684 }

```

Here is the call graph for this function:



#### 4.11.2.11 window\_get\_algorithm()

```
unsigned int window_get_algorithm ( )
```

Function to get the stochastic algorithm number.

##### Returns

Stochastic algorithm number.

Definition at line 732 of file [interface.c](#).

```

00733 {
00734     unsigned int i;
00735     #if DEBUG_INTERFACE
00736     fprintf (stderr, "window_get_algorithm: start\n");
00737     #endif
00738     i = gtk_array_get_active (window->button_algorithm,
        NALGORITHMS);
00739     #if DEBUG_INTERFACE
00740     fprintf (stderr, "window_get_algorithm: %u\n", i);
00741     fprintf (stderr, "window_get_algorithm: end\n");
00742     #endif
00743     return i;
00744 }

```

Here is the call graph for this function:



#### 4.11.2.12 window\_get\_climbing()

```
unsigned int window_get_climbing ( )
```

Function to get the hill climbing method number.

##### Returns

Hill climbing method number.

Definition at line 752 of file [interface.c](#).

```
00753 {  
00754     unsigned int i;  
00755     #if DEBUG_INTERFACE  
00756     fprintf (stderr, "window_get_climbing: start\n");  
00757     #endif  
00758     i = gtk_array_get_active (window->button_climbing,  
00759                             NCLIMBINGS);  
00759     #if DEBUG_INTERFACE  
00760     fprintf (stderr, "window_get_climbing: %u\n", i);  
00761     fprintf (stderr, "window_get_climbing: end\n");  
00762     #endif  
00763     return i;  
00764 }
```

Here is the call graph for this function:



#### 4.11.2.13 window\_get\_norm()

```
unsigned int window_get_norm ( )
```

Function to get the norm method number.

##### Returns

Norm method number.

Definition at line 772 of file [interface.c](#).

```

00773 {
00774     unsigned int i;
00775     #if DEBUG_INTERFACE
00776     fprintf (stderr, "window_get_norm: start\n");
00777     #endif
00778     i = gtk_array_get_active (window->button_norm,
NNORMS);
00779     #if DEBUG_INTERFACE
00780     fprintf (stderr, "window_get_norm: %u\n", i);
00781     fprintf (stderr, "window_get_norm: end\n");
00782     #endif
00783     return i;
00784 }

```

Here is the call graph for this function:



#### 4.11.2.14 window\_help()

```
void window_help ( )
```

Function to show a help dialog.

Definition at line 1029 of file [interface.c](#).

```

01030 {
01031     char *buffer, *buffer2;
01032     #if DEBUG_INTERFACE
01033     fprintf (stderr, "window_help: start\n");
01034     #endif
01035     buffer2 = g_build_filename (window->application_directory, "..", "manuals",
01036                               _("user-manual.pdf"), NULL);
01037     buffer = g_filename_to_uri (buffer2, NULL, NULL);
01038     g_free (buffer2);
01039     #if GTK_MINOR_VERSION >= 22
01040     gtk_show_uri_on_window (window->window, buffer, GDK_CURRENT_TIME, NULL);
01041     #else
01042     gtk_show_uri (NULL, buffer, GDK_CURRENT_TIME, NULL);
01043     #endif
01044     #if DEBUG_INTERFACE
01045     fprintf (stderr, "window_help: uri=%s\n", buffer);
01046     #endif
01047     g_free (buffer);
01048     #if DEBUG_INTERFACE
01049     fprintf (stderr, "window_help: end\n");
01050     #endif
01051 }

```

## 4.11.2.15 window\_inputs\_experiment()

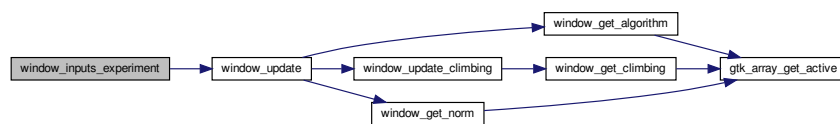
```
void window_inputs_experiment ( )
```

Function to update the experiment input templates number in the main window.

Definition at line 1492 of file [interface.c](#).

```
01493 {
01494     unsigned int j;
01495     #if DEBUG_INTERFACE
01496     fprintf (stderr, "window_inputs_experiment: start\n");
01497     #endif
01498     j = input->experiment->ninputs - 1;
01499     if (j
01500         && !gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON
01501                                           (window->check_template[j]))
01502         --input->experiment->ninputs;
01503     if (input->experiment->ninputs < MAX_NINPUTS
01504         && gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON
01505                                           (window->check_template[j]))
01506         ++input->experiment->ninputs;
01507     window_update ();
01508     #if DEBUG_INTERFACE
01509     fprintf (stderr, "window_inputs_experiment: end\n");
01510     #endif
01511 }
```

Here is the call graph for this function:



## 4.11.2.16 window\_label\_variable()

```
void window_label_variable ( )
```

Function to set the variable label in the main window.

Definition at line 1690 of file [interface.c](#).

```
01691 {
01692     unsigned int i;
01693     const char *buffer;
01694     #if DEBUG_INTERFACE
01695     fprintf (stderr, "window_label_variable: start\n");
01696     #endif
01697     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01698     buffer = gtk_entry_get_text (window->entry_variable);
01699     g_signal_handler_block (window->combo_variable, window->
01700                           id_variable);
01701     gtk_combo_box_text_remove (window->combo_variable, i);
01702     gtk_combo_box_text_insert_text (window->combo_variable, i, buffer);
01703     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i);
01704     g_signal_handler_unblock (window->combo_variable, window->
01705                             id_variable);
01706     #if DEBUG_INTERFACE
01707     fprintf (stderr, "window_label_variable: end\n");
01708     #endif
01709 }
```

#### 4.11.2.17 window\_name\_experiment()

```
void window_name_experiment ( )
```

Function to set the experiment name in the main window.

Definition at line 1445 of file [interface.c](#).

```
01446 {
01447     unsigned int i;
01448     char *buffer;
01449     GFile *file1, *file2;
01450     #if DEBUG_INTERFACE
01451     fprintf (stderr, "window_name_experiment: start\n");
01452     #endif
01453     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01454     file1
01455         = gtk_file_chooser_get_file (GTK_FILE_CHOOSER (window->
button_experiment));
01456     file2 = g_file_new_for_path (input->directory);
01457     buffer = g_file_get_relative_path (file2, file1);
01458     g_signal_handler_block (window->combo_experiment, window->
id_experiment);
01459     gtk_combo_box_text_remove (window->combo_experiment, i);
01460     gtk_combo_box_text_insert_text (window->combo_experiment, i, buffer);
01461     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i);
01462     g_signal_handler_unblock (window->combo_experiment,
window->id_experiment);
01463     g_free (buffer);
01464     g_object_unref (file2);
01465     g_object_unref (file1);
01466     #if DEBUG_INTERFACE
01467     fprintf (stderr, "window_name_experiment: end\n");
01468     #endif
01469 }
```

#### 4.11.2.18 window\_new()

```
void window_new (
    GtkApplication * application )
```

Function to open the main window.

##### Parameters

<i>application</i>	GtkApplication struct.
--------------------	------------------------

Definition at line 2065 of file [interface.c](#).

```
02066 {
02067     unsigned int i;
02068     char *buffer, *buffer2, buffer3[64];
02069     char *label_algorithm[NALGORITHMS] = {
02070         "_Monte-Carlo", _("_Sweep"), _("_Genetic"), _("_Orthogonal")
02071     };
02072     char *tip_algorithm[NALGORITHMS] = {
02073         _("Monte-Carlo brute force algorithm"),
02074         _("Sweep brute force algorithm"),
02075         _("Genetic algorithm"),
02076         _("Orthogonal sampling brute force algorithm"),
02077     };
02078     char *label_climbing[NCLIMBINGS] = {
02079         _("_Coordinates climbing"), _("_Random climbing")
02080     };
```



```

02081 char *tip_climbing[NCLIMBINGS] = {
02082     _("Coordinates climbing estimate method"),
02083     _("Random climbing estimate method")
02084 };
02085 char *label_norm[NNORMS] = { "L2", "L", "Lp", "L1" };
02086 char *tip_norm[NNORMS] = {
02087     _("Euclidean error norm (L2)"),
02088     _("Maximum error norm (L)"),
02089     _("P error norm (Lp)"),
02090     _("Taxicab error norm (L1)")
02091 };
02092
02093 #if DEBUG_INTERFACE
02094 fprintf (stderr, "window_new: start\n");
02095 #endif
02096
02097 // Creating the window
02098 window->window = main_window
02099     = (GtkWindow *) gtk_application_window_new (application);
02100
02101 // Finish when closing the window
02102 g_signal_connect_swapped (window->window, "delete-event",
02103     G_CALLBACK (g_application_quit),
02104     G_APPLICATION (application));
02105
02106 // Setting the window title
02107 gtk_window_set_title (window->window, "MPCOTool");
02108
02109 // Creating the open button
02110 window->button_open = (GtkToolButton *) gtk_tool_button_new
02111     (gtk_image_new_from_icon_name ("document-open",
02112     GTK_ICON_SIZE_LARGE_TOOLBAR), _("Open"));
02113 g_signal_connect (window->button_open, "clicked", window_open, NULL);
02114
02115 // Creating the save button
02116 window->button_save = (GtkToolButton *) gtk_tool_button_new
02117     (gtk_image_new_from_icon_name ("document-save",
02118     GTK_ICON_SIZE_LARGE_TOOLBAR), _("Save"));
02119 g_signal_connect (window->button_save, "clicked", (GCallback)
window_save,
02120     NULL);
02121
02122 // Creating the run button
02123 window->button_run = (GtkToolButton *) gtk_tool_button_new
02124     (gtk_image_new_from_icon_name ("system-run",
02125     GTK_ICON_SIZE_LARGE_TOOLBAR), _("Run"));
02126 g_signal_connect (window->button_run, "clicked", window_run, NULL);
02127
02128 // Creating the options button
02129 window->button_options = (GtkToolButton *) gtk_tool_button_new
02130     (gtk_image_new_from_icon_name ("preferences-system",
02131     GTK_ICON_SIZE_LARGE_TOOLBAR), _("Options"));
02132 g_signal_connect (window->button_options, "clicked",
options_new, NULL);
02133
02134 // Creating the help button
02135 window->button_help = (GtkToolButton *) gtk_tool_button_new
02136     (gtk_image_new_from_icon_name ("help-browser",
02137     GTK_ICON_SIZE_LARGE_TOOLBAR), _("Help"));
02138 g_signal_connect (window->button_help, "clicked", window_help, NULL);
02139
02140 // Creating the about button
02141 window->button_about = (GtkToolButton *) gtk_tool_button_new
02142     (gtk_image_new_from_icon_name ("help-about",
02143     GTK_ICON_SIZE_LARGE_TOOLBAR), _("About"));
02144 g_signal_connect (window->button_about, "clicked",
window_about, NULL);
02145
02146 // Creating the exit button
02147 window->button_exit = (GtkToolButton *) gtk_tool_button_new
02148     (gtk_image_new_from_icon_name ("application-exit",
02149     GTK_ICON_SIZE_LARGE_TOOLBAR), _("Exit"));
02150 g_signal_connect_swapped (window->button_exit, "clicked",
G_CALLBACK (g_application_quit),
02151     G_APPLICATION (application));
02152
02153 // Creating the buttons bar
02154 window->bar_buttons = (GtkToolbar *) gtk_toolbar_new ();
02155 gtk_toolbar_insert
02156     (window->bar_buttons, GTK_TOOL_ITEM (window->
button_open), 0);
02157 gtk_toolbar_insert
02158     (window->bar_buttons, GTK_TOOL_ITEM (window->
button_save), 1);
02159 gtk_toolbar_insert
02160     (window->bar_buttons, GTK_TOOL_ITEM (window->
button_run), 2);

```

```

02162 gtk_toolbar_insert
02163 (window->bar_buttons, GTK_TOOL_ITEM (window->
button_options), 3);
02164 gtk_toolbar_insert
02165 (window->bar_buttons, GTK_TOOL_ITEM (window->
button_help), 4);
02166 gtk_toolbar_insert
02167 (window->bar_buttons, GTK_TOOL_ITEM (window->
button_about), 5);
02168 gtk_toolbar_insert
02169 (window->bar_buttons, GTK_TOOL_ITEM (window->
button_exit), 6);
02170 gtk_toolbar_set_style (window->bar_buttons, GTK_TOOLBAR_BOTH);
02171
02172 // Creating the simulator program label and entry
02173 window->label_simulator = (GtkLabel *) gtk_label_new (_("Simulator program"));
02174 window->button_simulator = (GtkFileChooserButton *)
02175 gtk_file_chooser_button_new (_("Simulator program"),
02176 GTK_FILE_CHOOSER_ACTION_OPEN);
02177 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_simulator),
02178 _("Simulator program executable file"));
02179 gtk_widget_set_hexpand (GTK_WIDGET (window->button_simulator), TRUE);
02180
02181 // Creating the evaluator program label and entry
02182 window->check_evaluator = (GtkCheckButton *)
02183 gtk_check_button_new_with_mnemonic (_("_Evaluator program"));
02184 g_signal_connect (window->check_evaluator, "toggled",
window_update, NULL);
02185 window->button_evaluator = (GtkFileChooserButton *)
02186 gtk_file_chooser_button_new (_("Evaluator program"),
02187 GTK_FILE_CHOOSER_ACTION_OPEN);
02188 gtk_widget_set_tooltip_text
02189 (GTK_WIDGET (window->button_evaluator),
02190 _("Optional evaluator program executable file"));
02191
02192 // Creating the results files labels and entries
02193 window->label_result = (GtkLabel *) gtk_label_new (_("Result file"));
02194 window->entry_result = (GtkEntry *) gtk_entry_new ();
02195 gtk_widget_set_tooltip_text
02196 (GTK_WIDGET (window->entry_result), _("Best results file"));
02197 window->label_variables = (GtkLabel *) gtk_label_new (_("Variables file"));
02198 window->entry_variables = (GtkEntry *) gtk_entry_new ();
02199 gtk_widget_set_tooltip_text
02200 (GTK_WIDGET (window->entry_variables), _("All simulated results file"));
02201
02202 // Creating the files grid and attaching widgets
02203 window->grid_files = (GtkGrid *) gtk_grid_new ();
02204 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
label_simulator),
02205 0, 0, 1, 1);
02206 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
button_simulator),
02207 1, 0, 1, 1);
02208 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
check_evaluator),
02209 0, 1, 1, 1);
02210 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
button_evaluator),
02211 1, 1, 1, 1);
02212 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
label_result),
02213 0, 2, 1, 1);
02214 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
entry_result),
02215 1, 2, 1, 1);
02216 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
label_variables),
02217 0, 3, 1, 1);
02218 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
entry_variables),
02219 1, 3, 1, 1);
02220
02221 // Creating the algorithm properties
02222 window->label_simulations = (GtkLabel *) gtk_label_new
02223 (_("Simulations number"));
02224 window->spin_simulations
02225 = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02226 gtk_widget_set_tooltip_text
02227 (GTK_WIDGET (window->spin_simulations),
02228 _("Number of simulations to perform for each iteration"));
02229 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_simulations), TRUE);
02230 window->label_iterations = (GtkLabel *)
02231 gtk_label_new (_("Iterations number"));
02232 window->spin_iterations
02233 = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02234 gtk_widget_set_tooltip_text
02235 (GTK_WIDGET (window->spin_iterations), _("Number of iterations"));

```

```

02236 g_signal_connect
02237 (window->spin_iterations, "value-changed",
window_update, NULL);
02238 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_iterations), TRUE);
02239 window->label_tolerance = (GtkLabel *) gtk_label_new (_("Tolerance"));
02240 window->spin_tolerance =
02241 (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02242 gtk_widget_set_tooltip_text
02243 (GTK_WIDGET (window->spin_tolerance),
_("Tolerance to set the variable interval on the next iteration"));
02244 window->label_bests = (GtkLabel *) gtk_label_new (_("Bests number"));
02245 window->spin_bests
02246 = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02247 gtk_widget_set_tooltip_text
02248 (GTK_WIDGET (window->spin_bests),
_("Number of best simulations used to set the variable interval "
"on the next iteration"));
02250 window->label_population
02251 = (GtkLabel *) gtk_label_new (_("Population number"));
02252 window->spin_population
02253 = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02254 gtk_widget_set_tooltip_text
02255 (GTK_WIDGET (window->spin_population),
_("Number of population for the genetic algorithm"));
02256 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_population), TRUE);
02257 window->label_generations
02258 = (GtkLabel *) gtk_label_new (_("Generations number"));
02259 window->spin_generations
02260 = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02261 gtk_widget_set_tooltip_text
02262 (GTK_WIDGET (window->spin_generations),
_("Number of generations for the genetic algorithm"));
02263 window->label_mutation = (GtkLabel *) gtk_label_new (_("Mutation ratio"));
02264 window->spin_mutation
02265 = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02266 gtk_widget_set_tooltip_text
02267 (GTK_WIDGET (window->spin_mutation),
_("Ratio of mutation for the genetic algorithm"));
02268 window->label_reproduction
02269 = (GtkLabel *) gtk_label_new (_("Reproduction ratio"));
02270 window->spin_reproduction
02271 = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02272 gtk_widget_set_tooltip_text
02273 (GTK_WIDGET (window->spin_reproduction),
_("Ratio of reproduction for the genetic algorithm"));
02274 window->label_adaptation = (GtkLabel *) gtk_label_new (_("Adaptation ratio"));
02275 window->spin_adaptation
02276 = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02277 gtk_widget_set_tooltip_text
02278 (GTK_WIDGET (window->spin_adaptation),
_("Ratio of adaptation for the genetic algorithm"));
02279 window->label_threshold = (GtkLabel *) gtk_label_new (_("Threshold"));
02280 window->spin_threshold = (GtkSpinButton *)
02281 gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE,
precision[DEFAULT_PRECISION]);
02282 gtk_widget_set_tooltip_text
02283 (GTK_WIDGET (window->spin_threshold),
_("Threshold in the objective function to finish the simulations"));
02284 window->scrolled_threshold =
02285 (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02286 gtk_container_add (GTK_CONTAINER (window->scrolled_threshold),
GTK_WIDGET (window->spin_threshold));
02287 // gtk_widget_set_hexpand (GTK_WIDGET (window->scrolled_threshold), TRUE);
02288 // gtk_widget_set_halign (GTK_WIDGET (window->scrolled_threshold),
// GTK_ALIGN_FILL);
02289
02290 // Creating the hill climbing method properties
02291 window->check_climbing = (GtkCheckButton *)
02292 gtk_check_button_new_with_mnemonic (_("Hill climbing method"));
02293 g_signal_connect (window->check_climbing, "clicked",
window_update, NULL);
02294 window->grid_climbing = (GtkGrid *) gtk_grid_new ();
02295 window->button_climbing[0] = (GtkRadioButton *)
02296 gtk_radio_button_new_with_mnemonic (NULL, label_climbing[0]);
02297 gtk_grid_attach (window->grid_climbing,
GTK_WIDGET (window->button_climbing[0]), 0, 0, 1, 1);
02298 g_signal_connect (window->button_climbing[0], "clicked",
window_update, NULL);
02299 for (i = 0; ++i < NCLIMBINGS;)
02300 {
02301 window->button_climbing[i] = (GtkRadioButton *)
02302 gtk_radio_button_new_with_mnemonic
02303 (gtk_radio_button_get_group (window->button_climbing[0]),
label_climbing[i]);
02304 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_climbing[i]),
tip_climbing[i]);
02305 gtk_grid_attach (window->grid_climbing,

```

```

02320         GTK_WIDGET (window->button_climbing[i]), 0, i, 1, 1);
02321     g_signal_connect (window->button_climbing[i], "clicked",
window_update,
02322         NULL);
02323     }
02324     window->label_steps = (GtkLabel *) gtk_label_new (_("Steps number"));
02325     window->spin_steps = (GtkSpinButton *)
02326     gtk_spin_button_new_with_range (1., 1.e12, 1.);
02327     gtk_widget_set_hexpand (GTK_WIDGET (window->spin_steps), TRUE);
02328     window->label_estimates
02329     = (GtkLabel *) gtk_label_new (_("Climbing estimates number"));
02330     window->spin_estimates = (GtkSpinButton *)
02331     gtk_spin_button_new_with_range (1., 1.e3, 1.);
02332     window->label_relaxation
02333     = (GtkLabel *) gtk_label_new (_("Relaxation parameter"));
02334     window->spin_relaxation = (GtkSpinButton *)
02335     gtk_spin_button_new_with_range (0., 2., 0.001);
02336     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
label_steps),
02337         0, NCLIMBINGS, 1, 1);
02338     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
spin_steps),
02339         1, NCLIMBINGS, 1, 1);
02340     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
label_estimates),
02341         0, NCLIMBINGS + 1, 1, 1);
02342     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
spin_estimates),
02343         1, NCLIMBINGS + 1, 1, 1);
02344     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
label_relaxation),
02345         0, NCLIMBINGS + 2, 1, 1);
02346     gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
spin_relaxation),
02347         1, NCLIMBINGS + 2, 1, 1);
02348
02349     // Creating the array of algorithms
02350     window->grid_algorithm = (GtkGrid *) gtk_grid_new ();
02351     window->button_algorithm[0] = (GtkRadioButton *)
02352     gtk_radio_button_new_with_mnemonic (NULL, label_algorithm[0]);
02353     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[0]),
02354         tip_algorithm[0]);
02355     gtk_grid_attach (window->grid_algorithm,
02356         GTK_WIDGET (window->button_algorithm[0]), 0, 0, 1, 1);
02357     g_signal_connect (window->button_algorithm[0], "clicked",
02358         window_set_algorithm, NULL);
02359     for (i = 0; ++i < NALGORITHMS;)
02360     {
02361         window->button_algorithm[i] = (GtkRadioButton *)
02362         gtk_radio_button_new_with_mnemonic
02363         (gtk_radio_button_get_group (window->button_algorithm[0]),
02364             label_algorithm[i]);
02365         gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[i]),
02366             tip_algorithm[i]);
02367         gtk_grid_attach (window->grid_algorithm,
02368             GTK_WIDGET (window->button_algorithm[i]), 0, i, 1, 1);
02369         g_signal_connect (window->button_algorithm[i], "clicked",
02370             window_set_algorithm, NULL);
02371     }
02372     gtk_grid_attach (window->grid_algorithm,
02373         GTK_WIDGET (window->label_simulations),
02374         0, NALGORITHMS, 1, 1);
02375     gtk_grid_attach (window->grid_algorithm,
02376         GTK_WIDGET (window->spin_simulations), 1, NALGORITHMS, 1, 1);
02377     gtk_grid_attach (window->grid_algorithm,
02378         GTK_WIDGET (window->label_iterations),
02379         0, NALGORITHMS + 1, 1, 1);
02380     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
window->spin_iterations),
02381         1, NALGORITHMS + 1, 1, 1);
02382     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
window->label_tolerance),
02383         0, NALGORITHMS + 2, 1, 1);
02384     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
window->spin_tolerance),
02385         1, NALGORITHMS + 2, 1, 1);
02386     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
window->label_bests),
02387         0, NALGORITHMS + 3, 1, 1);
02388     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
window->spin_bests),
02389         1, NALGORITHMS + 3, 1, 1);
02390     gtk_grid_attach (window->grid_algorithm,
02391         GTK_WIDGET (window->label_population),
02392         0, NALGORITHMS + 4, 1, 1);
02393     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
window->spin_population),

```

```

02394         1, NALGORITHMS + 4, 1, 1);
02395     gtk_grid_attach (window->grid_algorithm,
02396         GTK_WIDGET (window->label_generations),
02397         0, NALGORITHMS + 5, 1, 1);
02398     gtk_grid_attach (window->grid_algorithm,
02399         GTK_WIDGET (window->spin_generations),
02400         1, NALGORITHMS + 5, 1, 1);
02401     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02402         window->label_mutation),
02403         0, NALGORITHMS + 6, 1, 1);
02404     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02405         window->spin_mutation),
02406         1, NALGORITHMS + 6, 1, 1);
02407     gtk_grid_attach (window->grid_algorithm,
02408         GTK_WIDGET (window->label_reproduction),
02409         0, NALGORITHMS + 7, 1, 1);
02410     gtk_grid_attach (window->grid_algorithm,
02411         GTK_WIDGET (window->spin_reproduction),
02412         1, NALGORITHMS + 7, 1, 1);
02413     gtk_grid_attach (window->grid_algorithm,
02414         GTK_WIDGET (window->label_adaptation),
02415         0, NALGORITHMS + 8, 1, 1);
02416     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02417         window->spin_adaptation),
02418         1, NALGORITHMS + 8, 1, 1);
02419     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02420         window->check_climbing),
02421         0, NALGORITHMS + 9, 2, 1);
02422     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02423         window->grid_climbing),
02424         0, NALGORITHMS + 10, 2, 1);
02425     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02426         window->label_threshold),
02427         0, NALGORITHMS + 11, 1, 1);
02428     gtk_grid_attach (window->grid_algorithm,
02429         GTK_WIDGET (window->scrolled_threshold),
02430         1, NALGORITHMS + 11, 1, 1);
02431     window->frame_algorithm = (GtkFrame *) gtk_frame_new (_("Algorithm"));
02432     gtk_container_add (GTK_CONTAINER (window->frame_algorithm),
02433         GTK_WIDGET (window->grid_algorithm));
02434
02435     // Creating the variable widgets
02436     window->combo_variable = (GtkComboBoxText *) gtk_combo_box_text_new ();
02437     gtk_widget_set_tooltip_text
02438         (GTK_WIDGET (window->combo_variable), _("Variables selector"));
02439     window->id_variable = g_signal_connect
02440         (window->combo_variable, "changed", window_set_variable, NULL);
02441     window->button_add_variable = (GtkButton *)
02442         gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);
02443     g_signal_connect (window->button_add_variable, "clicked",
02444         window_add_variable,
02445         NULL);
02446     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_variable),
02447         _("Add variable"));
02448     window->button_remove_variable = (GtkButton *)
02449         gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02450     g_signal_connect (window->button_remove_variable, "clicked",
02451         window_remove_variable, NULL);
02452     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_remove_variable),
02453         _("Remove variable"));
02454     window->label_variable = (GtkLabel *) gtk_label_new (_("Name"));
02455     window->entry_variable = (GtkEntry *) gtk_entry_new ();
02456     gtk_widget_set_tooltip_text
02457         (GTK_WIDGET (window->entry_variable), _("Variable name"));
02458     gtk_widget_set_expand (GTK_WIDGET (window->entry_variable), TRUE);
02459     window->id_variable_label = g_signal_connect
02460         (window->entry_variable, "changed",
02461         window_label_variable, NULL);
02462     window->label_min = (GtkLabel *) gtk_label_new (_("Minimum"));
02463     window->spin_min = (GtkSpinButton *) gtk_spin_button_new_with_range
02464         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02465     gtk_widget_set_tooltip_text
02466         (GTK_WIDGET (window->spin_min), _("Minimum initial value of the variable"));
02467     window->scrolled_min
02468         = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02469     gtk_container_add (GTK_CONTAINER (window->scrolled_min),
02470         GTK_WIDGET (window->spin_min));
02471     g_signal_connect (window->spin_min, "value-changed",
02472         window_rangemin_variable, NULL);
02473     window->label_max = (GtkLabel *) gtk_label_new (_("Maximum"));
02474     window->spin_max = (GtkSpinButton *) gtk_spin_button_new_with_range
02475         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02476     gtk_widget_set_tooltip_text
02477         (GTK_WIDGET (window->spin_max), _("Maximum initial value of the variable"));
02478     window->scrolled_max
02479         = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02480     gtk_container_add (GTK_CONTAINER (window->scrolled_max),

```

```

02473         GTK_WIDGET (window->spin_max));
02474 g_signal_connect (window->spin_max, "value-changed",
02475                  window_rangemax_variable, NULL);
02476 window->check_minabs = (GtkCheckButton *)
02477   gtk_check_button_new_with_mnemonic (_("Absolute minimum"));
02478 g_signal_connect (window->check_minabs, "toggled",
window_update, NULL);
02479 window->spin_minabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02480   (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02481 gtk_widget_set_tooltip_text
02482   (GTK_WIDGET (window->spin_minabs),
02483    _("Minimum allowed value of the variable"));
02484 window->scrolled_minabs
02485   = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02486 gtk_container_add (GTK_CONTAINER (window->scrolled_minabs),
02487                  GTK_WIDGET (window->spin_minabs));
02488 g_signal_connect (window->spin_minabs, "value-changed",
02489                  window_rangeminabs_variable, NULL);
02490 window->check_maxabs = (GtkCheckButton *)
02491   gtk_check_button_new_with_mnemonic (_("Absolute maximum"));
02492 g_signal_connect (window->check_maxabs, "toggled",
window_update, NULL);
02493 window->spin_maxabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02494   (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02495 gtk_widget_set_tooltip_text
02496   (GTK_WIDGET (window->spin_maxabs),
02497    _("Maximum allowed value of the variable"));
02498 window->scrolled_maxabs
02499   = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02500 gtk_container_add (GTK_CONTAINER (window->scrolled_maxabs),
02501                  GTK_WIDGET (window->spin_maxabs));
02502 g_signal_connect (window->spin_maxabs, "value-changed",
02503                  window_rangemaxabs_variable, NULL);
02504 window->label_precision = (GtkLabel *) gtk_label_new (_("Precision digits"));
02505 window->spin_precision = (GtkSpinButton *)
02506   gtk_spin_button_new_with_range (0., (gdouble) DEFAULT_PRECISION, 1.);
02507 gtk_widget_set_tooltip_text
02508   (GTK_WIDGET (window->spin_precision),
02509    _("Number of precision floating point digits\n"
02510      "0 is for integer numbers"));
02511 g_signal_connect (window->spin_precision, "value-changed",
02512                  window_precision_variable, NULL);
02513 window->label_sweeps = (GtkLabel *) gtk_label_new (_("Sweeps number"));
02514 window->spin_sweeps =
02515   (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02516 gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_sweeps),
02517   _("Number of steps sweeping the variable"));
02518 g_signal_connect (window->spin_sweeps, "value-changed",
02519                  window_update_variable, NULL);
02520 window->label_bits = (GtkLabel *) gtk_label_new (_("Bits number"));
02521 window->spin_bits
02522   = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
02523 gtk_widget_set_tooltip_text
02524   (GTK_WIDGET (window->spin_bits),
02525    _("Number of bits to encode the variable"));
02526 g_signal_connect
02527   (window->spin_bits, "value-changed", window_update_variable, NULL);
;
02528 window->label_step = (GtkLabel *) gtk_label_new (_("Step size"));
02529 window->spin_step = (GtkSpinButton *) gtk_spin_button_new_with_range
02530   (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02531 gtk_widget_set_tooltip_text
02532   (GTK_WIDGET (window->spin_step),
02533    _("Initial step size for the hill climbing method"));
02534 window->scrolled_step
02535   = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02536 gtk_container_add (GTK_CONTAINER (window->scrolled_step),
02537                  GTK_WIDGET (window->spin_step));
02538 g_signal_connect
02539   (window->spin_step, "value-changed", window_step_variable, NULL);
02540 window->grid_variable = (GtkGrid *) gtk_grid_new ();
02541 gtk_grid_attach (window->grid_variable,
02542                GTK_WIDGET (window->combo_variable), 0, 0, 2, 1);
02543 gtk_grid_attach (window->grid_variable,
02544                GTK_WIDGET (window->button_add_variable), 2, 0, 1, 1);
02545 gtk_grid_attach (window->grid_variable,
02546                GTK_WIDGET (window->button_remove_variable), 3, 0, 1, 1);
02547 gtk_grid_attach (window->grid_variable,
02548                GTK_WIDGET (window->label_variable), 0, 1, 1, 1);
02549 gtk_grid_attach (window->grid_variable,
02550                GTK_WIDGET (window->entry_variable), 1, 1, 3, 1);
02551 gtk_grid_attach (window->grid_variable,
02552                GTK_WIDGET (window->label_min), 0, 2, 1, 1);
02553 gtk_grid_attach (window->grid_variable,
02554                GTK_WIDGET (window->scrolled_min), 1, 2, 3, 1);
02555 gtk_grid_attach (window->grid_variable,
02556                GTK_WIDGET (window->label_max), 0, 3, 1, 1);

```

```

02557 gtk_grid_attach (window->grid_variable,
02558                 GTK_WIDGET (window->scrolled_max), 1, 3, 3, 1);
02559 gtk_grid_attach (window->grid_variable,
02560                 GTK_WIDGET (window->check_minabs), 0, 4, 1, 1);
02561 gtk_grid_attach (window->grid_variable,
02562                 GTK_WIDGET (window->scrolled_minabs), 1, 4, 3, 1);
02563 gtk_grid_attach (window->grid_variable,
02564                 GTK_WIDGET (window->check_maxabs), 0, 5, 1, 1);
02565 gtk_grid_attach (window->grid_variable,
02566                 GTK_WIDGET (window->scrolled_maxabs), 1, 5, 3, 1);
02567 gtk_grid_attach (window->grid_variable,
02568                 GTK_WIDGET (window->label_precision), 0, 6, 1, 1);
02569 gtk_grid_attach (window->grid_variable,
02570                 GTK_WIDGET (window->spin_precision), 1, 6, 3, 1);
02571 gtk_grid_attach (window->grid_variable,
02572                 GTK_WIDGET (window->label_sweeps), 0, 7, 1, 1);
02573 gtk_grid_attach (window->grid_variable,
02574                 GTK_WIDGET (window->spin_sweeps), 1, 7, 3, 1);
02575 gtk_grid_attach (window->grid_variable,
02576                 GTK_WIDGET (window->label_bits), 0, 8, 1, 1);
02577 gtk_grid_attach (window->grid_variable,
02578                 GTK_WIDGET (window->spin_bits), 1, 8, 3, 1);
02579 gtk_grid_attach (window->grid_variable,
02580                 GTK_WIDGET (window->label_step), 0, 9, 1, 1);
02581 gtk_grid_attach (window->grid_variable,
02582                 GTK_WIDGET (window->scrolled_step), 1, 9, 3, 1);
02583 window->frame_variable = (GtkFrame *) gtk_frame_new (_("Variable"));
02584 gtk_container_add (GTK_CONTAINER (window->frame_variable),
02585                   GTK_WIDGET (window->grid_variable));
02586
02587 // Creating the experiment widgets
02588 window->combo_experiment = (GtkComboBoxText *) gtk_combo_box_text_new ();
02589 gtk_widget_set_tooltip_text (GTK_WIDGET (window->combo_experiment),
02590                             _("Experiment selector"));
02591 window->id_experiment = g_signal_connect
02592 (window->combo_experiment, "changed",
02593  window_set_experiment, NULL);
02594 window->button_add_experiment = (GtkButton *)
02595   gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);
02596 g_signal_connect
02597 (window->button_add_experiment, "clicked",
02598  window_add_experiment, NULL);
02599 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_experiment),
02600                             _("Add experiment"));
02601 window->button_remove_experiment = (GtkButton *)
02602   gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02603 g_signal_connect (window->button_remove_experiment, "clicked",
02604                  window_remove_experiment, NULL);
02605 gtk_widget_set_tooltip_text (GTK_WIDGET (window->
02606   button_remove_experiment),
02607                             _("Remove experiment"));
02608 window->label_experiment
02609   = (GtkLabel *) gtk_label_new (_("Experimental data file"));
02610 window->button_experiment = (GtkFileChooserButton *)
02611   gtk_file_chooser_button_new (_("Experimental data file"),
02612                               GTK_FILE_CHOOSER_ACTION_OPEN);
02613 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_experiment),
02614                             _("Experimental data file"));
02615 window->id_experiment_name
02616   = g_signal_connect (window->button_experiment, "selection-changed",
02617                       window_name_experiment, NULL);
02618 gtk_widget_set_hexpend (GTK_WIDGET (window->button_experiment), TRUE);
02619 window->label_weight = (GtkLabel *) gtk_label_new (_("Weight"));
02620 window->spin_weight
02621   = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02622 gtk_widget_set_tooltip_text
02623 (GTK_WIDGET (window->spin_weight),
02624  _("Weight factor to build the objective function"));
02625 g_signal_connect
02626 (window->spin_weight, "value-changed",
02627  window_weight_experiment, NULL);
02628 window->grid_experiment = (GtkGrid *) gtk_grid_new ();
02629 gtk_grid_attach (window->grid_experiment,
02630                 GTK_WIDGET (window->combo_experiment), 0, 0, 2, 1);
02631 gtk_grid_attach (window->grid_experiment,
02632                 GTK_WIDGET (window->button_add_experiment), 2, 0, 1, 1);
02633 gtk_grid_attach (window->grid_experiment,
02634                 GTK_WIDGET (window->button_remove_experiment), 3, 0, 1, 1);
02635
02636 gtk_grid_attach (window->grid_experiment,
02637                 GTK_WIDGET (window->label_experiment), 0, 1, 1, 1);
02638 gtk_grid_attach (window->grid_experiment,
02639                 GTK_WIDGET (window->button_experiment), 1, 1, 3, 1);
02640 gtk_grid_attach (window->grid_experiment,
02641                 GTK_WIDGET (window->label_weight), 0, 2, 1, 1);
02642 gtk_grid_attach (window->grid_experiment,
02643                 GTK_WIDGET (window->spin_weight), 1, 2, 3, 1);

```



```

02639     for (i = 0; i < MAX_NINPUTS; ++i)
02640     {
02641         snprintf (buffer3, 64, "%s %u", _("Input template"), i + 1);
02642         window->check_template[i] = (GtkCheckButton *)
02643             gtk_check_button_new_with_label (buffer3);
02644         window->id_template[i]
02645             = g_signal_connect (window->check_template[i], "toggled",
02646                                 window_inputs_experiment, NULL);
02647         gtk_grid_attach (window->grid_experiment,
02648                         GTK_WIDGET (window->check_template[i]), 0, 3 + i, 1, 1);
02649         window->button_template[i] = (GtkFileChooserButton *)
02650             gtk_file_chooser_button_new (_("Input template"),
02651                                         GTK_FILE_CHOOSER_ACTION_OPEN);
02652         gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_template[i]),
02653                                     _("Experimental input template file"));
02654         window->id_input[i] =
02655             g_signal_connect_swapped (window->button_template[i],
02656                                     "selection-changed",
02657                                     (GCallback) window_template_experiment,
02658                                     (void *) (size_t) i);
02659         gtk_grid_attach (window->grid_experiment,
02660                         GTK_WIDGET (window->button_template[i]), 1, 3 + i, 3, 1);
02661     }
02662     window->frame_experiment = (GtkFrame *) gtk_frame_new (_("Experiment"));
02663     gtk_container_add (GTK_CONTAINER (window->frame_experiment),
02664                       GTK_WIDGET (window->grid_experiment));
02665
02666     // Creating the error norm widgets
02667     window->frame_norm = (GtkFrame *) gtk_frame_new (_("Error norm"));
02668     window->grid_norm = (GtkGrid *) gtk_grid_new ();
02669     gtk_container_add (GTK_CONTAINER (window->frame_norm),
02670                       GTK_WIDGET (window->grid_norm));
02671     window->button_norm[0] = (GtkRadioButton *)
02672         gtk_radio_button_new_with_mnemonic (NULL, label_norm[0]);
02673     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[0]),
02674                                 tip_norm[0]);
02675     gtk_grid_attach (window->grid_norm,
02676                     GTK_WIDGET (window->button_norm[0]), 0, 0, 1, 1);
02677     g_signal_connect (window->button_norm[0], "clicked",
02678                       window_update, NULL);
02679     for (i = 0; ++i < NNORMS;)
02680     {
02681         window->button_norm[i] = (GtkRadioButton *)
02682             gtk_radio_button_new_with_mnemonic
02683             (gtk_radio_button_get_group (window->button_norm[0]), label_norm[i]);
02684         gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[i]),
02685                                     tip_norm[i]);
02686         gtk_grid_attach (window->grid_norm,
02687                         GTK_WIDGET (window->button_norm[i]), 0, i, 1, 1);
02688         g_signal_connect (window->button_norm[i], "clicked",
02689                           window_update, NULL);
02690     }
02691     window->label_p = (GtkLabel *) gtk_label_new (_("P parameter"));
02692     gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->
02693 label_p), 1, 1, 1, 1);
02694     window->spin_p = (GtkSpinButton *)
02695         gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE, 0.01);
02696     gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_p),
02697                                 _("P parameter for the P error norm"));
02698     window->scrolled_p =
02699         (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02700     gtk_container_add (GTK_CONTAINER (window->scrolled_p),
02701                       GTK_WIDGET (window->spin_p));
02702     gtk_widget_set_hexexpand (GTK_WIDGET (window->scrolled_p), TRUE);
02703     gtk_widget_set_halign (GTK_WIDGET (window->scrolled_p), GTK_ALIGN_FILL);
02704     gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->
02705 scrolled_p),
02706                     1, 2, 1, 2);
02707
02708     // Creating the grid and attaching the widgets to the grid
02709     window->grid = (GtkGrid *) gtk_grid_new ();
02710     gtk_grid_attach (window->grid, GTK_WIDGET (window->bar_buttons), 0, 0, 3, 1);
02711     gtk_grid_attach (window->grid, GTK_WIDGET (window->grid_files), 0, 1, 1, 1);
02712     gtk_grid_attach (window->grid,
02713                     GTK_WIDGET (window->frame_algorithm), 0, 2, 1, 1);
02714     gtk_grid_attach (window->grid,
02715                     GTK_WIDGET (window->frame_variable), 1, 2, 1, 1);
02716     gtk_grid_attach (window->grid,
02717                     GTK_WIDGET (window->frame_experiment), 2, 2, 1, 1);
02718     gtk_grid_attach (window->grid, GTK_WIDGET (window->frame_norm), 1, 1, 2, 1);
02719     gtk_container_add (GTK_CONTAINER (window->window), GTK_WIDGET (
02720 window->grid));
02721
02722     // Setting the window logo
02723     window->logo = gdk_pixbuf_new_from_xpm_data (logo);
02724     gtk_window_set_icon (window->window, window->logo);
02725

```



```

02721 // Showing the window
02722 gtk_widget_show_all (GTK_WIDGET (window->window));
02723
02724 // In GTK+ 3.16 and 3.18 the default scrolled size is wrong
02725 #if GTK_MINOR_VERSION >= 16
02726 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_min), -1, 40);
02727 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_max), -1, 40);
02728 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_minabs), -1, 40);
02729 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_maxabs), -1, 40);
02730 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_step), -1, 40);
02731 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_p), -1, 40);
02732 gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_threshold), -1, 40);
02733 #endif
02734
02735 // Reading initial example
02736 input_new ();
02737 buffer2 = g_get_current_dir ();
02738 buffer = g_build_filename (buffer2, "..", "tests", "test1", INPUT_FILE, NULL);
02739 g_free (buffer2);
02740 window_read (buffer);
02741 g_free (buffer);
02742
02743 #if DEBUG_INTERFACE
02744 fprintf (stderr, "window_new: start\n");
02745 #endif
02746 }

```

#### 4.11.2.19 window\_open()

```
void window_open ( )
```

Function to open the input data.

Definition at line 1979 of file [interface.c](#).

```

01980 {
01981     GtkFileChooserDialog *dlg;
01982     GtkFileFilter *filter;
01983     char *buffer, *directory, *name;
01984
01985     #if DEBUG_INTERFACE
01986         fprintf (stderr, "window_open: start\n");
01987     #endif
01988
01989     // Saving a backup of the current input file
01990     directory = g_strdup (input->directory);
01991     name = g_strdup (input->name);
01992
01993     // Opening dialog
01994     dlg = (GtkFileChooserDialog *)
01995         gtk_file_chooser_dialog_new (_("Open input file"),
01996                                     window->window,
01997                                     GTK_FILE_CHOOSER_ACTION_OPEN,
01998                                     _("_Cancel"), GTK_RESPONSE_CANCEL,
01999                                     _("_OK"), GTK_RESPONSE_OK, NULL);
02000
02001     // Adding XML filter
02002     filter = (GtkFileFilter *) gtk_file_filter_new ();
02003     gtk_file_filter_set_name (filter, "XML");
02004     gtk_file_filter_add_pattern (filter, "*.xml");
02005     gtk_file_filter_add_pattern (filter, "*.XML");
02006     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter);
02007
02008     // Adding JSON filter
02009     filter = (GtkFileFilter *) gtk_file_filter_new ();
02010     gtk_file_filter_set_name (filter, "JSON");
02011     gtk_file_filter_add_pattern (filter, "*.json");
02012     gtk_file_filter_add_pattern (filter, "*.JSON");
02013     gtk_file_filter_add_pattern (filter, "*.js");
02014     gtk_file_filter_add_pattern (filter, "*.JS");
02015     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter);
02016
02017     // If OK saving
02018     while (gtk_dialog_run (GTK_DIALOG (dlg)) == GTK_RESPONSE_OK)
02019     {

```

```

02020
02021 // Trying to open the input file
02022 buffer = gtk_file_chooser_get_filename (GTK_FILE_CHOOSER (dlg));
02023 if (!window_read (buffer))
02024 {
02025 #if DEBUG_INTERFACE
02026     fprintf (stderr, "window_open: error reading input file\n");
02027 #endif
02028     g_free (buffer);
02029
02030     // Reading backup file on error
02031     buffer = g_build_filename (directory, name, NULL);
02032     input->result = input->variables = NULL;
02033     if (!input_open (buffer))
02034     {
02035
02036         // Closing on backup file reading error
02037 #if DEBUG_INTERFACE
02038     fprintf (stderr, "window_read: error reading backup file\n");
02039 #endif
02040     g_free (buffer);
02041     break;
02042     }
02043     g_free (buffer);
02044 }
02045 else
02046 {
02047     g_free (buffer);
02048     break;
02049 }
02050 }
02051
02052 // Freeing and closing
02053 g_free (name);
02054 g_free (directory);
02055 gtk_widget_destroy (GTK_WIDGET (dlg));
02056 #if DEBUG_INTERFACE
02057 fprintf (stderr, "window_open: end\n");
02058 #endif
02059 }

```

#### 4.11.2.20 window\_precision\_variable()

```
void window_precision_variable ( )
```

Function to update the variable precision in the main window.

Definition at line 1713 of file [interface.c](#).

```

01714 {
01715     unsigned int i;
01716 #if DEBUG_INTERFACE
01717     fprintf (stderr, "window_precision_variable: start\n");
01718 #endif
01719     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01720     input->variable[i].precision
01721     = (unsigned int) gtk_spin_button_get_value_as_int (window->
01722     spin_precision);
01723     gtk_spin_button_set_digits (window->spin_min, input->
01724     variable[i].precision);
01725     gtk_spin_button_set_digits (window->spin_max, input->
01726     variable[i].precision);
01727     gtk_spin_button_set_digits (window->spin_minabs,
01728     input->variable[i].precision);
01729     gtk_spin_button_set_digits (window->spin_maxabs,
01730     input->variable[i].precision);
01731 #if DEBUG_INTERFACE
01732     fprintf (stderr, "window_precision_variable: end\n");
01733 #endif
01734 }

```

#### 4.11.2.21 window\_rangemax\_variable()

```
void window_rangemax_variable ( )
```

Function to update the variable rangemax in the main window.

Definition at line 1754 of file [interface.c](#).

```
01755 {
01756     unsigned int i;
01757     #if DEBUG_INTERFACE
01758     fprintf (stderr, "window_rangemax_variable: start\n");
01759     #endif
01760     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01761     input->variable[i].rangemax = gtk_spin_button_get_value (
        window->spin_max);
01762     #if DEBUG_INTERFACE
01763     fprintf (stderr, "window_rangemax_variable: end\n");
01764     #endif
01765 }
```

#### 4.11.2.22 window\_rangemaxabs\_variable()

```
void window_rangemaxabs_variable ( )
```

Function to update the variable rangemaxabs in the main window.

Definition at line 1789 of file [interface.c](#).

```
01790 {
01791     unsigned int i;
01792     #if DEBUG_INTERFACE
01793     fprintf (stderr, "window_rangemaxabs_variable: start\n");
01794     #endif
01795     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01796     input->variable[i].rangemaxabs
01797     = gtk_spin_button_get_value (window->spin_maxabs);
01798     #if DEBUG_INTERFACE
01799     fprintf (stderr, "window_rangemaxabs_variable: end\n");
01800     #endif
01801 }
```

#### 4.11.2.23 window\_rangemin\_variable()

```
void window_rangemin_variable ( )
```

Function to update the variable rangemin in the main window.

Definition at line 1737 of file [interface.c](#).

```
01738 {
01739     unsigned int i;
01740     #if DEBUG_INTERFACE
01741     fprintf (stderr, "window_rangemin_variable: start\n");
01742     #endif
01743     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01744     input->variable[i].rangemin = gtk_spin_button_get_value (
        window->spin_min);
01745     #if DEBUG_INTERFACE
01746     fprintf (stderr, "window_rangemin_variable: end\n");
01747     #endif
01748 }
```

#### 4.11.2.24 window\_rangeminabs\_variable()

```
void window_rangeminabs_variable ( )
```

Function to update the variable rangeminabs in the main window.

Definition at line 1771 of file [interface.c](#).

```
01772 {
01773     unsigned int i;
01774     #if DEBUG_INTERFACE
01775     fprintf (stderr, "window_rangeminabs_variable: start\n");
01776     #endif
01777     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01778     input->variable[i].rangeminabs
01779     = gtk_spin_button_get_value (window->spin_minabs);
01780     #if DEBUG_INTERFACE
01781     fprintf (stderr, "window_rangeminabs_variable: end\n");
01782     #endif
01783 }
```

#### 4.11.2.25 window\_read()

```
int window_read (
    char * filename )
```

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 1863 of file [interface.c](#).

```
01864 {
01865     unsigned int i;
01866     char *buffer;
01867     #if DEBUG_INTERFACE
01868     fprintf (stderr, "window_read: start\n");
01869     #endif
01870
01871     // Reading new input file
01872     input_free ();
01873     input->result = input->variables = NULL;
01874     if (!input_open (filename))
01875     {
01876     #if DEBUG_INTERFACE
01877         fprintf (stderr, "window_read: end\n");
01878     #endif
01879         return 0;
01880     }
01881
01882     // Setting GTK+ widgets data
01883     gtk_entry_set_text (window->entry_result, input->result);
01884     gtk_entry_set_text (window->entry_variables, input->
    variables);
```

```

01885     buffer = g_build_filename (input->directory, input->
simulator, NULL);
01886     gtk_file_chooser_set_filename (GTK_FILE_CHOOSER
01887         (window->button_simulator), buffer);
01888     g_free (buffer);
01889     gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON (window->check_evaluator),
01890         (size_t) input->evaluator);
01891     if (input->evaluator)
01892     {
01893         buffer = g_build_filename (input->directory, input->
evaluator, NULL);
01894         gtk_file_chooser_set_filename (GTK_FILE_CHOOSER
01895             (window->button_evaluator), buffer);
01896         g_free (buffer);
01897     }
01898     gtk_toggle_button_set_active
01899         (GTK_TOGGLE_BUTTON (window->button_algorithm[input->
algorithm]), TRUE);
01900     switch (input->algorithm)
01901     {
01902     case ALGORITHM_MONTE_CARLO:
01903         gtk_spin_button_set_value (window->spin_simulations,
01904             (gdouble) input->nsimulations);
01905         // fallthrough
01906     case ALGORITHM_SWEEP:
01907     case ALGORITHM_ORTHOGONAL:
01908         gtk_spin_button_set_value (window->spin_iterations,
01909             (gdouble) input->niterations);
01910         gtk_spin_button_set_value (window->spin_bests, (gdouble)
input->nbest);
01911         gtk_spin_button_set_value (window->spin_tolerance,
input->tolerance);
01912         gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON
01913             (window->check_climbing),
input->nsteps);
01914         if (input->nsteps)
01915         {
01916             gtk_toggle_button_set_active
01917                 (GTK_TOGGLE_BUTTON (window->button_climbing[
input->climbing]),
TRUE);
01918             gtk_spin_button_set_value (window->spin_steps,
01919                 (gdouble) input->nsteps);
01920             gtk_spin_button_set_value (window->spin_relaxation,
01921                 (gdouble) input->relaxation);
01922             switch (input->climbing)
01923             {
01924             case CLIMBING_METHOD_RANDOM:
01925                 gtk_spin_button_set_value (window->spin_estimates,
01926                     (gdouble) input->nestimates);
01927             }
01928         }
01929         break;
01930     default:
01931         gtk_spin_button_set_value (window->spin_population,
01932             (gdouble) input->nsimulations);
01933         gtk_spin_button_set_value (window->spin_generations,
01934             (gdouble) input->niterations);
01935         gtk_spin_button_set_value (window->spin_mutation, input->
mutation_ratio);
01936         gtk_spin_button_set_value (window->spin_reproduction,
input->reproduction_ratio);
01937         gtk_spin_button_set_value (window->spin_adaptation,
input->adaptation_ratio);
01938     }
01939     gtk_toggle_button_set_active
01940         (GTK_TOGGLE_BUTTON (window->button_norm[input->norm]), TRUE);
01941     gtk_spin_button_set_value (window->spin_p, input->p);
01942     gtk_spin_button_set_value (window->spin_threshold, input->
threshold);
01943     g_signal_handler_block (window->combo_experiment, window->
id_experiment);
01944     g_signal_handler_block (window->button_experiment,
window->id_experiment_name);
01945     gtk_combo_box_text_remove_all (window->combo_experiment);
01946     for (i = 0; i < input->nexperiments; ++i)
01947         gtk_combo_box_text_append_text (window->combo_experiment,
input->experiment[i].name);
01948     g_signal_handler_unblock
01949         (window->button_experiment, window->
id_experiment_name);
01950     g_signal_handler_unblock (window->combo_experiment,
window->id_experiment);
01951     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), 0);
01952     g_signal_handler_block (window->combo_variable, window->
id_variable);
01953     g_signal_handler_block (window->entry_variable, window->

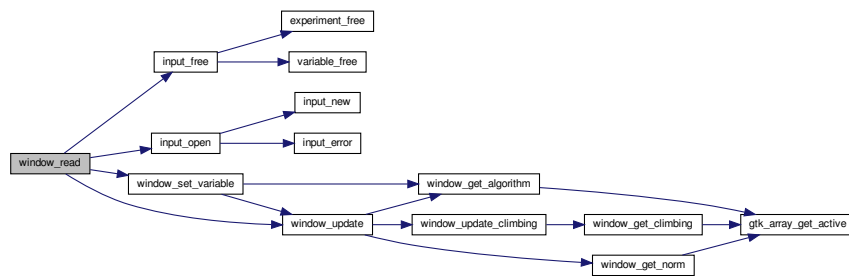
```

```

    id_variable_label);
01959   gtk_combo_box_text_remove_all (window->combo_variable);
01960   for (i = 0; i < input->nvariables; ++i)
01961       gtk_combo_box_text_append_text (window->combo_variable,
01962                                       input->variable[i].name);
01963   g_signal_handler_unblock (window->entry_variable, window->
id_variable_label);
01964   g_signal_handler_unblock (window->combo_variable, window->
id_variable_label);
01965   gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), 0);
01966   window_set_variable ();
01967   window_update ();
01968
01969   #if DEBUG_INTERFACE
01970       fprintf (stderr, "window_read: end\n");
01971   #endif
01972   return 1;
01973 }

```

Here is the call graph for this function:



#### 4.11.2.26 window\_remove\_experiment()

```
void window_remove_experiment ( )
```

Function to remove an experiment in the main window.

Definition at line 1355 of file [interface.c](#).

```

01356 {
01357     unsigned int i, j;
01358     #if DEBUG_INTERFACE
01359         fprintf (stderr, "window_remove_experiment: start\n");
01360     #endif
01361     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01362     g_signal_handler_block (window->combo_experiment, window->
id_experiment);
01363     gtk_combo_box_text_remove (window->combo_experiment, i);
01364     g_signal_handler_unblock (window->combo_experiment,
window->id_experiment);
01365     experiment_free (input->experiment + i, input->
type);
01366     --input->nexperiments;
01367     for (j = i; j < input->nexperiments; ++j)
01368         memcpy (input->experiment + j, input->experiment + j + 1,
01369               sizeof (Experiment));
01370     j = input->nexperiments - 1;
01371     if (i > j)
01372         i = j;
01373     for (j = 0; j < input->experiment->ninputs; ++j)
01374         g_signal_handler_block (window->button_template[j],
window->id_input[j]);
01375     g_signal_handler_block

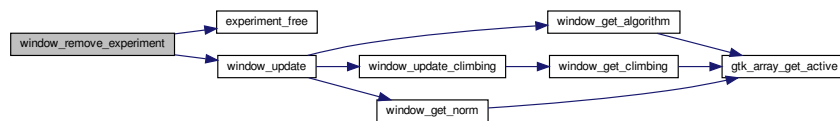
```

```

01376     (window->button_experiment, window->
id_experiment_name);
01377     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i);
01378     g_signal_handler_unblock
01379     (window->button_experiment, window->
id_experiment_name);
01380     for (j = 0; j < input->experiment->ninputs; ++j)
01381         g_signal_handler_unblock (window->button_template[j],
window->id_input[j]);
01382     window_update ();
01383     #if DEBUG_INTERFACE
01384     fprintf (stderr, "window_remove_experiment: end\n");
01385     #endif
01386 }

```

Here is the call graph for this function:



#### 4.11.2.27 window\_remove\_variable()

```
void window_remove_variable ( )
```

Function to remove a variable in the main window.

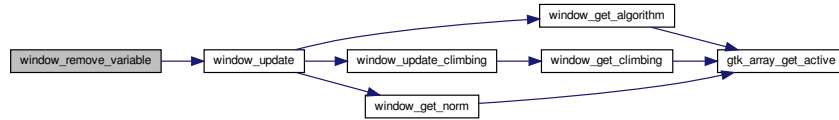
Definition at line 1625 of file [interface.c](#).

```

01626 {
01627     unsigned int i, j;
01628     #if DEBUG_INTERFACE
01629     fprintf (stderr, "window_remove_variable: start\n");
01630     #endif
01631     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01632     g_signal_handler_block (window->combo_variable, window->
id_variable);
01633     gtk_combo_box_text_remove (window->combo_variable, i);
01634     g_signal_handler_unblock (window->combo_variable, window->
id_variable);
01635     xmlFree (input->variable[i].name);
01636     --input->nvariables;
01637     for (j = i; j < input->nvariables; ++j)
01638         memcpy (input->variable + j, input->variable + j + 1, sizeof (
Variable));
01639     j = input->nvariables - 1;
01640     if (i > j)
01641         i = j;
01642     g_signal_handler_block (window->entry_variable, window->
id_variable_label);
01643     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i);
01644     g_signal_handler_unblock (window->entry_variable, window->
id_variable_label);
01645     window_update ();
01646     #if DEBUG_INTERFACE
01647     fprintf (stderr, "window_remove_variable: end\n");
01648     #endif
01649 }

```

Here is the call graph for this function:



#### 4.11.2.28 window\_run()

```
void window_run ( )
```

Function to run a optimization.

Definition at line 974 of file [interface.c](#).

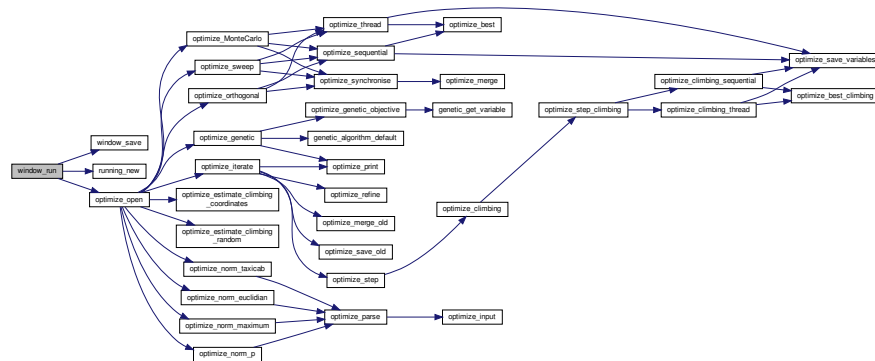
```

00975 {
00976     unsigned int i;
00977     char *msg, *msg2, buffer[64], buffer2[64];
00978     #if DEBUG_INTERFACE
00979     fprintf (stderr, "window_run: start\n");
00980     #endif
00981     if (!window_save ())
00982     {
00983         #if DEBUG_INTERFACE
00984         fprintf (stderr, "window_run: end\n");
00985         #endif
00986         return;
00987     }
00988     running_new ();
00989     while (gtk_events_pending ())
00990         gtk_main_iteration ();
00991     optimize_open ();
00992     #if DEBUG_INTERFACE
00993     fprintf (stderr, "window_run: closing running dialog\n");
00994     #endif
00995     gtk_spinner_stop (running->spinner);
00996     gtk_widget_destroy (GTK_WIDGET (running->dialog));
00997     #if DEBUG_INTERFACE
00998     fprintf (stderr, "window_run: displaying results\n");
00999     #endif
01000     snprintf (buffer, 64, "error = %.15le\n", optimize->error_old[0]);
01001     msg2 = g_strdup (buffer);
01002     for (i = 0; i < optimize->nvariables; ++i, msg2 = msg)
01003     {
01004         snprintf (buffer, 64, "%s = %s\n",
01005             input->variable[i].name, format[input->
01006 variable[i].precision]);
01007         snprintf (buffer2, 64, buffer, optimize->value_old[i]);
01008         msg = g_strconcat (msg2, buffer2, NULL);
01009         g_free (msg2);
01010     }
01010     snprintf (buffer, 64, "%s = %.6lg s", _("Calculation time"),
01011         optimize->calculation_time);
01012     msg = g_strconcat (msg2, buffer, NULL);
01013     g_free (msg2);
01014     show_message (_("Best result"), msg, INFO_TYPE);
01015     g_free (msg);
01016     #if DEBUG_INTERFACE
01017     fprintf (stderr, "window_run: freeing memory\n");
01018     #endif
01019     optimize_free ();
01020     #if DEBUG_INTERFACE
01021     fprintf (stderr, "window_run: end\n");
01022     #endif
01023 }

```



Here is the call graph for this function:



#### 4.11.2.29 window\_save()

```
int window_save ( )
```

Function to save the input file.

## Returns

1 on OK, 0 on Cancel.

Definition at line 823 of file interface.c.

```

00824 {
00825     GtkFileChooserDialog *dlg;
00826     GtkFileFilter *filter1, *filter2;
00827     char *buffer;
00828
00829     #if DEBUG_INTERFACE
00830         fprintf (stderr, "window_save: start\n");
00831     #endif
00832
00833     // Opening the saving dialog
00834     dlg = (GtkFileChooserDialog *)
00835         gtk_file_chooser_dialog_new (_("Save file"),
00836                                     window->window,
00837                                     GTK_FILE_CHOOSER_ACTION_SAVE,
00838                                     _("_Cancel"), GTK_RESPONSE_CANCEL,
00839                                     _("_OK"), GTK_RESPONSE_OK, NULL);
00840     gtk_file_chooser_set_do_overwrite_confirmation (GTK_FILE_CHOOSER (dlg), TRUE);
00841     buffer = g_build_filename (input->directory, input->name, NULL);
00842     gtk_file_chooser_set_filename (GTK_FILE_CHOOSER (dlg), buffer);
00843     g_free (buffer);
00844
00845     // Adding XML filter
00846     filter1 = (GtkFileFilter *) gtk_file_filter_new ();
00847     gtk_file_filter_set_name (filter1, "XML");
00848     gtk_file_filter_add_pattern (filter1, "*.xml");
00849     gtk_file_filter_add_pattern (filter1, "*.XML");
00850     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter1);
00851
00852     // Adding JSON filter
00853     filter2 = (GtkFileFilter *) gtk_file_filter_new ();
00854     gtk_file_filter_set_name (filter2, "JSON");
00855     gtk_file_filter_add_pattern (filter2, "*.json");
00856     gtk_file_filter_add_pattern (filter2, "*.JSON");
00857     gtk_file_filter_add_pattern (filter2, "*.js");
00858     gtk_file_filter_add_pattern (filter2, "*.JS");

```

```

00859 gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter2);
00860
00861 if (input->type == INPUT_TYPE_XML)
00862     gtk_file_chooser_set_filter (GTK_FILE_CHOOSER (dlg), filter1);
00863 else
00864     gtk_file_chooser_set_filter (GTK_FILE_CHOOSER (dlg), filter2);
00865
00866 // If OK response then saving
00867 if (gtk_dialog_run (GTK_DIALOG (dlg)) == GTK_RESPONSE_OK)
00868 {
00869     // Setting input file type
00870     filter1 = gtk_file_chooser_get_filter (GTK_FILE_CHOOSER (dlg));
00871     buffer = (char *) gtk_file_filter_get_name (filter1);
00872     if (!strcmp (buffer, "XML"))
00873         input->type = INPUT_TYPE_XML;
00874     else
00875         input->type = INPUT_TYPE_JSON;
00876
00877     // Adding properties to the root XML node
00878     input->simulator = gtk_file_chooser_get_filename
00879         (GTK_FILE_CHOOSER (window->button_simulator));
00880     if (gtk_toggle_button_get_active
00881         (GTK_TOGGLE_BUTTON (window->check_evaluator)))
00882         input->evaluator = gtk_file_chooser_get_filename
00883             (GTK_FILE_CHOOSER (window->button_evaluator));
00884     else
00885         input->evaluator = NULL;
00886     if (input->type == INPUT_TYPE_XML)
00887     {
00888         input->result
00889             = (char *) xmlStrdup ((const xmlChar *)
00890                                     gtk_entry_get_text (window->entry_result));
00891         input->variables
00892             = (char *) xmlStrdup ((const xmlChar *)
00893                                     gtk_entry_get_text (window->
00894 entry_variables));
00895     }
00896     else
00897     {
00898         input->result = g_strdup (gtk_entry_get_text (window->
00899 entry_result));
00900         input->variables =
00901             g_strdup (gtk_entry_get_text (window->entry_variables));
00902     }
00903
00904     // Setting the algorithm
00905     switch (window_get_algorithm ())
00906     {
00907     case ALGORITHM_MONTE_CARLO:
00908         input->algorithm = ALGORITHM_MONTE_CARLO;
00909         input->nsimulations
00910             = gtk_spin_button_get_value_as_int (window->spin_simulations);
00911         input->niterations
00912             = gtk_spin_button_get_value_as_int (window->spin_iterations);
00913         input->tolerance = gtk_spin_button_get_value (window->
00914 spin_tolerance);
00915         input->nbest = gtk_spin_button_get_value_as_int (window->
00916 spin_bests);
00917         window_save_climbing ();
00918         break;
00919     case ALGORITHM_SWEEP:
00920         input->algorithm = ALGORITHM_SWEEP;
00921         input->niterations
00922             = gtk_spin_button_get_value_as_int (window->spin_iterations);
00923         input->tolerance = gtk_spin_button_get_value (window->
00924 spin_tolerance);
00925         input->nbest = gtk_spin_button_get_value_as_int (window->
00926 spin_bests);
00927         window_save_climbing ();
00928         break;
00929     case ALGORITHM_ORTHOGONAL:
00930         input->algorithm = ALGORITHM_ORTHOGONAL;
00931         input->niterations
00932             = gtk_spin_button_get_value_as_int (window->spin_iterations);
00933         input->tolerance = gtk_spin_button_get_value (window->
00934 spin_tolerance);
00935         input->nbest = gtk_spin_button_get_value_as_int (window->
00936 spin_bests);
00937         window_save_climbing ();
00938         break;
00939     default:
00940         input->algorithm = ALGORITHM_GENETIC;
00941         input->nsimulations
00942             = gtk_spin_button_get_value_as_int (window->spin_population);
00943         input->niterations
00944             = gtk_spin_button_get_value_as_int (window->spin_generations);
00945         input->mutation_ratio

```

```

00938         = gtk_spin_button_get_value (window->spin_mutation);
00939     input->reproduction_ratio
00940     = gtk_spin_button_get_value (window->spin_reproduction);
00941     input->adaptation_ratio
00942     = gtk_spin_button_get_value (window->spin_adaptation);
00943     break;
00944 }
00945 input->norm = window_get_norm ();
00946 input->p = gtk_spin_button_get_value (window->spin_p);
00947 input->threshold = gtk_spin_button_get_value (window->
spin_threshold);
00948
00949 // Saving the XML file
00950 buffer = gtk_file_chooser_get_filename (GTK_FILE_CHOOSER (dlg));
00951 input_save (buffer);
00952
00953 // Closing and freeing memory
00954 g_free (buffer);
00955 gtk_widget_destroy (GTK_WIDGET (dlg));
00956 #if DEBUG_INTERFACE
00957     fprintf (stderr, "window_save: end\n");
00958 #endif
00959     return 1;
00960 }
00961
00962 // Closing and freeing memory
00963 gtk_widget_destroy (GTK_WIDGET (dlg));
00964 #if DEBUG_INTERFACE
00965     fprintf (stderr, "window_save: end\n");
00966 #endif
00967     return 0;
00968 }

```

#### 4.11.2.30 window\_save\_climbing()

```
void window_save_climbing ( )
```

Function to save the hill climbing method data in the input file.

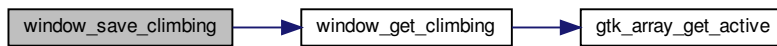
Definition at line 790 of file [interface.c](#).

```

00791 {
00792     #if DEBUG_INTERFACE
00793         fprintf (stderr, "window_save_climbing: start\n");
00794     #endif
00795     if (gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->
check_climbing)))
00796     {
00797         input->nsteps = gtk_spin_button_get_value_as_int (window->
spin_steps);
00798         input->relaxation = gtk_spin_button_get_value (window->
spin_relaxation);
00799         switch (window_get_climbing ())
00800         {
00801             case CLIMBING_METHOD_COORDINATES:
00802                 input->climbing = CLIMBING_METHOD_COORDINATES;
00803                 break;
00804             default:
00805                 input->climbing = CLIMBING_METHOD_RANDOM;
00806                 input->nestimates
00807                 = gtk_spin_button_get_value_as_int (window->spin_estimates);
00808         }
00809     }
00810     else
00811         input->nsteps = 0;
00812     #if DEBUG_INTERFACE
00813         fprintf (stderr, "window_save_climbing: end\n");
00814     #endif
00815 }

```

Here is the call graph for this function:



#### 4.11.2.31 window\_set\_algorithm()

```
void window_set_algorithm ( )
```

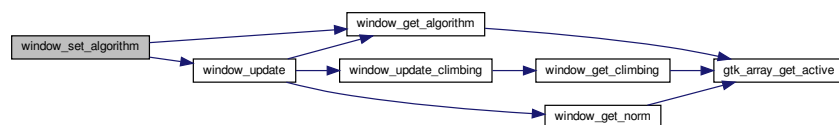
Function to avoid memory errors changing the algorithm.

Definition at line 1281 of file [interface.c](#).

```

01282 {
01283     int i;
01284     #if DEBUG_INTERFACE
01285     fprintf (stderr, "window_set_algorithm: start\n");
01286     #endif
01287     i = window_get_algorithm ();
01288     switch (i)
01289     {
01290     case ALGORITHM_SWEEP:
01291     case ALGORITHM_ORTHOGONAL:
01292         i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01293         if (i < 0)
01294             i = 0;
01295         gtk_spin_button_set_value (window->spin_sweeps,
01296                                   (gdouble) input->variable[i].
01297                                   nsweeps);
01298         break;
01299     case ALGORITHM_GENETIC:
01300         i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01301         if (i < 0)
01302             i = 0;
01303         gtk_spin_button_set_value (window->spin_bits,
01304                                   (gdouble) input->variable[i].nbits);
01305     }
01306     window_update ();
01307     #if DEBUG_INTERFACE
01308     fprintf (stderr, "window_set_algorithm: end\n");
01309     #endif
01310 }
  
```

Here is the call graph for this function:



## 4.11.2.32 window\_set\_experiment()

```
void window_set_experiment ( )
```

Function to set the experiment data in the main window.

Definition at line 1315 of file [interface.c](#).

```
01316 {
01317     unsigned int i, j;
01318     char *buffer1, *buffer2;
01319     #if DEBUG_INTERFACE
01320     fprintf (stderr, "window_set_experiment: start\n");
01321     #endif
01322     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01323     gtk_spin_button_set_value (window->spin_weight, input->
experiment[i].weight);
01324     buffer1 = gtk_combo_box_text_get_active_text (window->combo_experiment);
01325     buffer2 = g_build_filename (input->directory, buffer1, NULL);
01326     g_free (buffer1);
01327     g_signal_handler_block
01328     (window->button_experiment, window->
id_experiment_name);
01329     gtk_file_chooser_set_filename
01330     (GTK_FILE_CHOOSER (window->button_experiment), buffer2);
01331     g_signal_handler_unblock
01332     (window->button_experiment, window->
id_experiment_name);
01333     g_free (buffer2);
01334     for (j = 0; j < input->experiment->ninputs; ++j)
01335     {
01336         g_signal_handler_block (window->button_template[j],
window->id_input[j]);
01337         buffer2 =
01338         g_build_filename (input->directory, input->experiment[i].
stencil[j],
01339             NULL);
01340         gtk_file_chooser_set_filename (GTK_FILE_CHOOSER
01341             (window->button_template[j]), buffer2);
01342         g_free (buffer2);
01343         g_signal_handler_unblock
01344         (window->button_template[j], window->id_input[j]);
01345     }
01346     #if DEBUG_INTERFACE
01347     fprintf (stderr, "window_set_experiment: end\n");
01348     #endif
01349 }
```

## 4.11.2.33 window\_set\_variable()

```
void window_set_variable ( )
```

Function to set the variable data in the main window.

Definition at line 1548 of file [interface.c](#).

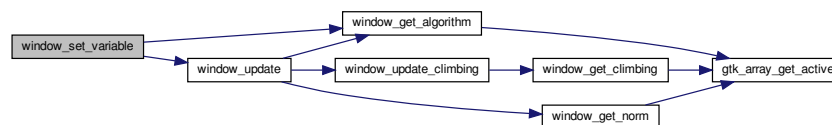
```
01549 {
01550     unsigned int i;
01551     #if DEBUG_INTERFACE
01552     fprintf (stderr, "window_set_variable: start\n");
01553     #endif
01554     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01555     g_signal_handler_block (window->entry_variable, window->
id_variable_label);
01556     gtk_entry_set_text (window->entry_variable, input->
variable[i].name);
01557     g_signal_handler_unblock (window->entry_variable, window->
id_variable_label);
01558     gtk_spin_button_set_value (window->spin_min, input->
variable[i].rangemin);
```

```

01559  gtk_spin_button_set_value (window->spin_max, input->
variable[i].rangemax);
01560  if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
01561  {
01562      gtk_spin_button_set_value (window->spin_minabs,
01563                               input->variable[i].rangeminabs);
01564      gtk_toggle_button_set_active
01565      (GTK_TOGGLE_BUTTON (window->check_minabs), 1);
01566  }
01567  else
01568  {
01569      gtk_spin_button_set_value (window->spin_minabs, -G_MAXDOUBLE);
01570      gtk_toggle_button_set_active
01571      (GTK_TOGGLE_BUTTON (window->check_minabs), 0);
01572  }
01573  if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
01574  {
01575      gtk_spin_button_set_value (window->spin_maxabs,
01576                               input->variable[i].rangemaxabs);
01577      gtk_toggle_button_set_active
01578      (GTK_TOGGLE_BUTTON (window->check_maxabs), 1);
01579  }
01580  else
01581  {
01582      gtk_spin_button_set_value (window->spin_maxabs, G_MAXDOUBLE);
01583      gtk_toggle_button_set_active
01584      (GTK_TOGGLE_BUTTON (window->check_maxabs), 0);
01585  }
01586  gtk_spin_button_set_value (window->spin_precision,
01587                             input->variable[i].precision);
01588  gtk_spin_button_set_value (window->spin_steps, (gdouble) input->
nsteps);
01589  if (input->nsteps)
01590      gtk_spin_button_set_value (window->spin_step, input->
variable[i].step);
01591  #if DEBUG_INTERFACE
01592      fprintf (stderr, "window_set_variable: precision[%u]=%u\n", i,
01593              input->variable[i].precision);
01594  #endif
01595  switch (window_get_algorithm ())
01596  {
01597      case ALGORITHM_SWEEP:
01598      case ALGORITHM_ORTHOGONAL:
01599          gtk_spin_button_set_value (window->spin_sweeps,
01600                                   (gdouble) input->variable[i].
nsweps);
01601  #if DEBUG_INTERFACE
01602      fprintf (stderr, "window_set_variable: nsweps[%u]=%u\n", i,
01603              input->variable[i].nsweps);
01604  #endif
01605      break;
01606      case ALGORITHM_GENETIC:
01607          gtk_spin_button_set_value (window->spin_bits,
01608                                   (gdouble) input->variable[i].nbits);
01609  #if DEBUG_INTERFACE
01610      fprintf (stderr, "window_set_variable: nbits[%u]=%u\n", i,
01611              input->variable[i].nbits);
01612  #endif
01613      break;
01614  }
01615  window_update ();
01616  #if DEBUG_INTERFACE
01617      fprintf (stderr, "window_set_variable: end\n");
01618  #endif
01619  }

```

Here is the call graph for this function:



## 4.11.234 window\_step\_variable()

```
void window_step_variable ( )
```

Function to update the variable step in the main window.

Definition at line 1807 of file [interface.c](#).

```
01808 {
01809     unsigned int i;
01810     #if DEBUG_INTERFACE
01811     fprintf (stderr, "window_step_variable: start\n");
01812     #endif
01813     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01814     input->variable[i].step = gtk_spin_button_get_value (window->
    spin_step);
01815     #if DEBUG_INTERFACE
01816     fprintf (stderr, "window_step_variable: end\n");
01817     #endif
01818 }
```

## 4.11.235 window\_template\_experiment()

```
void window_template_experiment (
    void * data )
```

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 1517 of file [interface.c](#).

```
01519 {
01520     unsigned int i, j;
01521     char *buffer;
01522     GFile *file1, *file2;
01523     #if DEBUG_INTERFACE
01524     fprintf (stderr, "window_template_experiment: start\n");
01525     #endif
01526     i = (size_t) data;
01527     j = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01528     file1
    = gtk_file_chooser_get_file (GTK_FILE_CHOOSER (window->button_template[i]));
01529     file2 = g_file_new_for_path (input->directory);
01530     buffer = g_file_get_relative_path (file2, file1);
01531     if (input->type == INPUT_TYPE_XML)
01532         input->experiment[j].stencil[i] = (char *) xmlStrdup ((xmlChar *) buffer);
01533     else
01534         input->experiment[j].stencil[i] = g_strdup (buffer);
01535     g_free (buffer);
01536     g_object_unref (file2);
01537     g_object_unref (file1);
01538     #if DEBUG_INTERFACE
01539     fprintf (stderr, "window_template_experiment: end\n");
01540     #endif
01541 }
```

## 4.11.2.36 window\_update()

```
void window_update ( )
```

Function to update the main window view.

Definition at line 1124 of file [interface.c](#).

```
01125 {
01126     unsigned int i;
01127     #if DEBUG_INTERFACE
01128         fprintf (stderr, "window_update: start\n");
01129     #endif
01130     gtk_widget_set_sensitive
01131         (GTK_WIDGET (window->button_evaluator),
01132          gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON
01133                                         (window->check_evaluator)));
01134     gtk_widget_hide (GTK_WIDGET (window->label_simulations));
01135     gtk_widget_hide (GTK_WIDGET (window->spin_simulations));
01136     gtk_widget_hide (GTK_WIDGET (window->label_iterations));
01137     gtk_widget_hide (GTK_WIDGET (window->spin_iterations));
01138     gtk_widget_hide (GTK_WIDGET (window->label_tolerance));
01139     gtk_widget_hide (GTK_WIDGET (window->spin_tolerance));
01140     gtk_widget_hide (GTK_WIDGET (window->label_bests));
01141     gtk_widget_hide (GTK_WIDGET (window->spin_bests));
01142     gtk_widget_hide (GTK_WIDGET (window->label_population));
01143     gtk_widget_hide (GTK_WIDGET (window->spin_population));
01144     gtk_widget_hide (GTK_WIDGET (window->label_generations));
01145     gtk_widget_hide (GTK_WIDGET (window->spin_generations));
01146     gtk_widget_hide (GTK_WIDGET (window->label_mutation));
01147     gtk_widget_hide (GTK_WIDGET (window->spin_mutation));
01148     gtk_widget_hide (GTK_WIDGET (window->label_reproduction));
01149     gtk_widget_hide (GTK_WIDGET (window->spin_reproduction));
01150     gtk_widget_hide (GTK_WIDGET (window->label_adaptation));
01151     gtk_widget_hide (GTK_WIDGET (window->spin_adaptation));
01152     gtk_widget_hide (GTK_WIDGET (window->label_sweeps));
01153     gtk_widget_hide (GTK_WIDGET (window->spin_sweeps));
01154     gtk_widget_hide (GTK_WIDGET (window->label_bits));
01155     gtk_widget_hide (GTK_WIDGET (window->spin_bits));
01156     gtk_widget_hide (GTK_WIDGET (window->check_climbing));
01157     gtk_widget_hide (GTK_WIDGET (window->grid_climbing));
01158     gtk_widget_hide (GTK_WIDGET (window->label_step));
01159     gtk_widget_hide (GTK_WIDGET (window->spin_step));
01160     gtk_widget_hide (GTK_WIDGET (window->label_p));
01161     gtk_widget_hide (GTK_WIDGET (window->spin_p));
01162     i = gtk_spin_button_get_value_as_int (window->spin_iterations);
01163     switch (window_get_algorithm ())
01164     {
01165         case ALGORITHM_MONTE_CARLO:
01166             gtk_widget_show (GTK_WIDGET (window->label_simulations));
01167             gtk_widget_show (GTK_WIDGET (window->spin_simulations));
01168             gtk_widget_show (GTK_WIDGET (window->label_iterations));
01169             gtk_widget_show (GTK_WIDGET (window->spin_iterations));
01170             if (i > 1)
01171             {
01172                 gtk_widget_show (GTK_WIDGET (window->label_tolerance));
01173                 gtk_widget_show (GTK_WIDGET (window->spin_tolerance));
01174                 gtk_widget_show (GTK_WIDGET (window->label_bests));
01175                 gtk_widget_show (GTK_WIDGET (window->spin_bests));
01176             }
01177             window_update_climbing ();
01178             break;
01179         case ALGORITHM_SWEEP:
01180         case ALGORITHM_ORTHOGONAL:
01181             gtk_widget_show (GTK_WIDGET (window->label_iterations));
01182             gtk_widget_show (GTK_WIDGET (window->spin_iterations));
01183             if (i > 1)
01184             {
01185                 gtk_widget_show (GTK_WIDGET (window->label_tolerance));
01186                 gtk_widget_show (GTK_WIDGET (window->spin_tolerance));
01187                 gtk_widget_show (GTK_WIDGET (window->label_bests));
01188                 gtk_widget_show (GTK_WIDGET (window->spin_bests));
01189             }
01190             gtk_widget_show (GTK_WIDGET (window->label_sweeps));
01191             gtk_widget_show (GTK_WIDGET (window->spin_sweeps));
01192             gtk_widget_show (GTK_WIDGET (window->check_climbing));
01193             window_update_climbing ();
01194             break;
01195         default:
01196             gtk_widget_show (GTK_WIDGET (window->label_population));
01197             gtk_widget_show (GTK_WIDGET (window->spin_population));
01198             gtk_widget_show (GTK_WIDGET (window->label_generations));
01199     }
```

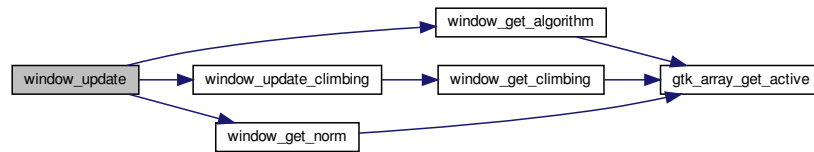


```

01199     gtk_widget_show (GTK_WIDGET (window->spin_generations));
01200     gtk_widget_show (GTK_WIDGET (window->label_mutation));
01201     gtk_widget_show (GTK_WIDGET (window->spin_mutation));
01202     gtk_widget_show (GTK_WIDGET (window->label_reproduction));
01203     gtk_widget_show (GTK_WIDGET (window->spin_reproduction));
01204     gtk_widget_show (GTK_WIDGET (window->label_adaptation));
01205     gtk_widget_show (GTK_WIDGET (window->spin_adaptation));
01206     gtk_widget_show (GTK_WIDGET (window->label_bits));
01207     gtk_widget_show (GTK_WIDGET (window->spin_bits));
01208 }
01209 gtk_widget_set_sensitive
01210 (GTK_WIDGET (window->button_remove_experiment),
input->nexperiments > 1);
01211 gtk_widget_set_sensitive
01212 (GTK_WIDGET (window->button_remove_variable),
input->nvariables > 1);
01213 for (i = 0; i < input->experiment->ninputs; ++i)
01214 {
01215     gtk_widget_show (GTK_WIDGET (window->check_template[i]));
01216     gtk_widget_show (GTK_WIDGET (window->button_template[i]));
01217     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i]), 0);
01218     gtk_widget_set_sensitive (GTK_WIDGET (window->button_template[i]), 1);
01219     g_signal_handler_block
01220     (window->check_template[i], window->
id_template[i]);
01221     g_signal_handler_block (window->button_template[i],
window->id_input[i]);
01222     gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON
(window->check_template[i]), 1);
01223     g_signal_handler_unblock (window->button_template[i],
01224     window->id_input[i]);
01225     g_signal_handler_unblock (window->check_template[i],
01226     window->id_template[i]);
01227 }
01228 if (i > 0)
01229 {
01230     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i - 1]), 1);
01231     gtk_widget_set_sensitive (GTK_WIDGET (window->button_template[i - 1]),
01232     gtk_toggle_button_get_active
01233     GTK_TOGGLE_BUTTON (window->check_template
[i - 1]));
01234 }
01235 if (i < MAX_NINPUTS)
01236 {
01237     gtk_widget_show (GTK_WIDGET (window->check_template[i]));
01238     gtk_widget_show (GTK_WIDGET (window->button_template[i]));
01239     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i]), 1);
01240     gtk_widget_set_sensitive
01241     (GTK_WIDGET (window->button_template[i]),
01242     gtk_toggle_button_get_active
01243     GTK_TOGGLE_BUTTON (window->check_template[i]));
01244     g_signal_handler_block
01245     (window->check_template[i], window->
id_template[i]);
01246     g_signal_handler_block (window->button_template[i],
window->id_input[i]);
01247     gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON
(window->check_template[i]), 0);
01248     g_signal_handler_unblock (window->button_template[i],
01249     window->id_input[i]);
01250     g_signal_handler_unblock (window->check_template[i],
01251     window->id_template[i]);
01252 }
01253 while (++i < MAX_NINPUTS)
01254 {
01255     gtk_widget_hide (GTK_WIDGET (window->check_template[i]));
01256     gtk_widget_hide (GTK_WIDGET (window->button_template[i]));
01257 }
01258 gtk_widget_set_sensitive
01259 (GTK_WIDGET (window->spin_minabs),
01260     gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->check_minabs)));
01261 gtk_widget_set_sensitive
01262 (GTK_WIDGET (window->spin_maxabs),
01263     gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->check_maxabs)));
01264 if (window_get_norm () == ERROR_NORM_P)
01265 {
01266     gtk_widget_show (GTK_WIDGET (window->label_p));
01267     gtk_widget_show (GTK_WIDGET (window->spin_p));
01268 }
01269 #if DEBUG_INTERFACE
01270 fprintf (stderr, "window_update: end\n");
01271 #endif
01272 }

```

Here is the call graph for this function:



#### 4.11.2.37 window\_update\_climbing()

```
void window_update_climbing ( )
```

Function to update hill climbing method widgets view in the main window.

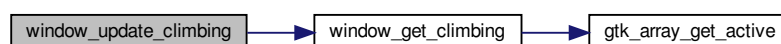
Definition at line 1093 of file [interface.c](#).

```

01094 {
01095     #if DEBUG_INTERFACE
01096         fprintf (stderr, "window_update_climbing: start\n");
01097     #endif
01098     gtk_widget_show (GTK_WIDGET (window->check_climbing));
01099     if (gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->
01100         check_climbing)))
01101     {
01102         gtk_widget_show (GTK_WIDGET (window->grid_climbing));
01103         gtk_widget_show (GTK_WIDGET (window->label_step));
01104         gtk_widget_show (GTK_WIDGET (window->spin_step));
01105     }
01106     switch (window_get_climbing ())
01107     {
01108     case CLIMBING_METHOD_COORDINATES:
01109         gtk_widget_hide (GTK_WIDGET (window->label_estimates));
01110         gtk_widget_hide (GTK_WIDGET (window->spin_estimates));
01111         break;
01112     default:
01113         gtk_widget_show (GTK_WIDGET (window->label_estimates));
01114         gtk_widget_show (GTK_WIDGET (window->spin_estimates));
01115     }
01116     #if DEBUG_INTERFACE
01117     fprintf (stderr, "window_update_climbing: end\n");
01118     #endif
01119 }

```

Here is the call graph for this function:



## 4.11.2.38 window\_update\_variable()

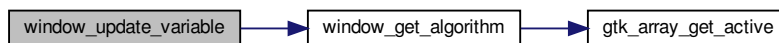
```
void window_update_variable ( )
```

Function to update the variable data in the main window.

Definition at line 1824 of file [interface.c](#).

```
01825 {
01826     int i;
01827     #if DEBUG_INTERFACE
01828     fprintf (stderr, "window_update_variable: start\n");
01829     #endif
01830     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01831     if (i < 0)
01832         i = 0;
01833     switch (window_get_algorithm ())
01834     {
01835     case ALGORITHM_SWEEP:
01836     case ALGORITHM_ORTHOGONAL:
01837         input->variable[i].nsweeps
01838         = gtk_spin_button_get_value_as_int (window->spin_sweeps);
01839     #if DEBUG_INTERFACE
01840         fprintf (stderr, "window_update_variable: nsweeps[%d]=%u\n", i,
01841                 input->variable[i].nsweeps);
01842     #endif
01843         break;
01844     case ALGORITHM_GENETIC:
01845         input->variable[i].nbits
01846         = gtk_spin_button_get_value_as_int (window->spin_bits);
01847     #if DEBUG_INTERFACE
01848         fprintf (stderr, "window_update_variable: nbits[%d]=%u\n", i,
01849                 input->variable[i].nbits);
01850     #endif
01851     }
01852     #if DEBUG_INTERFACE
01853     fprintf (stderr, "window_update_variable: end\n");
01854     #endif
01855 }
```

Here is the call graph for this function:



## 4.11.2.39 window\_weight\_experiment()

```
void window_weight_experiment ( )
```

Function to update the experiment weight in the main window.

Definition at line 1475 of file [interface.c](#).

```
01476 {
01477     unsigned int i;
01478     #if DEBUG_INTERFACE
01479     fprintf (stderr, "window_weight_experiment: start\n");
01480     #endif
01481     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01482     input->experiment[i].weight = gtk_spin_button_get_value (
01483         window->spin_weight);
01484     #if DEBUG_INTERFACE
01485     fprintf (stderr, "window_weight_experiment: end\n");
01486     #endif
01487 }
```

## 4.12 interface.c

```

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 2012-2018, 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 <stdlib.h>
00036 #include <string.h>
00037 #include <math.h>
00038 #include <gsl/gsl_rng.h>
00039 #include <libxml/parser.h>
00040 #include <libintl.h>
00041 #include <glib.h>
00042 #include <glib/gstdio.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 #include <gio/gio.h>
00051 #include <gtk/gtk.h>
00052 #include "genetic/genetic.h"
00053 #include "utils.h"
00054 #include "experiment.h"
00055 #include "variable.h"
00056 #include "input.h"
00057 #include "optimize.h"
00058 #include "interface.h"
00059
00060 #define DEBUG_INTERFACE 0
00061
00062 #ifdef G_OS_WIN32
00063 #define INPUT_FILE "test-ga-win.xml"
00064 #else
00065 #define INPUT_FILE "test-ga.xml"
00066 #endif
00067
00068 const char *logo[] = {
00069     "32 32 3 1",
00070     "    c None",
00071     ".    c #0000FF",
00072 "+    c #FF0000",
00073
00074     "                                ",
00075     "                                ",
00076     "                                ",
00077     "                                ",
00078     ".        .        .        .",
00079     ".        .        .        .",
00080     ".        .        .        .",
00081     ".        .        .        .",
00082     ".        .        .        .",
00083     ".        .        .        .",
00084     ".        .        .        .",
00085     ".        .        .        .",
00086     ".        .        .        .",
00087     ".        .        .        .",
00088     ".        .        .        .",
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 const char * logo[] = {
00119 "32 32 3 1",
00120 "    c #FFFFFFFFFFFF",
00121 ".    c #00000000FFFF",
00122 "X    c #FFFF00000000",
00123 "    ",
00124 "    ",
00125 "    ",
00126 "    .    .    .    .    ",
00127 "    .    .    .    .    ",
00128 "    .    .    .    .    ",
00129 "    .    .    .    .    ",
00130 "    .    .    XXX    .    ",
00131 "    .    .    XXXXX    .    ",
00132 "    .    .    XXXXX    .    ",
00133 "    .    .    XXXXX    .    ",
00134 "    XXX    .    XXX    XXX    ",
00135 "    XXXXX    .    .    XXXXX    ",
00136 "    XXXXX    .    .    XXXXX    ",
00137 "    XXXXX    .    .    XXXXX    ",
00138 "    XXX    .    .    XXX    ",
00139 "    .    .    .    .    ",
00140 "    .    XXX    .    .    ",
00141 "    .    XXXXX    .    .    ",
00142 "    .    XXXXX    .    .    ",
00143 "    .    XXXXX    .    .    ",
00144 "    .    XXX    .    .    ",
00145 "    .    .    .    .    ",
00146 "    .    .    .    .    ",
00147 "    .    .    .    .    ",
00148 "    .    .    .    .    ",
00149 "    .    .    .    .    ",
00150 "    .    .    .    .    ",
00151 "    .    .    .    .    ",
00152 "    ",
00153 "    ",
00154 "    "};
00155 */
00156
00157 Options options[1];
00159 Running running[1];
00161 Window window[1];
00163
00167 void
00168 input_save_climbing_xml (xmlNode * node)
00169 {
00170     #if DEBUG_INTERFACE
00171         fprintf (stderr, "input_save_climbing_xml: start\n");
00172     #endif
00173     if (input->nsteps)
00174     {
00175         xml_node_set_uint (node, (const xmlChar *) LABEL_NSTEPS,
00176             input->nsteps);
00177         if (input->relaxation != DEFAULT_RELAXATION)
00178             xml_node_set_float (node, (const xmlChar *)
00179                 LABEL_RELAXATION,
00180                 input->relaxation);
00181         switch (input->climbing)
00182         {
00183             case CLIMBING_METHOD_COORDINATES:
00184                 xmlSetProp (node, (const xmlChar *) LABEL_CLIMBING,
00185                     (const xmlChar *) LABEL_COORDINATES);
00186                 break;

```

```

00185         default:
00186             xmlSetProp (node, (const xmlChar *) LABEL_CLIMBING,
00187                         (const xmlChar *) LABEL_RANDOM);
00188             xml_node_set_uint (node, (const xmlChar *)
00189                               LABEL_NESTIMATES,
00189                               input->nestimates);
00190         }
00191     }
00192     #if DEBUG_INTERFACE
00193     fprintf (stderr, "input_save_climbing_xml: end\n");
00194     #endif
00195 }
00196
00197 void
00200 input_save_climbing_json (JsonNode * node)
00201 {
00202     JsonObject *object;
00203     #if DEBUG_INTERFACE
00204     fprintf (stderr, "input_save_climbing_json: start\n");
00205     #endif
00206     object = json_node_get_object (node);
00207     if (input->nsteps)
00208     {
00209         json_object_set_uint (object, LABEL_NSTEPS,
00210                               input->nsteps);
00211         if (input->relaxation != DEFAULT_RELAXATION)
00212             json_object_set_float (object, LABEL_RELAXATION,
00213                                    input->relaxation);
00214         switch (input->climbing)
00215         {
00216             case CLIMBING_METHOD_COORDINATES:
00217                 json_object_set_string_member (object, LABEL_CLIMBING,
00218                                                LABEL_COORDINATES);
00219                 break;
00220             default:
00221                 json_object_set_string_member (object, LABEL_CLIMBING,
00222                                                LABEL_RANDOM);
00223             json_object_set_uint (object, LABEL_NESTIMATES,
00224                                   input->nestimates);
00225         }
00226     }
00227     #if DEBUG_INTERFACE
00228     fprintf (stderr, "input_save_climbing_json: end\n");
00229     #endif
00230 }
00231
00232 void
00233 input_save_xml (xmlDoc * doc)
00234 {
00235     unsigned int i, j;
00236     char *buffer;
00237     xmlNode *node, *child;
00238     GFile *file, *file2;
00239
00240     #if DEBUG_INTERFACE
00241     fprintf (stderr, "input_save_xml: start\n");
00242     #endif
00243
00244     // Setting root XML node
00245     node = xmlNewDocNode (doc, 0, (const xmlChar *) LABEL_OPTIMIZE, 0);
00246     xmlDocSetRootElement (doc, node);
00247
00248     // Adding properties to the root XML node
00249     if (xmlStrcmp
00250         ((const xmlChar *) input->result, (const xmlChar *) result_name))
00251         xmlSetProp (node, (const xmlChar *) LABEL_RESULT_FILE,
00252                    (xmlChar *) input->result);
00253     if (xmlStrcmp
00254         ((const xmlChar *) input->variables, (const xmlChar *)
00255          variables_name))
00256         xmlSetProp (node, (const xmlChar *) LABEL_VARIABLES_FILE,
00257                    (xmlChar *) input->variables);
00258     file = g_file_new_for_path (input->directory);
00259     file2 = g_file_new_for_path (input->simulator);
00260     buffer = g_file_get_relative_path (file, file2);
00261     g_object_unref (file2);
00262     xmlSetProp (node, (const xmlChar *) LABEL_SIMULATOR, (xmlChar *) buffer);
00263     g_free (buffer);
00264     if (input->evaluator)
00265     {
00266         file2 = g_file_new_for_path (input->evaluator);
00267         buffer = g_file_get_relative_path (file, file2);
00268         g_object_unref (file2);
00269         if (xmlStrlen ((xmlChar *) buffer))
00270             xmlSetProp (node, (const xmlChar *) LABEL_EVALUATOR,
00271                        (xmlChar *) buffer);
00272         g_free (buffer);
00273     }

```

```

00272     }
00273     if (input->seed != DEFAULT_RANDOM_SEED)
00274         xml_node_set_uint (node, (const xmlChar *) LABEL_SEED,
input->seed);
00275
00276     // Setting the algorithm
00277     buffer = (char *) g_slice_alloc (64);
00278     switch (input->algorithm)
00279     {
00280     case ALGORITHM_MONTE_CARLO:
00281         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00282             (const xmlChar *) LABEL_MONTE_CARLO);
00283         snprintf (buffer, 64, "%u", input->nsimulations);
00284         xmlSetProp (node, (const xmlChar *) LABEL_NSIMULATIONS,
00285             (xmlChar *) buffer);
00286         snprintf (buffer, 64, "%u", input->niterations);
00287         xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00288             (xmlChar *) buffer);
00289         snprintf (buffer, 64, "%.3lg", input->tolerance);
00290         xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00291         snprintf (buffer, 64, "%u", input->nbest);
00292         xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00293         input_save_climbing_xml (node);
00294         break;
00295     case ALGORITHM_SWEEP:
00296         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00297             (const xmlChar *) LABEL_SWEEP);
00298         snprintf (buffer, 64, "%u", input->niterations);
00299         xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00300             (xmlChar *) buffer);
00301         snprintf (buffer, 64, "%.3lg", input->tolerance);
00302         xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00303         snprintf (buffer, 64, "%u", input->nbest);
00304         xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00305         input_save_climbing_xml (node);
00306         break;
00307     case ALGORITHM_ORTHOGONAL:
00308         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00309             (const xmlChar *) LABEL_ORTHOGONAL);
00310         snprintf (buffer, 64, "%u", input->niterations);
00311         xmlSetProp (node, (const xmlChar *) LABEL_NITERATIONS,
00312             (xmlChar *) buffer);
00313         snprintf (buffer, 64, "%.3lg", input->tolerance);
00314         xmlSetProp (node, (const xmlChar *) LABEL_TOLERANCE, (xmlChar *) buffer);
00315         snprintf (buffer, 64, "%u", input->nbest);
00316         xmlSetProp (node, (const xmlChar *) LABEL_NBEST, (xmlChar *) buffer);
00317         input_save_climbing_xml (node);
00318         break;
00319     default:
00320         xmlSetProp (node, (const xmlChar *) LABEL_ALGORITHM,
00321             (const xmlChar *) LABEL_GENETIC);
00322         snprintf (buffer, 64, "%u", input->nsimulations);
00323         xmlSetProp (node, (const xmlChar *) LABEL_NPOPULATION,
00324             (xmlChar *) buffer);
00325         snprintf (buffer, 64, "%u", input->niterations);
00326         xmlSetProp (node, (const xmlChar *) LABEL_NGENERATIONS,
00327             (xmlChar *) buffer);
00328         snprintf (buffer, 64, "%.3lg", input->mutation_ratio);
00329         xmlSetProp (node, (const xmlChar *) LABEL_MUTATION, (xmlChar *) buffer);
00330         snprintf (buffer, 64, "%.3lg", input->reproduction_ratio);
00331         xmlSetProp (node, (const xmlChar *) LABEL_REPRODUCTION,
00332             (xmlChar *) buffer);
00333         snprintf (buffer, 64, "%.3lg", input->adaptation_ratio);
00334         xmlSetProp (node, (const xmlChar *) LABEL_ADAPTATION, (xmlChar *) buffer);
00335         break;
00336     }
00337     g_slice_free1 (64, buffer);
00338     if (input->threshold != 0.)
00339         xml_node_set_float (node, (const xmlChar *)
LABEL_THRESHOLD,
input->threshold);
00340
00341     // Setting the experimental data
00342     for (i = 0; i < input->nexperiments; ++i)
00343     {
00344         child = xmlNewChild (node, 0, (const xmlChar *) LABEL_EXPERIMENT, 0);
00345         xmlSetProp (child, (const xmlChar *) LABEL_NAME,
00346             (xmlChar *) input->experiment[i].name);
00347         if (input->experiment[i].weight != 1.)
00348             xml_node_set_float (child, (const xmlChar *)
LABEL_WEIGHT,
input->experiment[i].weight);
00349         for (j = 0; j < input->experiment->ninputs; ++j)
00350             xmlSetProp (child, (const xmlChar *) stencil[j],
00351                 (xmlChar *) input->experiment[i].stencil[j]);
00352     }
00353 }
00354
00355

```

```

00356 // Setting the variables data
00357 for (i = 0; i < input->nvariables; ++i)
00358 {
00359     child = xmlNewChild (node, 0, (const xmlChar *) LABEL_VARIABLE, 0);
00360     xmlSetProp (child, (const xmlChar *) LABEL_NAME,
00361                 (xmlChar *) input->variable[i].name);
00362     xml_node_set_float (child, (const xmlChar *)
00363 LABEL_MINIMUM,
00364                         input->variable[i].rangemin);
00364     if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
00365         xml_node_set_float (child, (const xmlChar *)
00366 LABEL_ABSOLUTE_MINIMUM,
00367                             input->variable[i].rangeminabs);
00367     xml_node_set_float (child, (const xmlChar *)
00368 LABEL_MAXIMUM,
00369                         input->variable[i].rangemax);
00369     if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
00370         xml_node_set_float (child, (const xmlChar *)
00371 LABEL_ABSOLUTE_MAXIMUM,
00372                             input->variable[i].rangemaxabs);
00372     if (input->variable[i].precision !=
00373         DEFAULT_PRECISION)
00374         xml_node_set_uint (child, (const xmlChar *)
00375 LABEL_PRECISION,
00376                             input->variable[i].precision);
00376     if (input->algorithm == ALGORITHM_SWEEP
00377         || input->algorithm == ALGORITHM_ORTHOGONAL)
00378         xml_node_set_uint (child, (const xmlChar *)
00379 LABEL_NSWEEPS,
00380                             input->variable[i].nsweeps);
00380     else if (input->algorithm == ALGORITHM_GENETIC)
00381         xml_node_set_uint (child, (const xmlChar *) LABEL_NBITS,
00382                             input->variable[i].nbits);
00382     if (input->nsteps)
00383         xml_node_set_float (child, (const xmlChar *)
00384 LABEL_STEP,
00385                             input->variable[i].step);
00385 }
00386
00387 // Saving the error norm
00388 switch (input->norm)
00389 {
00390     case ERROR_NORM_MAXIMUM:
00391         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00392                     (const xmlChar *) LABEL_MAXIMUM);
00393         break;
00394     case ERROR_NORM_P:
00395         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00396                     (const xmlChar *) LABEL_P);
00397         xml_node_set_float (node, (const xmlChar *) LABEL_P,
00398 input->p);
00398         break;
00399     case ERROR_NORM_TAXICAB:
00400         xmlSetProp (node, (const xmlChar *) LABEL_NORM,
00401                     (const xmlChar *) LABEL_TAXICAB);
00402 }
00403
00404 #if DEBUG_INTERFACE
00405 fprintf (stderr, "input_save: end\n");
00406 #endif
00407 }
00408
00412 void
00413 input_save_json (JsonGenerator * generator)
00414 {
00415     unsigned int i, j;
00416     char *buffer;
00417     JsonNode *node, *child;
00418     JsonObject *object;
00419     JsonArray *array;
00420     GFile *file, *file2;
00421
00422 #if DEBUG_INTERFACE
00423 fprintf (stderr, "input_save_json: start\n");
00424 #endif
00425
00426 // Setting root JSON node
00427 node = json_node_new (JSON_NODE_OBJECT);
00428 object = json_node_get_object (node);
00429 json_generator_set_root (generator, node);
00430
00431 // Adding properties to the root JSON node
00432 if (strcmp (input->result, result_name))
00433     json_object_set_string_member (object, LABEL_RESULT_FILE,
00434 input->result);
00434 if (strcmp (input->variables, variables_name))
00435     json_object_set_string_member (object, LABEL_VARIABLES_FILE,

```



```

00436         input->variables);
00437     file = g_file_new_for_path (input->directory);
00438     file2 = g_file_new_for_path (input->simulator);
00439     buffer = g_file_get_relative_path (file, file2);
00440     g_object_unref (file2);
00441     json_object_set_string_member (object, LABEL_SIMULATOR, buffer);
00442     g_free (buffer);
00443     if (input->evaluator)
00444     {
00445         file2 = g_file_new_for_path (input->evaluator);
00446         buffer = g_file_get_relative_path (file, file2);
00447         g_object_unref (file2);
00448         if (strlen (buffer))
00449             json_object_set_string_member (object, LABEL_EVALUATOR, buffer);
00450         g_free (buffer);
00451     }
00452     if (input->seed != DEFAULT_RANDOM_SEED)
00453         json_object_set_uint (object, LABEL_SEED,
input->seed);
00454
00455     // Setting the algorithm
00456     buffer = (char *) g_slice_alloc (64);
00457     switch (input->algorithm)
00458     {
00459     case ALGORITHM_MONTE_CARLO:
00460         json_object_set_string_member (object, LABEL_ALGORITHM,
00461             LABEL_MONTE_CARLO);
00462         snprintf (buffer, 64, "%u", input->nsimulations);
00463         json_object_set_string_member (object, LABEL_NSIMULATIONS, buffer);
00464         snprintf (buffer, 64, "%u", input->niterations);
00465         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);
00466         snprintf (buffer, 64, "%.3lg", input->tolerance);
00467         json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00468         snprintf (buffer, 64, "%u", input->nbest);
00469         json_object_set_string_member (object, LABEL_NBEST, buffer);
00470         input_save_climbing_json (node);
00471         break;
00472     case ALGORITHM_SWEEP:
00473         json_object_set_string_member (object, LABEL_ALGORITHM,
00474             LABEL_SWEEP);
00475         snprintf (buffer, 64, "%u", input->niterations);
00476         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);
00477         snprintf (buffer, 64, "%.3lg", input->tolerance);
00478         json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00479         snprintf (buffer, 64, "%u", input->nbest);
00480         json_object_set_string_member (object, LABEL_NBEST, buffer);
00481         input_save_climbing_json (node);
00482         break;
00483     case ALGORITHM_ORTHOGONAL:
00484         json_object_set_string_member (object, LABEL_ALGORITHM,
00485             LABEL_ORTHOGONAL);
00486         snprintf (buffer, 64, "%u", input->niterations);
00487         json_object_set_string_member (object, LABEL_NITERATIONS, buffer);
00488         snprintf (buffer, 64, "%.3lg", input->tolerance);
00489         json_object_set_string_member (object, LABEL_TOLERANCE, buffer);
00490         snprintf (buffer, 64, "%u", input->nbest);
00491         json_object_set_string_member (object, LABEL_NBEST, buffer);
00492         input_save_climbing_json (node);
00493         break;
00494     default:
00495         json_object_set_string_member (object, LABEL_ALGORITHM,
00496             LABEL_GENETIC);
00497         snprintf (buffer, 64, "%u", input->nsimulations);
00498         json_object_set_string_member (object, LABEL_NPOPULATION, buffer);
00499         snprintf (buffer, 64, "%u", input->niterations);
00500         json_object_set_string_member (object, LABEL_NGENERATIONS, buffer);
00501         snprintf (buffer, 64, "%.3lg", input->mutation_ratio);
00502         json_object_set_string_member (object, LABEL_MUTATION, buffer);
00503         snprintf (buffer, 64, "%.3lg", input->reproduction_ratio);
00504         json_object_set_string_member (object, LABEL_REPRODUCTION, buffer);
00505         snprintf (buffer, 64, "%.3lg", input->adaptation_ratio);
00506         json_object_set_string_member (object, LABEL_ADAPTATION, buffer);
00507         break;
00508     }
00509     g_slice_free1 (64, buffer);
00510     if (input->threshold != 0.)
00511         json_object_set_float (object, LABEL_THRESHOLD,
input->threshold);
00512
00513     // Setting the experimental data
00514     array = json_array_new ();
00515     for (i = 0; i < input->nexperiments; ++i)
00516     {
00517         child = json_node_new (JSON_NODE_OBJECT);
00518         object = json_node_get_object (child);
00519         json_object_set_string_member (object, LABEL_NAME,
input->experiment[i].name);

```

```

00518     if (input->experiment[i].weight != 1.)
00519         json_object_set_float (object, LABEL_WEIGHT,
00520             input->experiment[i].weight);
00521     for (j = 0; j < input->experiment->ninputs; ++j)
00522         json_object_set_string_member (object, stencil[j],
00523             input->experiment[i].
stencil[j]);
00524     json_array_add_element (array, child);
00525 }
00526 json_object_set_array_member (object, LABEL_EXPERIMENTS, array);
00527
00528 // Setting the variables data
00529 array = json_array_new ();
00530 for (i = 0; i < input->nvariables; ++i)
00531 {
00532     child = json_node_new (JSON_NODE_OBJECT);
00533     object = json_node_get_object (child);
00534     json_object_set_string_member (object, LABEL_NAME,
00535         input->variable[i].name);
00536     json_object_set_float (object, LABEL_MINIMUM,
00537         input->variable[i].rangemin);
00538     if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
00539         json_object_set_float (object,
LABEL_ABSOLUTE_MINIMUM,
00540             input->variable[i].rangeminabs);
00541     json_object_set_float (object, LABEL_MAXIMUM,
00542         input->variable[i].rangemax);
00543     if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
00544         json_object_set_float (object,
LABEL_ABSOLUTE_MAXIMUM,
00545             input->variable[i].rangemaxabs);
00546     if (input->variable[i].precision !=
DEFAULT_PRECISION)
00547         json_object_set_uint (object, LABEL_PRECISION,
00548             input->variable[i].precision);
00549     if (input->algorithm == ALGORITHM_SWEEP
|| input->algorithm == ALGORITHM_ORTHOGONAL)
00550         json_object_set_uint (object, LABEL_NSWEEPS,
00551             input->variable[i].nsweeps);
00552     else if (input->algorithm == ALGORITHM_GENETIC)
00553         json_object_set_uint (object, LABEL_NBITS,
input->variable[i].nbits);
00554     if (input->nsteps)
00555         json_object_set_float (object, LABEL_STEP,
input->variable[i].step);
00556     json_array_add_element (array, child);
00557 }
00558 json_object_set_array_member (object, LABEL_VARIABLES, array);
00559
00560 // Saving the error norm
00561 switch (input->norm)
00562 {
00563     case ERROR_NORM_MAXIMUM:
00564         json_object_set_string_member (object, LABEL_NORM, LABEL_MAXIMUM);
00565         break;
00566     case ERROR_NORM_P:
00567         json_object_set_string_member (object, LABEL_NORM, LABEL_P);
00568         json_object_set_float (object, LABEL_P, input->
p);
00569         break;
00570     case ERROR_NORM_TAXICAB:
00571         json_object_set_string_member (object, LABEL_NORM, LABEL_TAXICAB);
00572 }
00573
00574 #if DEBUG_INTERFACE
00575     fprintf (stderr, "input_save_json: end\n");
00576 #endif
00577 }
00578
00579 void
00580 input_save (char *filename)
00581 {
00582     xmlDoc *doc;
00583     JsonGenerator *generator;
00584
00585 #if DEBUG_INTERFACE
00586     fprintf (stderr, "input_save: start\n");
00587 #endif
00588
00589 // Getting the input file directory
00590 input->name = g_path_get_basename (filename);
00591 input->directory = g_path_get_dirname (filename);
00592
00593 if (input->type == INPUT_TYPE_XML)
00594 {
00595     // Opening the input file
00596     doc = xmlNewDoc ((const xmlChar *) "1.0");

```

```

00601     input_save_xml (doc);
00602
00603     // Saving the XML file
00604     xmlSaveFormatFile (filename, doc, 1);
00605
00606     // Freeing memory
00607     xmlFreeDoc (doc);
00608 }
00609 else
00610 {
00611     // Opening the input file
00612     generator = json_generator_new ();
00613     json_generator_set_pretty (generator, TRUE);
00614     input_save_json (generator);
00615
00616     // Saving the JSON file
00617     json_generator_to_file (generator, filename, NULL);
00618
00619     // Freeing memory
00620     g_object_unref (generator);
00621 }
00622
00623 #if DEBUG_INTERFACE
00624     fprintf (stderr, "input_save: end\n");
00625 #endif
00626 }
00627
00631 void
00632 options_new ()
00633 {
00634     #if DEBUG_INTERFACE
00635         fprintf (stderr, "options_new: start\n");
00636     #endif
00637     options->label_seed = (GtkLabel *)
00638         gtk_label_new (_("Pseudo-random numbers generator seed"));
00639     options->spin_seed = (GtkSpinButton *)
00640         gtk_spin_button_new_with_range (0., (gdouble) G_MAXULONG, 1.);
00641     gtk_widget_set_tooltip_text
00642         (GTK_WIDGET (options->spin_seed),
00643          _("Seed to init the pseudo-random numbers generator"));
00644     gtk_spin_button_set_value (options->spin_seed, (gdouble) input->
seed);
00645     options->label_threads = (GtkLabel *)
00646         gtk_label_new (_("Threads number for the stochastic algorithm"));
00647     options->spin_threads
00648         = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
00649     gtk_widget_set_tooltip_text
00650         (GTK_WIDGET (options->spin_threads),
00651          _("Number of threads to perform the calibration/optimization for "
00652            "the stochastic algorithm"));
00653     gtk_spin_button_set_value (options->spin_threads, (gdouble)
nthreads);
00654     options->label_climbing = (GtkLabel *)
00655         gtk_label_new (_("Threads number for the hill climbing method"));
00656     options->spin_climbing =
00657         (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
00658     gtk_widget_set_tooltip_text
00659         (GTK_WIDGET (options->spin_climbing),
00660          _("Number of threads to perform the calibration/optimization for the "
00661            "hill climbing method"));
00662     gtk_spin_button_set_value (options->spin_climbing,
00663                               (gdouble) nthreads_climbing);
00664     options->grid = (GtkGrid *) gtk_grid_new ();
00665     gtk_grid_attach (options->grid, GTK_WIDGET (options->label_seed), 0, 0, 1, 1);
00666     gtk_grid_attach (options->grid, GTK_WIDGET (options->spin_seed), 1, 0, 1, 1);
00667     gtk_grid_attach (options->grid, GTK_WIDGET (options->label_threads),
00668                     0, 1, 1, 1);
00669     gtk_grid_attach (options->grid, GTK_WIDGET (options->spin_threads),
00670                     1, 1, 1, 1);
00671     gtk_grid_attach (options->grid, GTK_WIDGET (options->label_climbing), 0, 2, 1,
00672                     1);
00673     gtk_grid_attach (options->grid, GTK_WIDGET (options->spin_climbing), 1, 2, 1,
00674                     1);
00675     gtk_widget_show_all (GTK_WIDGET (options->grid));
00676     options->dialog = (GtkDialog *)
00677         gtk_dialog_new_with_buttons (_("Options"),
00678                                     window->window,
00679                                     GTK_DIALOG_MODAL,
00680                                     _("_OK"), GTK_RESPONSE_OK,
00681                                     _("_Cancel"), GTK_RESPONSE_CANCEL, NULL);
00682     gtk_container_add
00683         (GTK_CONTAINER (gtk_dialog_get_content_area (options->dialog)),
00684          GTK_WIDGET (options->grid));
00685     if (gtk_dialog_run (options->dialog) == GTK_RESPONSE_OK)
00686     {
00687         input->seed
00688             = (unsigned long int) gtk_spin_button_get_value (options->spin_seed);

```

```

00689     nthreads = gtk_spin_button_get_value_as_int (options->spin_threads);
00690     nthreads_climbing
00691     = gtk_spin_button_get_value_as_int (options->spin_climbing);
00692 }
00693 gtk_widget_destroy (GTK_WIDGET (options->dialog));
00694 #if DEBUG_INTERFACE
00695 fprintf (stderr, "options_new: end\n");
00696 #endif
00697 }
00698
00702 void
00703 running_new ()
00704 {
00705     #if DEBUG_INTERFACE
00706     fprintf (stderr, "running_new: start\n");
00707     #endif
00708     running->label = (GtkLabel *) gtk_label_new (_("Calculating ..."));
00709     running->spinner = (GtkSpinner *) gtk_spinner_new ();
00710     running->grid = (GtkGrid *) gtk_grid_new ();
00711     gtk_grid_attach (running->grid, GTK_WIDGET (running->label), 0, 0, 1, 1);
00712     gtk_grid_attach (running->grid, GTK_WIDGET (running->spinner), 0, 1, 1, 1);
00713     running->dialog = (GtkDialog *)
00714         gtk_dialog_new_with_buttons (_("Calculating"),
00715                                     window->window, GTK_DIALOG_MODAL, NULL, NULL);
00716     gtk_container_add (GTK_CONTAINER
00717                       (gtk_dialog_get_content_area (running->dialog)),
00718                       GTK_WIDGET (running->grid));
00719     gtk_spinner_start (running->spinner);
00720     gtk_widget_show_all (GTK_WIDGET (running->dialog));
00721     #if DEBUG_INTERFACE
00722     fprintf (stderr, "running_new: end\n");
00723     #endif
00724 }
00725
00731 unsigned int
00732 window_get_algorithm ()
00733 {
00734     unsigned int i;
00735     #if DEBUG_INTERFACE
00736     fprintf (stderr, "window_get_algorithm: start\n");
00737     #endif
00738     i = gtk_array_get_active (window->button_algorithm,
00739                             NALGORITHMS);
00739     #if DEBUG_INTERFACE
00740     fprintf (stderr, "window_get_algorithm: %u\n", i);
00741     fprintf (stderr, "window_get_algorithm: end\n");
00742     #endif
00743     return i;
00744 }
00745
00751 unsigned int
00752 window_get_climbing ()
00753 {
00754     unsigned int i;
00755     #if DEBUG_INTERFACE
00756     fprintf (stderr, "window_get_climbing: start\n");
00757     #endif
00758     i = gtk_array_get_active (window->button_climbing,
00759                             NCLIMBINGS);
00759     #if DEBUG_INTERFACE
00760     fprintf (stderr, "window_get_climbing: %u\n", i);
00761     fprintf (stderr, "window_get_climbing: end\n");
00762     #endif
00763     return i;
00764 }
00765
00771 unsigned int
00772 window_get_norm ()
00773 {
00774     unsigned int i;
00775     #if DEBUG_INTERFACE
00776     fprintf (stderr, "window_get_norm: start\n");
00777     #endif
00778     i = gtk_array_get_active (window->button_norm,
00779                             NNORMS);
00779     #if DEBUG_INTERFACE
00780     fprintf (stderr, "window_get_norm: %u\n", i);
00781     fprintf (stderr, "window_get_norm: end\n");
00782     #endif
00783     return i;
00784 }
00785
00789 void
00790 window_save_climbing ()
00791 {
00792     #if DEBUG_INTERFACE
00793     fprintf (stderr, "window_save_climbing: start\n");

```

```

00794 #endif
00795     if (gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->check_climbing)))
00796     {
00797         input->nsteps = gtk_spin_button_get_value_as_int (window->
spin_steps);
00798         input->relaxation = gtk_spin_button_get_value (window->
spin_relaxation);
00799         switch (window_get_climbing ())
00800         {
00801             case CLIMBING_METHOD_COORDINATES:
00802                 input->climbing = CLIMBING_METHOD_COORDINATES;
00803                 break;
00804             default:
00805                 input->climbing = CLIMBING_METHOD_RANDOM;
00806                 input->nestimates
= gtk_spin_button_get_value_as_int (window->spin_estimates);
00807         }
00808     }
00809 }
00810 else
00811     input->nsteps = 0;
00812 #if DEBUG_INTERFACE
00813     fprintf (stderr, "window_save_climbing: end\n");
00814 #endif
00815 }
00816
00822 int
00823 window_save ()
00824 {
00825     GtkFileChooserDialog *dlg;
00826     GtkFileFilter *filter1, *filter2;
00827     char *buffer;
00828
00829 #if DEBUG_INTERFACE
00830     fprintf (stderr, "window_save: start\n");
00831 #endif
00832
00833     // Opening the saving dialog
00834     dlg = (GtkFileChooserDialog *)
00835         gtk_file_chooser_dialog_new (_("Save file"),
00836                                     window->window,
00837                                     GTK_FILE_CHOOSER_ACTION_SAVE,
00838                                     _("_Cancel"), GTK_RESPONSE_CANCEL,
00839                                     _("_OK"), GTK_RESPONSE_OK, NULL);
00840     gtk_file_chooser_set_do_overwrite_confirmation (GTK_FILE_CHOOSER (dlg), TRUE);
00841     buffer = g_build_filename (input->directory, input->name, NULL);
00842     gtk_file_chooser_set_filename (GTK_FILE_CHOOSER (dlg), buffer);
00843     g_free (buffer);
00844
00845     // Adding XML filter
00846     filter1 = (GtkFileFilter *) gtk_file_filter_new ();
00847     gtk_file_filter_set_name (filter1, "XML");
00848     gtk_file_filter_add_pattern (filter1, "*.xml");
00849     gtk_file_filter_add_pattern (filter1, "*.XML");
00850     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter1);
00851
00852     // Adding JSON filter
00853     filter2 = (GtkFileFilter *) gtk_file_filter_new ();
00854     gtk_file_filter_set_name (filter2, "JSON");
00855     gtk_file_filter_add_pattern (filter2, "*.json");
00856     gtk_file_filter_add_pattern (filter2, "*.JSON");
00857     gtk_file_filter_add_pattern (filter2, "*.js");
00858     gtk_file_filter_add_pattern (filter2, "*.JS");
00859     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter2);
00860
00861     if (input->type == INPUT_TYPE_XML)
00862         gtk_file_chooser_set_filter (GTK_FILE_CHOOSER (dlg), filter1);
00863     else
00864         gtk_file_chooser_set_filter (GTK_FILE_CHOOSER (dlg), filter2);
00865
00866     // If OK response then saving
00867     if (gtk_dialog_run (GTK_DIALOG (dlg)) == GTK_RESPONSE_OK)
00868     {
00869         // Setting input file type
00870         filter1 = gtk_file_chooser_get_filter (GTK_FILE_CHOOSER (dlg));
00871         buffer = (char *) gtk_file_filter_get_name (filter1);
00872         if (!strcmp (buffer, "XML"))
00873             input->type = INPUT_TYPE_XML;
00874         else
00875             input->type = INPUT_TYPE_JSON;
00876
00877         // Adding properties to the root XML node
00878         input->simulator = gtk_file_chooser_get_filename
(GTK_FILE_CHOOSER (window->button_simulator));
00879         if (gtk_toggle_button_get_active
(GTK_TOGGLE_BUTTON (window->check_evaluator)))
00880             input->evaluator = gtk_file_chooser_get_filename
(GTK_FILE_CHOOSER (window->button_evaluator));
00881     }

```

```

00884     else
00885         input->evaluator = NULL;
00886     if (input->type == INPUT_TYPE_XML)
00887     {
00888         input->result
00889             = (char *) xmlStrdup ((const xmlChar *)
00890                                   gtk_entry_get_text (window->entry_result));
00891         input->variables
00892             = (char *) xmlStrdup ((const xmlChar *)
00893                                   gtk_entry_get_text (window->entry_variables));
00894     }
00895     else
00896     {
00897         input->result = g_strdup (gtk_entry_get_text (window->
00898 entry_result));
00899         input->variables =
00900             g_strdup (gtk_entry_get_text (window->entry_variables));
00901     }
00902     // Setting the algorithm
00903     switch (window_get_algorithm ())
00904     {
00905         case ALGORITHM_MONTE_CARLO:
00906             input->algorithm = ALGORITHM_MONTE_CARLO;
00907             input->nsimulations
00908                 = gtk_spin_button_get_value_as_int (window->spin_simulations);
00909             input->niterations
00910                 = gtk_spin_button_get_value_as_int (window->spin_iterations);
00911             input->tolerance = gtk_spin_button_get_value (window->
00912 spin_tolerance);
00913             input->nbest = gtk_spin_button_get_value_as_int (window->
00914 spin_bests);
00915             window_save_climbing ();
00916             break;
00917         case ALGORITHM_SWEEP:
00918             input->algorithm = ALGORITHM_SWEEP;
00919             input->niterations
00920                 = gtk_spin_button_get_value_as_int (window->spin_iterations);
00921             input->tolerance = gtk_spin_button_get_value (window->
00922 spin_tolerance);
00923             input->nbest = gtk_spin_button_get_value_as_int (window->
00924 spin_bests);
00925             window_save_climbing ();
00926             break;
00927         case ALGORITHM_ORTHOGONAL:
00928             input->algorithm = ALGORITHM_ORTHOGONAL;
00929             input->niterations
00930                 = gtk_spin_button_get_value_as_int (window->spin_iterations);
00931             input->tolerance = gtk_spin_button_get_value (window->
00932 spin_tolerance);
00933             input->nbest = gtk_spin_button_get_value_as_int (window->
00934 spin_bests);
00935             window_save_climbing ();
00936             break;
00937         default:
00938             input->algorithm = ALGORITHM_GENETIC;
00939             input->nsimulations
00940                 = gtk_spin_button_get_value_as_int (window->spin_population);
00941             input->niterations
00942                 = gtk_spin_button_get_value_as_int (window->spin_generations);
00943             input->mutation_ratio
00944                 = gtk_spin_button_get_value (window->spin_mutation);
00945             input->reproduction_ratio
00946                 = gtk_spin_button_get_value (window->spin_reproduction);
00947             input->adaptation_ratio
00948                 = gtk_spin_button_get_value (window->spin_adaptation);
00949             break;
00950     }
00951     input->norm = window_get_norm ();
00952     input->p = gtk_spin_button_get_value (window->spin_p);
00953     input->threshold = gtk_spin_button_get_value (window->
00954 spin_threshold);
00955     // Saving the XML file
00956     buffer = gtk_file_chooser_get_filename (GTK_FILE_CHOOSER (dlg));
00957     input_save (buffer);
00958     // Closing and freeing memory
00959     g_free (buffer);
00960     gtk_widget_destroy (GTK_WIDGET (dlg));
00961     #if DEBUG_INTERFACE
00962         fprintf (stderr, "window_save: end\n");
00963     #endif
00964     return 1;
00965 }
00966 // Closing and freeing memory

```

```

00963  gtk_widget_destroy (GTK_WIDGET (dlg));
00964  #if DEBUG_INTERFACE
00965  fprintf (stderr, "window_save: end\n");
00966  #endif
00967  return 0;
00968  }
00969
00973  void
00974  window_run ()
00975  {
00976  unsigned int i;
00977  char *msg, *msg2, buffer[64], buffer2[64];
00978  #if DEBUG_INTERFACE
00979  fprintf (stderr, "window_run: start\n");
00980  #endif
00981  if (!window_save ())
00982  {
00983  #if DEBUG_INTERFACE
00984  fprintf (stderr, "window_run: end\n");
00985  #endif
00986  return;
00987  }
00988  running_new ();
00989  while (gtk_events_pending ())
00990  gtk_main_iteration ();
00991  optimize_open ();
00992  #if DEBUG_INTERFACE
00993  fprintf (stderr, "window_run: closing running dialog\n");
00994  #endif
00995  gtk_spinner_stop (running->spinner);
00996  gtk_widget_destroy (GTK_WIDGET (running->dialog));
00997  #if DEBUG_INTERFACE
00998  fprintf (stderr, "window_run: displaying results\n");
00999  #endif
01000  snprintf (buffer, 64, "error = %.15le\n", optimize->error_old[0]);
01001  msg2 = g_strdup (buffer);
01002  for (i = 0; i < optimize->nvariables; ++i, msg2 = msg)
01003  {
01004  snprintf (buffer, 64, "%s = %s\n",
01005           input->variable[i].name, format[input->
01006           variable[i].precision]);
01007  snprintf (buffer2, 64, buffer, optimize->value_old[i]);
01008  msg = g_strconcat (msg2, buffer2, NULL);
01009  g_free (msg2);
01010  snprintf (buffer, 64, "%s = %.6lg s", _("Calculation time"),
01011           optimize->calculation_time);
01012  msg = g_strconcat (msg2, buffer, NULL);
01013  g_free (msg2);
01014  show_message (_("Best result"), msg, INFO_TYPE);
01015  g_free (msg);
01016  #if DEBUG_INTERFACE
01017  fprintf (stderr, "window_run: freeing memory\n");
01018  #endif
01019  optimize_free ();
01020  #if DEBUG_INTERFACE
01021  fprintf (stderr, "window_run: end\n");
01022  #endif
01023  }
01024
01028  void
01029  window_help ()
01030  {
01031  char *buffer, *buffer2;
01032  #if DEBUG_INTERFACE
01033  fprintf (stderr, "window_help: start\n");
01034  #endif
01035  buffer2 = g_build_filename (window->application_directory, "..", "manuals",
01036                             _("user-manual.pdf"), NULL);
01037  buffer = g_filename_to_uri (buffer2, NULL, NULL);
01038  g_free (buffer2);
01039  #if GTK_MINOR_VERSION >= 22
01040  gtk_show_uri_on_window (window->window, buffer, GDK_CURRENT_TIME, NULL);
01041  #else
01042  gtk_show_uri (NULL, buffer, GDK_CURRENT_TIME, NULL);
01043  #endif
01044  #if DEBUG_INTERFACE
01045  fprintf (stderr, "window_help: uri=%s\n", buffer);
01046  #endif
01047  g_free (buffer);
01048  #if DEBUG_INTERFACE
01049  fprintf (stderr, "window_help: end\n");
01050  #endif
01051  }
01052
01056  void
01057  window_about ()

```

```

01058 {
01059     static const gchar *authors[] = {
01060         "Javier Burguete Tolosa <jburguete@eead.csic.es>",
01061         "Borja Latorre Garcés <borja.latorre@csic.es>",
01062         NULL
01063     };
01064     #if DEBUG_INTERFACE
01065     fprintf (stderr, "window_about: start\n");
01066     #endif
01067     gtk_show_about_dialog
01068     (window->window,
01069      "program_name", "MPCOTool",
01070      "comments",
01071      _("The Multi-Purposes Calibration and Optimization Tool.\n"
01072       "A software to perform calibrations or optimizations of empirical "
01073       "parameters"),
01074      "authors", authors,
01075      "translator-credits",
01076      "Javier Burguete Tolosa <jburguete@eead.csic.es> "
01077       "(english, french and spanish)\n"
01078       "Uğur Çayoğlu (german)",
01079      "version", "4.0.1",
01080      "copyright", "Copyright 2012-2018 Javier Burguete Tolosa",
01081      "logo", window->logo,
01082      "website", "https://github.com/jburguete/mpcotool",
01083      "license-type", GTK_LICENSE_BSD, NULL);
01084     #if DEBUG_INTERFACE
01085     fprintf (stderr, "window_about: end\n");
01086     #endif
01087 }
01088
01092 void
01093 window_update_climbing ()
01094 {
01095     #if DEBUG_INTERFACE
01096     fprintf (stderr, "window_update_climbing: start\n");
01097     #endif
01098     gtk_widget_show (GTK_WIDGET (window->check_climbing));
01099     if (gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->check_climbing)))
01100     {
01101         gtk_widget_show (GTK_WIDGET (window->grid_climbing));
01102         gtk_widget_show (GTK_WIDGET (window->label_step));
01103         gtk_widget_show (GTK_WIDGET (window->spin_step));
01104     }
01105     switch (window_get_climbing ())
01106     {
01107         case CLIMBING_METHOD_COORDINATES:
01108             gtk_widget_hide (GTK_WIDGET (window->label_estimates));
01109             gtk_widget_hide (GTK_WIDGET (window->spin_estimates));
01110             break;
01111         default:
01112             gtk_widget_show (GTK_WIDGET (window->label_estimates));
01113             gtk_widget_show (GTK_WIDGET (window->spin_estimates));
01114     }
01115     #if DEBUG_INTERFACE
01116     fprintf (stderr, "window_update_climbing: end\n");
01117     #endif
01118 }
01119
01123 void
01124 window_update ()
01125 {
01126     unsigned int i;
01127     #if DEBUG_INTERFACE
01128     fprintf (stderr, "window_update: start\n");
01129     #endif
01130     gtk_widget_set_sensitive
01131     (GTK_WIDGET (window->button_evaluator),
01132      gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON
01133       (window->check_evaluator)));
01134     gtk_widget_hide (GTK_WIDGET (window->label_simulations));
01135     gtk_widget_hide (GTK_WIDGET (window->spin_simulations));
01136     gtk_widget_hide (GTK_WIDGET (window->label_iterations));
01137     gtk_widget_hide (GTK_WIDGET (window->spin_iterations));
01138     gtk_widget_hide (GTK_WIDGET (window->label_tolerance));
01139     gtk_widget_hide (GTK_WIDGET (window->spin_tolerance));
01140     gtk_widget_hide (GTK_WIDGET (window->label_bests));
01141     gtk_widget_hide (GTK_WIDGET (window->spin_bests));
01142     gtk_widget_hide (GTK_WIDGET (window->label_population));
01143     gtk_widget_hide (GTK_WIDGET (window->spin_population));
01144     gtk_widget_hide (GTK_WIDGET (window->label_generations));
01145     gtk_widget_hide (GTK_WIDGET (window->spin_generations));
01146     gtk_widget_hide (GTK_WIDGET (window->label_mutation));
01147     gtk_widget_hide (GTK_WIDGET (window->spin_mutation));
01148     gtk_widget_hide (GTK_WIDGET (window->label_reproduction));
01149     gtk_widget_hide (GTK_WIDGET (window->spin_reproduction));
01150     gtk_widget_hide (GTK_WIDGET (window->label_adaptation));

```



```

01151 gtk_widget_hide (GTK_WIDGET (window->spin_adaptation));
01152 gtk_widget_hide (GTK_WIDGET (window->label_sweeps));
01153 gtk_widget_hide (GTK_WIDGET (window->spin_sweeps));
01154 gtk_widget_hide (GTK_WIDGET (window->label_bits));
01155 gtk_widget_hide (GTK_WIDGET (window->spin_bits));
01156 gtk_widget_hide (GTK_WIDGET (window->check_climbing));
01157 gtk_widget_hide (GTK_WIDGET (window->grid_climbing));
01158 gtk_widget_hide (GTK_WIDGET (window->label_step));
01159 gtk_widget_hide (GTK_WIDGET (window->spin_step));
01160 gtk_widget_hide (GTK_WIDGET (window->label_p));
01161 gtk_widget_hide (GTK_WIDGET (window->spin_p));
01162 i = gtk_spin_button_get_value_as_int (window->spin_iterations);
01163 switch (window_get_algorithm ())
01164 {
01165     case ALGORITHM_MONTE_CARLO:
01166         gtk_widget_show (GTK_WIDGET (window->label_simulations));
01167         gtk_widget_show (GTK_WIDGET (window->spin_simulations));
01168         gtk_widget_show (GTK_WIDGET (window->label_iterations));
01169         gtk_widget_show (GTK_WIDGET (window->spin_iterations));
01170         if (i > 1)
01171         {
01172             gtk_widget_show (GTK_WIDGET (window->label_tolerance));
01173             gtk_widget_show (GTK_WIDGET (window->spin_tolerance));
01174             gtk_widget_show (GTK_WIDGET (window->label_bests));
01175             gtk_widget_show (GTK_WIDGET (window->spin_bests));
01176         }
01177         window_update_climbing ();
01178         break;
01179     case ALGORITHM_SWEEP:
01180     case ALGORITHM_ORTHOGONAL:
01181         gtk_widget_show (GTK_WIDGET (window->label_iterations));
01182         gtk_widget_show (GTK_WIDGET (window->spin_iterations));
01183         if (i > 1)
01184         {
01185             gtk_widget_show (GTK_WIDGET (window->label_tolerance));
01186             gtk_widget_show (GTK_WIDGET (window->spin_tolerance));
01187             gtk_widget_show (GTK_WIDGET (window->label_bests));
01188             gtk_widget_show (GTK_WIDGET (window->spin_bests));
01189         }
01190         gtk_widget_show (GTK_WIDGET (window->label_sweeps));
01191         gtk_widget_show (GTK_WIDGET (window->spin_sweeps));
01192         gtk_widget_show (GTK_WIDGET (window->check_climbing));
01193         window_update_climbing ();
01194         break;
01195     default:
01196         gtk_widget_show (GTK_WIDGET (window->label_population));
01197         gtk_widget_show (GTK_WIDGET (window->spin_population));
01198         gtk_widget_show (GTK_WIDGET (window->label_generations));
01199         gtk_widget_show (GTK_WIDGET (window->spin_generations));
01200         gtk_widget_show (GTK_WIDGET (window->label_mutation));
01201         gtk_widget_show (GTK_WIDGET (window->spin_mutation));
01202         gtk_widget_show (GTK_WIDGET (window->label_reproduction));
01203         gtk_widget_show (GTK_WIDGET (window->spin_reproduction));
01204         gtk_widget_show (GTK_WIDGET (window->label_adaptation));
01205         gtk_widget_show (GTK_WIDGET (window->spin_adaptation));
01206         gtk_widget_show (GTK_WIDGET (window->label_bits));
01207         gtk_widget_show (GTK_WIDGET (window->spin_bits));
01208     }
01209     gtk_widget_set_sensitive
01210     (GTK_WIDGET (window->button_remove_experiment),
01211      input->nexperiments > 1);
01211     gtk_widget_set_sensitive
01212     (GTK_WIDGET (window->button_remove_variable), input->
01213      nvariables > 1);
01213     for (i = 0; i < input->experiment->ninputs; ++i)
01214     {
01215         gtk_widget_show (GTK_WIDGET (window->check_template[i]));
01216         gtk_widget_show (GTK_WIDGET (window->button_template[i]));
01217         gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i]), 0);
01218         gtk_widget_set_sensitive (GTK_WIDGET (window->button_template[i]), 1);
01219         g_signal_handler_block
01220         (window->check_template[i], window->id_template[i]);
01221         g_signal_handler_block (window->button_template[i], window->
01222          id_input[i]);
01222         gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON
01223          (window->check_template[i]), 1);
01224         g_signal_handler_unblock (window->button_template[i],
01225          window->id_input[i]);
01226         g_signal_handler_unblock (window->check_template[i],
01227          window->id_template[i]);
01228     }
01229     if (i > 0)
01230     {
01231         gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i - 1]), 1);
01232         gtk_widget_set_sensitive (GTK_WIDGET (window->button_template[i - 1]),
01233          gtk_toggle_button_get_active
01234          GTK_TOGGLE_BUTTON (window->check_template

```

```

01235                                     [i - 1]));
01236     }
01237     if (i < MAX_NINPUTS)
01238     {
01239         gtk_widget_show (GTK_WIDGET (window->check_template[i]));
01240         gtk_widget_show (GTK_WIDGET (window->button_template[i]));
01241         gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i]), 1);
01242         gtk_widget_set_sensitive
01243             (GTK_WIDGET (window->button_template[i]),
01244              gtk_toggle_button_get_active
01245                (GTK_TOGGLE_BUTTON (window->check_template[i]));
01246         g_signal_handler_block
01247             (window->check_template[i], window->id_template[i]);
01248         g_signal_handler_block (window->button_template[i], window->
01249             id_input[i]);
01249         gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON
01250             (window->check_template[i]), 0);
01251         g_signal_handler_unblock (window->button_template[i],
01252             window->id_input[i]);
01253         g_signal_handler_unblock (window->check_template[i],
01254             window->id_template[i]);
01255     }
01256     while (++i < MAX_NINPUTS)
01257     {
01258         gtk_widget_hide (GTK_WIDGET (window->check_template[i]));
01259         gtk_widget_hide (GTK_WIDGET (window->button_template[i]));
01260     }
01261     gtk_widget_set_sensitive
01262         (GTK_WIDGET (window->spin_minabs),
01263          gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->check_minabs)));
01264     gtk_widget_set_sensitive
01265         (GTK_WIDGET (window->spin_maxabs),
01266          gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->check_maxabs)));
01267     if (window_get_norm () == ERROR_NORM_P)
01268     {
01269         gtk_widget_show (GTK_WIDGET (window->label_p));
01270         gtk_widget_show (GTK_WIDGET (window->spin_p));
01271     }
01272     #if DEBUG_INTERFACE
01273     fprintf (stderr, "window_update: end\n");
01274     #endif
01275 }
01276
01280 void
01281 window_set_algorithm ()
01282 {
01283     int i;
01284     #if DEBUG_INTERFACE
01285     fprintf (stderr, "window_set_algorithm: start\n");
01286     #endif
01287     i = window_get_algorithm ();
01288     switch (i)
01289     {
01290     case ALGORITHM_SWEEP:
01291     case ALGORITHM_ORTHOGONAL:
01292         i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01293         if (i < 0)
01294             i = 0;
01295         gtk_spin_button_set_value (window->spin_sweeps,
01296             (gdouble) input->variable[i].
01297             nsweeps);
01298         break;
01299     case ALGORITHM_GENETIC:
01300         i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01301         if (i < 0)
01302             i = 0;
01303         gtk_spin_button_set_value (window->spin_bits,
01304             (gdouble) input->variable[i].nbits);
01305     }
01306     window_update ();
01307     #if DEBUG_INTERFACE
01308     fprintf (stderr, "window_set_algorithm: end\n");
01309     #endif
01310 }
01311
01314 void
01315 window_set_experiment ()
01316 {
01317     unsigned int i, j;
01318     char *buffer1, *buffer2;
01319     #if DEBUG_INTERFACE
01320     fprintf (stderr, "window_set_experiment: start\n");
01321     #endif
01322     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01323     gtk_spin_button_set_value (window->spin_weight, input->
01324         experiment[i].weight);
01325     buffer1 = gtk_combo_box_text_get_active_text (window->combo_experiment);

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```

01325     buffer2 = g_build_filename (input->directory, buffer1, NULL);
01326     g_free (buffer1);
01327     g_signal_handler_block
01328         (window->button_experiment, window->id_experiment_name);
01329     gtk_file_chooser_set_filename
01330         (GTK_FILE_CHOOSER (window->button_experiment), buffer2);
01331     g_signal_handler_unblock
01332         (window->button_experiment, window->id_experiment_name);
01333     g_free (buffer2);
01334     for (j = 0; j < input->experiment->ninputs; ++j)
01335     {
01336         g_signal_handler_block (window->button_template[j], window->
01337             id_input[j]);
01338         buffer2 =
01339             g_build_filename (input->directory, input->experiment[i].
01340                 stencil[j],
01341                     NULL);
01342         gtk_file_chooser_set_filename (GTK_FILE_CHOOSER
01343             (window->button_template[j]), buffer2);
01344         g_free (buffer2);
01345         g_signal_handler_unblock
01346             (window->button_template[j], window->id_input[j]);
01347     }
01348     #if DEBUG_INTERFACE
01349     fprintf (stderr, "window_set_experiment: end\n");
01350     #endif
01351 }
01352
01353 void
01354 window_remove_experiment ()
01355 {
01356     unsigned int i, j;
01357     #if DEBUG_INTERFACE
01358     fprintf (stderr, "window_remove_experiment: start\n");
01359     #endif
01360     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01361     g_signal_handler_block (window->combo_experiment, window->
01362         id_experiment);
01363     gtk_combo_box_text_remove (window->combo_experiment, i);
01364     g_signal_handler_unblock (window->combo_experiment, window->
01365         id_experiment);
01366     experiment_free (input->experiment + i, input->
01367         type);
01368     --input->nexperiments;
01369     for (j = i; j < input->nexperiments; ++j)
01370         memcpy (input->experiment + j, input->experiment + j + 1,
01371             sizeof (Experiment));
01372     j = input->nexperiments - 1;
01373     if (i > j)
01374         i = j;
01375     for (j = 0; j < input->experiment->ninputs; ++j)
01376         g_signal_handler_block (window->button_template[j], window->
01377             id_input[j]);
01378     g_signal_handler_block
01379         (window->button_experiment, window->id_experiment_name);
01380     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i);
01381     g_signal_handler_unblock
01382         (window->button_experiment, window->id_experiment_name);
01383     for (j = 0; j < input->experiment->ninputs; ++j)
01384         g_signal_handler_unblock (window->button_template[j], window->
01385             id_input[j]);
01386     window_update ();
01387     #if DEBUG_INTERFACE
01388     fprintf (stderr, "window_remove_experiment: end\n");
01389     #endif
01390 }
01391
01392 void
01393 window_add_experiment ()
01394 {
01395     unsigned int i, j;
01396     #if DEBUG_INTERFACE
01397     fprintf (stderr, "window_add_experiment: start\n");
01398     #endif
01399     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01400     g_signal_handler_block (window->combo_experiment, window->
01401         id_experiment);
01402     gtk_combo_box_text_insert_text
01403         (window->combo_experiment, i, input->experiment[i].
01404             name);
01405     g_signal_handler_unblock (window->combo_experiment, window->
01406         id_experiment);
01407     input->experiment = (Experiment *) g_realloc
01408         (input->experiment, (input->nexperiments + 1) * sizeof (
01409             Experiment));
01410     for (j = input->nexperiments - 1; j > i; --j)
01411         memcpy (input->experiment + j + 1, input->experiment + j,

```

```

01407         sizeof (Experiment));
01408     input->experiment[j + 1].weight = input->experiment[j].
weight;
01409     input->experiment[j + 1].ninputs = input->
experiment[j].ninputs;
01410     if (input->type == INPUT_TYPE_XML)
01411     {
01412         input->experiment[j + 1].name
01413         = (char *) xmlStrdup ((xmlChar *) input->experiment[j].
name);
01414         for (j = 0; j < input->experiment->ninputs; ++j)
01415             input->experiment[i + 1].stencil[j]
01416             = (char *) xmlStrdup ((xmlChar *) input->experiment[i].
stencil[j]);
01417     }
01418     else
01419     {
01420         input->experiment[j + 1].name = g_strdup (input->
experiment[j].name);
01421         for (j = 0; j < input->experiment->ninputs; ++j)
01422             input->experiment[i + 1].stencil[j]
01423             = g_strdup (input->experiment[i].stencil[j]);
01424     }
01425     ++input->nexperiments;
01426     for (j = 0; j < input->experiment->ninputs; ++j)
01427         g_signal_handler_block (window->button_template[j], window->
id_input[j]);
01428     g_signal_handler_block
01429     (window->button_experiment, window->id_experiment_name);
01430     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i + 1);
01431     g_signal_handler_unblock
01432     (window->button_experiment, window->id_experiment_name);
01433     for (j = 0; j < input->experiment->ninputs; ++j)
01434         g_signal_handler_unblock (window->button_template[j], window->
id_input[j]);
01435     window_update ();
01436 #if DEBUG_INTERFACE
01437     fprintf (stderr, "window_add_experiment: end\n");
01438 #endif
01439 }
01440
01441 void
01442 window_name_experiment ()
01443 {
01444     unsigned int i;
01445     char *buffer;
01446     GFile *file1, *file2;
01447 #if DEBUG_INTERFACE
01448     fprintf (stderr, "window_name_experiment: start\n");
01449 #endif
01450     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01451     file1
01452     = gtk_file_chooser_get_file (GTK_FILE_CHOOSER (window->button_experiment));
01453     file2 = g_file_new_for_path (input->directory);
01454     buffer = g_file_get_relative_path (file2, file1);
01455     g_signal_handler_block (window->combo_experiment, window->
id_experiment);
01456     gtk_combo_box_text_remove (window->combo_experiment, i);
01457     gtk_combo_box_text_insert_text (window->combo_experiment, i, buffer);
01458     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i);
01459     g_signal_handler_unblock (window->combo_experiment, window->
id_experiment);
01460     g_free (buffer);
01461     g_object_unref (file2);
01462     g_object_unref (file1);
01463 #if DEBUG_INTERFACE
01464     fprintf (stderr, "window_name_experiment: end\n");
01465 #endif
01466 }
01467
01468 void
01469 window_weight_experiment ()
01470 {
01471     unsigned int i;
01472 #if DEBUG_INTERFACE
01473     fprintf (stderr, "window_weight_experiment: start\n");
01474 #endif
01475     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01476     input->experiment[i].weight = gtk_spin_button_get_value (window->
spin_weight);
01477 #if DEBUG_INTERFACE
01478     fprintf (stderr, "window_weight_experiment: end\n");
01479 #endif
01480 }
01481
01482 void
01483 window_inputs_experiment ()

```

```

01493 {
01494     unsigned int j;
01495     #if DEBUG_INTERFACE
01496     fprintf (stderr, "window_inputs_experiment: start\n");
01497     #endif
01498     j = input->experiment->ninputs - 1;
01499     if (j
01500         && !gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON
01501             (window->check_template[j])))
01502         --input->experiment->ninputs;
01503     if (input->experiment->ninputs < MAX_NINPUTS
01504         && gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON
01505             (window->check_template[j])))
01506         ++input->experiment->ninputs;
01507     window_update ();
01508     #if DEBUG_INTERFACE
01509     fprintf (stderr, "window_inputs_experiment: end\n");
01510     #endif
01511 }
01512
01516 void
01517 window_template_experiment (void *data)
01518 {
01519     unsigned int i, j;
01520     char *buffer;
01521     GFile *file1, *file2;
01522     #if DEBUG_INTERFACE
01523     fprintf (stderr, "window_template_experiment: start\n");
01524     #endif
01525     i = (size_t) data;
01526     j = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01527     file1
01528         = gtk_file_chooser_get_file (GTK_FILE_CHOOSER (window->button_template[i]));
01529     file2 = g_file_new_for_path (input->directory);
01530     buffer = g_file_get_relative_path (file2, file1);
01531     if (input->type == INPUT_TYPE_XML)
01532         input->experiment[j].stencil[i] = (char *) xmlStrdup ((xmlChar *) buffer);
01533     else
01534         input->experiment[j].stencil[i] = g_strdup (buffer);
01535     g_free (buffer);
01536     g_object_unref (file2);
01537     g_object_unref (file1);
01538     #if DEBUG_INTERFACE
01539     fprintf (stderr, "window_template_experiment: end\n");
01540     #endif
01541 }
01542
01543 void
01544 window_set_variable ()
01545 {
01546     unsigned int i;
01547     #if DEBUG_INTERFACE
01548     fprintf (stderr, "window_set_variable: start\n");
01549     #endif
01550     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01551     g_signal_handler_block (window->entry_variable, window->
01552         id_variable_label);
01553     gtk_entry_set_text (window->entry_variable, input->variable[i].
01554         name);
01555     g_signal_handler_unblock (window->entry_variable, window->
01556         id_variable_label);
01557     gtk_spin_button_set_value (window->spin_min, input->variable[i].
01558         rangemin);
01559     gtk_spin_button_set_value (window->spin_max, input->variable[i].
01560         rangemax);
01561     if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
01562     {
01563         gtk_spin_button_set_value (window->spin_minabs,
01564             input->variable[i].rangeminabs);
01565         gtk_toggle_button_set_active
01566             (GTK_TOGGLE_BUTTON (window->check_minabs), 1);
01567     }
01568     else
01569     {
01570         gtk_spin_button_set_value (window->spin_minabs, -G_MAXDOUBLE);
01571         gtk_toggle_button_set_active
01572             (GTK_TOGGLE_BUTTON (window->check_minabs), 0);
01573     }
01574     if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
01575     {
01576         gtk_spin_button_set_value (window->spin_maxabs,
01577             input->variable[i].rangemaxabs);
01578         gtk_toggle_button_set_active
01579             (GTK_TOGGLE_BUTTON (window->check_maxabs), 1);
01580     }
01581     else
01582     {

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```

01582     gtk_spin_button_set_value (window->spin_maxabs, G_MAXDOUBLE);
01583     gtk_toggle_button_set_active
01584     (GTK_TOGGLE_BUTTON (window->check_maxabs), 0);
01585 }
01586 gtk_spin_button_set_value (window->spin_precision,
01587     input->variable[i].precision);
01588 gtk_spin_button_set_value (window->spin_steps, (gdouble) input->
nsteps);
01589 if (input->nsteps)
01590     gtk_spin_button_set_value (window->spin_step, input->variable[i].
step);
01591 #if DEBUG_INTERFACE
01592     fprintf (stderr, "window_set_variable: precision[%u]=%u\n", i,
01593         input->variable[i].precision);
01594 #endif
01595     switch (window_get_algorithm ())
01596     {
01597     case ALGORITHM_SWEEP:
01598     case ALGORITHM_ORTHOGONAL:
01599         gtk_spin_button_set_value (window->spin_sweeps,
01600             (gdouble) input->variable[i].
nsteps);
01601 #if DEBUG_INTERFACE
01602         fprintf (stderr, "window_set_variable: nsweeps[%u]=%u\n", i,
01603             input->variable[i].nsweeps);
01604 #endif
01605         break;
01606     case ALGORITHM_GENETIC:
01607         gtk_spin_button_set_value (window->spin_bits,
01608             (gdouble) input->variable[i].nbits);
01609 #if DEBUG_INTERFACE
01610         fprintf (stderr, "window_set_variable: nbits[%u]=%u\n", i,
01611             input->variable[i].nbits);
01612 #endif
01613         break;
01614     }
01615     window_update ();
01616 #if DEBUG_INTERFACE
01617     fprintf (stderr, "window_set_variable: end\n");
01618 #endif
01619 }
01620
01624 void
01625 window_remove_variable ()
01626 {
01627     unsigned int i, j;
01628     #if DEBUG_INTERFACE
01629         fprintf (stderr, "window_remove_variable: start\n");
01630     #endif
01631     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01632     g_signal_handler_block (window->combo_variable, window->
id_variable);
01633     gtk_combo_box_text_remove (window->combo_variable, i);
01634     g_signal_handler_unblock (window->combo_variable, window->
id_variable);
01635     xmlFree (input->variable[i].name);
01636     --input->nvariables;
01637     for (j = i; j < input->nvariables; ++j)
01638         memcpy (input->variable + j, input->variable + j + 1, sizeof (
Variable));
01639     j = input->nvariables - 1;
01640     if (i > j)
01641         i = j;
01642     g_signal_handler_block (window->entry_variable, window->
id_variable_label);
01643     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i);
01644     g_signal_handler_unblock (window->entry_variable, window->
id_variable_label);
01645     window_update ();
01646 #if DEBUG_INTERFACE
01647     fprintf (stderr, "window_remove_variable: end\n");
01648 #endif
01649 }
01650
01654 void
01655 window_add_variable ()
01656 {
01657     unsigned int i, j;
01658     #if DEBUG_INTERFACE
01659         fprintf (stderr, "window_add_variable: start\n");
01660     #endif
01661     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01662     g_signal_handler_block (window->combo_variable, window->
id_variable);
01663     gtk_combo_box_text_insert_text (window->combo_variable, i,
01664         input->variable[i].name);
01665     g_signal_handler_unblock (window->combo_variable, window->

```

```

        id_variable);
01666     input->variable = (Variable *) g_realloc
01667     (input->variable, (input->nvariables + 1) * sizeof (
    Variable));
01668     for (j = input->nvariables - 1; j > i; --j)
01669         memcpy (input->variable + j + 1, input->variable + j, sizeof (
    Variable));
01670     memcpy (input->variable + j + 1, input->variable + j, sizeof (
    Variable));
01671     if (input->type == INPUT_TYPE_XML)
01672         input->variable[j + 1].name
01673         = (char *) xmlStrdup ((xmlChar *) input->variable[j].name);
01674     else
01675         input->variable[j + 1].name = g_strdup (input->
    variable[j].name);
01676     ++input->nvariables;
01677     g_signal_handler_block (window->entry_variable, window->
    id_variable_label);
01678     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i + 1);
01679     g_signal_handler_unblock (window->entry_variable, window->
    id_variable_label);
01680     window_update ();
01681     #if DEBUG_INTERFACE
01682     fprintf (stderr, "window_add_variable: end\n");
01683     #endif
01684 }
01685
01689 void
01690 window_label_variable ()
01691 {
01692     unsigned int i;
01693     const char *buffer;
01694     #if DEBUG_INTERFACE
01695     fprintf (stderr, "window_label_variable: start\n");
01696     #endif
01697     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01698     buffer = gtk_entry_get_text (window->entry_variable);
01699     g_signal_handler_block (window->combo_variable, window->
    id_variable);
01700     gtk_combo_box_text_remove (window->combo_variable, i);
01701     gtk_combo_box_text_insert_text (window->combo_variable, i, buffer);
01702     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i);
01703     g_signal_handler_unblock (window->combo_variable, window->
    id_variable);
01704     #if DEBUG_INTERFACE
01705     fprintf (stderr, "window_label_variable: end\n");
01706     #endif
01707 }
01708
01712 void
01713 window_precision_variable ()
01714 {
01715     unsigned int i;
01716     #if DEBUG_INTERFACE
01717     fprintf (stderr, "window_precision_variable: start\n");
01718     #endif
01719     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01720     input->variable[i].precision
01721     = (unsigned int) gtk_spin_button_get_value_as_int (window->spin_precision);
01722     gtk_spin_button_set_digits (window->spin_min, input->variable[i].
    precision);
01723     gtk_spin_button_set_digits (window->spin_max, input->variable[i].
    precision);
01724     gtk_spin_button_set_digits (window->spin_minabs,
    input->variable[i].precision);
01725     gtk_spin_button_set_digits (window->spin_maxabs,
    input->variable[i].precision);
01726     #if DEBUG_INTERFACE
01727     fprintf (stderr, "window_precision_variable: end\n");
01728     #endif
01729 }
01730
01736 void
01737 window_rangemin_variable ()
01738 {
01739     unsigned int i;
01740     #if DEBUG_INTERFACE
01741     fprintf (stderr, "window_rangemin_variable: start\n");
01742     #endif
01743     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01744     input->variable[i].rangemin = gtk_spin_button_get_value (window->
    spin_min);
01745     #if DEBUG_INTERFACE
01746     fprintf (stderr, "window_rangemin_variable: end\n");
01747     #endif
01748 }
01749

```

```

01753 void
01754 window_rangemax_variable ()
01755 {
01756     unsigned int i;
01757     #if DEBUG_INTERFACE
01758     fprintf (stderr, "window_rangemax_variable: start\n");
01759     #endif
01760     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01761     input->variable[i].rangemax = gtk_spin_button_get_value (window->
spin_max);
01762     #if DEBUG_INTERFACE
01763     fprintf (stderr, "window_rangemax_variable: end\n");
01764     #endif
01765 }
01766
01770 void
01771 window_rangeminabs_variable ()
01772 {
01773     unsigned int i;
01774     #if DEBUG_INTERFACE
01775     fprintf (stderr, "window_rangeminabs_variable: start\n");
01776     #endif
01777     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01778     input->variable[i].rangeminabs
    = gtk_spin_button_get_value (window->spin_minabs);
01780     #if DEBUG_INTERFACE
01781     fprintf (stderr, "window_rangeminabs_variable: end\n");
01782     #endif
01783 }
01784
01788 void
01789 window_rangemaxabs_variable ()
01790 {
01791     unsigned int i;
01792     #if DEBUG_INTERFACE
01793     fprintf (stderr, "window_rangemaxabs_variable: start\n");
01794     #endif
01795     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01796     input->variable[i].rangemaxabs
    = gtk_spin_button_get_value (window->spin_maxabs);
01798     #if DEBUG_INTERFACE
01799     fprintf (stderr, "window_rangemaxabs_variable: end\n");
01800     #endif
01801 }
01802
01806 void
01807 window_step_variable ()
01808 {
01809     unsigned int i;
01810     #if DEBUG_INTERFACE
01811     fprintf (stderr, "window_step_variable: start\n");
01812     #endif
01813     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01814     input->variable[i].step = gtk_spin_button_get_value (window->
spin_step);
01815     #if DEBUG_INTERFACE
01816     fprintf (stderr, "window_step_variable: end\n");
01817     #endif
01818 }
01819
01823 void
01824 window_update_variable ()
01825 {
01826     int i;
01827     #if DEBUG_INTERFACE
01828     fprintf (stderr, "window_update_variable: start\n");
01829     #endif
01830     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01831     if (i < 0)
01832         i = 0;
01833     switch (window_get_algorithm ())
01834     {
01835         case ALGORITHM_SWEEP:
01836         case ALGORITHM_ORTHOGONAL:
01837             input->variable[i].nsweeps
    = gtk_spin_button_get_value_as_int (window->spin_sweeps);
01838             #if DEBUG_INTERFACE
01839             fprintf (stderr, "window_update_variable: nsweeps[%d]=%u\n", i,
    input->variable[i].nsweeps);
01842             #endif
01843             break;
01844         case ALGORITHM_GENETIC:
01845             input->variable[i].nbits
    = gtk_spin_button_get_value_as_int (window->spin_bits);
01846             #if DEBUG_INTERFACE
01847             fprintf (stderr, "window_update_variable: nbits[%d]=%u\n", i,
    input->variable[i].nbits);
01849

```



```

01850 #endif
01851 }
01852 #if DEBUG_INTERFACE
01853 fprintf (stderr, "window_update_variable: end\n");
01854 #endif
01855 }
01856
01857 int
01863 window_read (char *filename)
01864 {
01865     unsigned int i;
01866     char *buffer;
01867     #if DEBUG_INTERFACE
01868     fprintf (stderr, "window_read: start\n");
01869     #endif
01870
01871     // Reading new input file
01872     input_free ();
01873     input->result = input->variables = NULL;
01874     if (!input_open (filename))
01875     {
01876     #if DEBUG_INTERFACE
01877         fprintf (stderr, "window_read: end\n");
01878     #endif
01879         return 0;
01880     }
01881
01882     // Setting GTK+ widgets data
01883     gtk_entry_set_text (window->entry_result, input->result);
01884     gtk_entry_set_text (window->entry_variables, input->
variables);
01885     buffer = g_build_filename (input->directory, input->
simulator, NULL);
01886     gtk_file_chooser_set_filename (GTK_FILE_CHOOSER
(window->button_simulator), buffer);
01887     g_free (buffer);
01888     gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON (window->check_evaluator),
(size_t) input->evaluator);
01889
01890     if (input->evaluator)
01891     {
01892         buffer = g_build_filename (input->directory, input->
evaluator, NULL);
01893         gtk_file_chooser_set_filename (GTK_FILE_CHOOSER
(window->button_evaluator), buffer);
01894         g_free (buffer);
01895     }
01896     gtk_toggle_button_set_active
(GTK_TOGGLE_BUTTON (window->button_algorithm[input->
algorithm]), TRUE);
01897
01898     switch (input->algorithm)
01899     {
01900     case ALGORITHM_MONTE_CARLO:
01901         gtk_spin_button_set_value (window->spin_simulations,
(gdouble) input->nsimulations);
01902         // fallthrough
01903     case ALGORITHM_SWEEP:
01904     case ALGORITHM_ORTHOGONAL:
01905         gtk_spin_button_set_value (window->spin_iterations,
(gdouble) input->niterations);
01906         gtk_spin_button_set_value (window->spin_bests, (gdouble) input->
nbest);
01907         gtk_spin_button_set_value (window->spin_tolerance, input->
tolerance);
01908         gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON
(window->check_climbing),
input->nsteps);
01909         if (input->nsteps)
01910         {
01911             gtk_toggle_button_set_active
(GTK_TOGGLE_BUTTON (window->button_climbing[input->
climbing]),
TRUE);
01912             gtk_spin_button_set_value (window->spin_steps,
(gdouble) input->nsteps);
01913             gtk_spin_button_set_value (window->spin_relaxation,
(gdouble) input->relaxation);
01914
01915             switch (input->climbing)
01916             {
01917             case CLIMBING_METHOD_RANDOM:
01918                 gtk_spin_button_set_value (window->spin_estimates,
(gdouble) input->nestimates);
01919             }
01920             break;
01921         default:
01922             gtk_spin_button_set_value (window->spin_population,
(gdouble) input->nsimulations);
01923         }
01924     }
01925 }
01926
01927 // Setting GTK+ widgets data
01928 gtk_entry_set_text (window->entry_result, input->result);
01929 gtk_entry_set_text (window->entry_variables, input->
variables);
01930 buffer = g_build_filename (input->directory, input->
simulator, NULL);
01931 gtk_file_chooser_set_filename (GTK_FILE_CHOOSER
(window->button_simulator), buffer);
01932 g_free (buffer);
01933 gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON (window->check_evaluator),
(size_t) input->evaluator);
01934
01935 if (input->evaluator)
01936 {
01937     buffer = g_build_filename (input->directory, input->
evaluator, NULL);
01938     gtk_file_chooser_set_filename (GTK_FILE_CHOOSER
(window->button_evaluator), buffer);
01939     g_free (buffer);
01940 }
01941 gtk_toggle_button_set_active
(GTK_TOGGLE_BUTTON (window->button_algorithm[input->
algorithm]), TRUE);
01942
01943 switch (input->algorithm)
01944 {
01945 case ALGORITHM_MONTE_CARLO:
01946     gtk_spin_button_set_value (window->spin_simulations,
(gdouble) input->nsimulations);
01947     // fallthrough
01948 case ALGORITHM_SWEEP:
01949 case ALGORITHM_ORTHOGONAL:
01950     gtk_spin_button_set_value (window->spin_iterations,
(gdouble) input->niterations);
01951     gtk_spin_button_set_value (window->spin_bests, (gdouble) input->
nbest);
01952     gtk_spin_button_set_value (window->spin_tolerance, input->
tolerance);
01953     gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON
(window->check_climbing),
input->nsteps);
01954     if (input->nsteps)
01955     {
01956         gtk_toggle_button_set_active
(GTK_TOGGLE_BUTTON (window->button_climbing[input->
climbing]),
TRUE);
01957         gtk_spin_button_set_value (window->spin_steps,
(gdouble) input->nsteps);
01958         gtk_spin_button_set_value (window->spin_relaxation,
(gdouble) input->relaxation);
01959
01960         switch (input->climbing)
01961         {
01962         case CLIMBING_METHOD_RANDOM:
01963             gtk_spin_button_set_value (window->spin_estimates,
(gdouble) input->nestimates);
01964         }
01965         break;
01966     default:
01967         gtk_spin_button_set_value (window->spin_population,
(gdouble) input->nsimulations);
01968     }
01969 }

```

```

01934         gtk_spin_button_set_value (window->spin_generations,
01935                                     (gdouble) input->niterations);
01936         gtk_spin_button_set_value (window->spin_mutation, input->
mutation_ratio);
01937         gtk_spin_button_set_value (window->spin_reproduction,
01938                                     input->reproduction_ratio);
01939         gtk_spin_button_set_value (window->spin_adaptation,
01940                                     input->adaptation_ratio);
01941     }
01942     gtk_toggle_button_set_active
01943     (GTK_TOGGLE_BUTTON (window->button_norm[input->norm]), TRUE);
01944     gtk_spin_button_set_value (window->spin_p, input->p);
01945     gtk_spin_button_set_value (window->spin_threshold, input->
threshold);
01946     g_signal_handler_block (window->combo_experiment, window->
id_experiment);
01947     g_signal_handler_block (window->button_experiment,
01948                             window->id_experiment_name);
01949     gtk_combo_box_text_remove_all (window->combo_experiment);
01950     for (i = 0; i < input->nexperiments; ++i)
01951         gtk_combo_box_text_append_text (window->combo_experiment,
01952                                         input->experiment[i].name);
01953     g_signal_handler_unblock
01954     (window->button_experiment, window->id_experiment_name);
01955     g_signal_handler_unblock (window->combo_experiment, window->
id_experiment);
01956     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), 0);
01957     g_signal_handler_block (window->combo_variable, window->
id_variable);
01958     g_signal_handler_block (window->entry_variable, window->
id_variable_label);
01959     gtk_combo_box_text_remove_all (window->combo_variable);
01960     for (i = 0; i < input->nvariables; ++i)
01961         gtk_combo_box_text_append_text (window->combo_variable,
01962                                         input->variable[i].name);
01963     g_signal_handler_unblock (window->entry_variable, window->
id_variable_label);
01964     g_signal_handler_unblock (window->combo_variable, window->
id_variable);
01965     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), 0);
01966     window_set_variable ();
01967     window_update ();
01968
01969     #if DEBUG_INTERFACE
01970     fprintf (stderr, "window_read: end\n");
01971     #endif
01972     return 1;
01973 }
01974
01978 void
01979 window_open ()
01980 {
01981     GtkFileChooserDialog *dlg;
01982     GtkFileFilter *filter;
01983     char *buffer, *directory, *name;
01984
01985     #if DEBUG_INTERFACE
01986     fprintf (stderr, "window_open: start\n");
01987     #endif
01988
01989     // Saving a backup of the current input file
01990     directory = g_strdup (input->directory);
01991     name = g_strdup (input->name);
01992
01993     // Opening dialog
01994     dlg = (GtkFileChooserDialog *)
01995         gtk_file_chooser_dialog_new (_("Open input file"),
01996                                     window->window,
01997                                     GTK_FILE_CHOOSER_ACTION_OPEN,
01998                                     _("_Cancel"), GTK_RESPONSE_CANCEL,
01999                                     _("_OK"), GTK_RESPONSE_OK, NULL);
02000
02001     // Adding XML filter
02002     filter = (GtkFileFilter *) gtk_file_filter_new ();
02003     gtk_file_filter_set_name (filter, "XML");
02004     gtk_file_filter_add_pattern (filter, "*.xml");
02005     gtk_file_filter_add_pattern (filter, "*.XML");
02006     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter);
02007
02008     // Adding JSON filter
02009     filter = (GtkFileFilter *) gtk_file_filter_new ();
02010     gtk_file_filter_set_name (filter, "JSON");
02011     gtk_file_filter_add_pattern (filter, "*.json");
02012     gtk_file_filter_add_pattern (filter, "*.JSON");
02013     gtk_file_filter_add_pattern (filter, "*.js");
02014     gtk_file_filter_add_pattern (filter, "*.JS");
02015     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter);

```

```

02016
02017 // If OK saving
02018 while (gtk_dialog_run (GTK_DIALOG (dlg)) == GTK_RESPONSE_OK)
02019 {
02020
02021     // Traying to open the input file
02022     buffer = gtk_file_chooser_get_filename (GTK_FILE_CHOOSER (dlg));
02023     if (!window_read (buffer))
02024     {
02025 #if DEBUG_INTERFACE
02026         fprintf (stderr, "window_open: error reading input file\n");
02027 #endif
02028         g_free (buffer);
02029
02030         // Reading backup file on error
02031         buffer = g_build_filename (directory, name, NULL);
02032         input->result = input->variables = NULL;
02033         if (!input_open (buffer))
02034         {
02035
02036             // Closing on backup file reading error
02037 #if DEBUG_INTERFACE
02038             fprintf (stderr, "window_read: error reading backup file\n");
02039 #endif
02040             g_free (buffer);
02041             break;
02042         }
02043         g_free (buffer);
02044     }
02045     else
02046     {
02047         g_free (buffer);
02048         break;
02049     }
02050 }
02051
02052 // Freeing and closing
02053 g_free (name);
02054 g_free (directory);
02055 gtk_widget_destroy (GTK_WIDGET (dlg));
02056 #if DEBUG_INTERFACE
02057     fprintf (stderr, "window_open: end\n");
02058 #endif
02059 }
02060
02064 void
02065 window_new (GtkApplication * application)
02066 {
02067     unsigned int i;
02068     char *buffer, *buffer2, buffer3[64];
02069     char *label_algorithm[NALGORITHMS] = {
02070         "_Monte-Carlo", "_Sweep", "_Genetic", "_Orthogonal"
02071     };
02072     char *tip_algorithm[NALGORITHMS] = {
02073         _("Monte-Carlo brute force algorithm"),
02074         _("Sweep brute force algorithm"),
02075         _("Genetic algorithm"),
02076         _("Orthogonal sampling brute force algorithm"),
02077     };
02078     char *label_climbing[NCLIMBINGS] = {
02079         _("_Coordinates climbing"), _("_Random climbing")
02080     };
02081     char *tip_climbing[NCLIMBINGS] = {
02082         _("Coordinates climbing estimate method"),
02083         _("Random climbing estimate method")
02084     };
02085     char *label_norm[NNORMS] = { "L2", "L", "Lp", "L1" };
02086     char *tip_norm[NNORMS] = {
02087         _("Euclidean error norm (L2)"),
02088         _("Maximum error norm (L)"),
02089         _("P error norm (Lp)"),
02090         _("Taxicab error norm (L1)"),
02091     };
02092
02093 #if DEBUG_INTERFACE
02094     fprintf (stderr, "window_new: start\n");
02095 #endif
02096
02097     // Creating the window
02098     window->window = main_window
02099         = (GtkWindow *) gtk_application_window_new (application);
02100
02101     // Finish when closing the window
02102     g_signal_connect_swapped (window->window, "delete-event",
02103                             G_CALLBACK (g_application_quit),
02104                             G_APPLICATION (application));
02105

```

```

02106 // Setting the window title
02107 gtk_window_set_title (window->window, "MPCOTool");
02108
02109 // Creating the open button
02110 window->button_open = (GtkToolButton *) gtk_tool_button_new
02111     (gtk_image_new_from_icon_name ("document-open",
02112         GTK_ICON_SIZE_LARGE_TOOLBAR), _("Open"));
02113 g_signal_connect (window->button_open, "clicked", window_open, NULL);
02114
02115 // Creating the save button
02116 window->button_save = (GtkToolButton *) gtk_tool_button_new
02117     (gtk_image_new_from_icon_name ("document-save",
02118         GTK_ICON_SIZE_LARGE_TOOLBAR), _("Save"));
02119 g_signal_connect (window->button_save, "clicked", (GCallback)
window_save,
02120     NULL);
02121
02122 // Creating the run button
02123 window->button_run = (GtkToolButton *) gtk_tool_button_new
02124     (gtk_image_new_from_icon_name ("system-run",
02125         GTK_ICON_SIZE_LARGE_TOOLBAR), _("Run"));
02126 g_signal_connect (window->button_run, "clicked", window_run, NULL);
02127
02128 // Creating the options button
02129 window->button_options = (GtkToolButton *) gtk_tool_button_new
02130     (gtk_image_new_from_icon_name ("preferences-system",
02131         GTK_ICON_SIZE_LARGE_TOOLBAR), _("Options"));
02132 g_signal_connect (window->button_options, "clicked", options_new, NULL);
02133
02134 // Creating the help button
02135 window->button_help = (GtkToolButton *) gtk_tool_button_new
02136     (gtk_image_new_from_icon_name ("help-browser",
02137         GTK_ICON_SIZE_LARGE_TOOLBAR), _("Help"));
02138 g_signal_connect (window->button_help, "clicked", window_help, NULL);
02139
02140 // Creating the about button
02141 window->button_about = (GtkToolButton *) gtk_tool_button_new
02142     (gtk_image_new_from_icon_name ("help-about",
02143         GTK_ICON_SIZE_LARGE_TOOLBAR), _("About"));
02144 g_signal_connect (window->button_about, "clicked", window_about, NULL);
02145
02146 // Creating the exit button
02147 window->button_exit = (GtkToolButton *) gtk_tool_button_new
02148     (gtk_image_new_from_icon_name ("application-exit",
02149         GTK_ICON_SIZE_LARGE_TOOLBAR), _("Exit"));
02150 g_signal_connect_swapped (window->button_exit, "clicked",
02151     G_CALLBACK (g_application_quit),
02152     G_APPLICATION (application));
02153
02154 // Creating the buttons bar
02155 window->bar_buttons = (GtkToolbar *) gtk_toolbar_new ();
02156 gtk_toolbar_insert
02157     (window->bar_buttons, GTK_TOOL_ITEM (window->button_open), 0);
02158 gtk_toolbar_insert
02159     (window->bar_buttons, GTK_TOOL_ITEM (window->button_save), 1);
02160 gtk_toolbar_insert
02161     (window->bar_buttons, GTK_TOOL_ITEM (window->button_run), 2);
02162 gtk_toolbar_insert
02163     (window->bar_buttons, GTK_TOOL_ITEM (window->button_options), 3);
02164 gtk_toolbar_insert
02165     (window->bar_buttons, GTK_TOOL_ITEM (window->button_help), 4);
02166 gtk_toolbar_insert
02167     (window->bar_buttons, GTK_TOOL_ITEM (window->button_about), 5);
02168 gtk_toolbar_insert
02169     (window->bar_buttons, GTK_TOOL_ITEM (window->button_exit), 6);
02170 gtk_toolbar_set_style (window->bar_buttons, GTK_TOOLBAR_BOTH);
02171
02172 // Creating the simulator program label and entry
02173 window->label_simulator = (GtkLabel *) gtk_label_new (_("Simulator program"));
02174 window->button_simulator = (GtkFileChooserButton *)
02175     gtk_file_chooser_button_new (_("Simulator program"),
02176         GTK_FILE_CHOOSER_ACTION_OPEN);
02177 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_simulator),
02178     _("Simulator program executable file"));
02179 gtk_widget_set_hexpand (GTK_WIDGET (window->button_simulator), TRUE);
02180
02181 // Creating the evaluator program label and entry
02182 window->check_evaluator = (GtkCheckButton *)
02183     gtk_check_button_new_with_mnemonic (_("Evaluator program"));
02184 g_signal_connect (window->check_evaluator, "toggled",
window_update, NULL);
02185 window->button_evaluator = (GtkFileChooserButton *)
02186     gtk_file_chooser_button_new (_("Evaluator program"),
02187         GTK_FILE_CHOOSER_ACTION_OPEN);
02188 gtk_widget_set_tooltip_text
02189     (GTK_WIDGET (window->button_evaluator),
02190     _("Optional evaluator program executable file"));

```

```

02191
02192 // Creating the results files labels and entries
02193 window->label_result = (GtkLabel *) gtk_label_new (_("Result file"));
02194 window->entry_result = (GtkEntry *) gtk_entry_new ();
02195 gtk_widget_set_tooltip_text
02196 (GTK_WIDGET (window->entry_result), _("Best results file"));
02197 window->label_variables = (GtkLabel *) gtk_label_new (_("Variables file"));
02198 window->entry_variables = (GtkEntry *) gtk_entry_new ();
02199 gtk_widget_set_tooltip_text
02200 (GTK_WIDGET (window->entry_variables), _("All simulated results file"));
02201
02202 // Creating the files grid and attaching widgets
02203 window->grid_files = (GtkGrid *) gtk_grid_new ();
02204 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
label_simulator),
02205                 0, 0, 1, 1);
02206 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
button_simulator),
02207                 1, 0, 1, 1);
02208 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
check_evaluator),
02209                 0, 1, 1, 1);
02210 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
button_evaluator),
02211                 1, 1, 1, 1);
02212 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
label_result),
02213                 0, 2, 1, 1);
02214 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
entry_result),
02215                 1, 2, 1, 1);
02216 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
label_variables),
02217                 0, 3, 1, 1);
02218 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
entry_variables),
02219                 1, 3, 1, 1);
02220
02221 // Creating the algorithm properties
02222 window->label_simulations = (GtkLabel *) gtk_label_new
02223 (_("Simulations number"));
02224 window->spin_simulations
02225 = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02226 gtk_widget_set_tooltip_text
02227 (GTK_WIDGET (window->spin_simulations),
02228  _("Number of simulations to perform for each iteration"));
02229 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_simulations), TRUE);
02230 window->label_iterations = (GtkLabel *)
02231 gtk_label_new (_("Iterations number"));
02232 window->spin_iterations
02233 = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02234 gtk_widget_set_tooltip_text
02235 (GTK_WIDGET (window->spin_iterations), _("Number of iterations"));
02236 g_signal_connect
02237 (window->spin_iterations, "value-changed", window_update, NULL);
02238 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_iterations), TRUE);
02239 window->label_tolerance = (GtkLabel *) gtk_label_new (_("Tolerance"));
02240 window->spin_tolerance =
02241 (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02242 gtk_widget_set_tooltip_text
02243 (GTK_WIDGET (window->spin_tolerance),
02244  _("Tolerance to set the variable interval on the next iteration"));
02245 window->label_bests = (GtkLabel *) gtk_label_new (_("Bests number"));
02246 window->spin_bests
02247 = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02248 gtk_widget_set_tooltip_text
02249 (GTK_WIDGET (window->spin_bests),
02250  _("Number of best simulations used to set the variable interval "
02251    "on the next iteration"));
02252 window->label_population
02253 = (GtkLabel *) gtk_label_new (_("Population number"));
02254 window->spin_population
02255 = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02256 gtk_widget_set_tooltip_text
02257 (GTK_WIDGET (window->spin_population),
02258  _("Number of population for the genetic algorithm"));
02259 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_population), TRUE);
02260 window->label_generations
02261 = (GtkLabel *) gtk_label_new (_("Generations number"));
02262 window->spin_generations
02263 = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02264 gtk_widget_set_tooltip_text
02265 (GTK_WIDGET (window->spin_generations),
02266  _("Number of generations for the genetic algorithm"));
02267 window->label_mutation = (GtkLabel *) gtk_label_new (_("Mutation ratio"));
02268 window->spin_mutation
02269 = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);

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02270 gtk_widget_set_tooltip_text
02271     (GTK_WIDGET (window->spin_mutation),
02272      _("Ratio of mutation for the genetic algorithm"));
02273 window->label_reproduction
02274     = (GtkLabel *) gtk_label_new (_("Reproduction ratio"));
02275 window->spin_reproduction
02276     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02277 gtk_widget_set_tooltip_text
02278     (GTK_WIDGET (window->spin_reproduction),
02279      _("Ratio of reproduction for the genetic algorithm"));
02280 window->label_adaptation = (GtkLabel *) gtk_label_new (_("Adaptation ratio"));
02281 window->spin_adaptation
02282     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02283 gtk_widget_set_tooltip_text
02284     (GTK_WIDGET (window->spin_adaptation),
02285      _("Ratio of adaptation for the genetic algorithm"));
02286 window->label_threshold = (GtkLabel *) gtk_label_new (_("Threshold"));
02287 window->spin_threshold = (GtkSpinButton *)
02288     gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE,
02289                                     precision[DEFAULT_PRECISION]);
02289
02290 gtk_widget_set_tooltip_text
02291     (GTK_WIDGET (window->spin_threshold),
02292      _("Threshold in the objective function to finish the simulations"));
02293 window->scrolled_threshold =
02294     (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02295 gtk_container_add (GTK_CONTAINER (window->scrolled_threshold),
02296                   GTK_WIDGET (window->spin_threshold));
02297 // gtk_widget_set_hexpand (GTK_WIDGET (window->scrolled_threshold), TRUE);
02298 // gtk_widget_set_halign (GTK_WIDGET (window->scrolled_threshold),
02299 //                          GTK_ALIGN_FILL);
02300
02301 // Creating the hill climbing method properties
02302 window->check_climbing = (GtkCheckButton *)
02303     gtk_check_button_new_with_mnemonic (_("_Hill climbing method"));
02304 g_signal_connect (window->check_climbing, "clicked",
02305                  window_update, NULL);
02306 window->grid_climbing = (GtkGrid *) gtk_grid_new ();
02307 window->button_climbing[0] = (GtkRadioButton *)
02308     gtk_radio_button_new_with_mnemonic (NULL, label_climbing[0]);
02309 gtk_grid_attach (window->grid_climbing,
02310                 GTK_WIDGET (window->button_climbing[0]), 0, 0, 1, 1);
02311 g_signal_connect (window->button_climbing[0], "clicked",
02312                  window_update, NULL);
02313 for (i = 0; ++i < NCLIMBINGS;)
02314 {
02315     window->button_climbing[i] = (GtkRadioButton *)
02316         gtk_radio_button_new_with_mnemonic
02317         (gtk_radio_button_get_group (window->button_climbing[0]),
02318          label_climbing[i]);
02319     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_climbing[i]),
02320                                 tip_climbing[i]);
02321     gtk_grid_attach (window->grid_climbing,
02322                     GTK_WIDGET (window->button_climbing[i]), 0, i, 1, 1);
02323     g_signal_connect (window->button_climbing[i], "clicked",
02324                      window_update,
02325                      NULL);
02326 }
02327 window->label_steps = (GtkLabel *) gtk_label_new (_("Steps number"));
02328 window->spin_steps = (GtkSpinButton *)
02329     gtk_spin_button_new_with_range (1., 1.e12, 1.);
02330 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_steps), TRUE);
02331 window->label_estimates
02332     = (GtkLabel *) gtk_label_new (_("Climbing estimates number"));
02333 window->spin_estimates = (GtkSpinButton *)
02334     gtk_spin_button_new_with_range (1., 1.e3, 1.);
02335 window->label_relaxation
02336     = (GtkLabel *) gtk_label_new (_("Relaxation parameter"));
02337 window->spin_relaxation = (GtkSpinButton *)
02338     gtk_spin_button_new_with_range (0., 2., 0.001);
02339 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
02340 label_steps),
02341                 0, NCLIMBINGS, 1, 1);
02342 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
02343 spin_steps),
02344                 1, NCLIMBINGS, 1, 1);
02345 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
02346 label_estimates),
02347                 0, NCLIMBINGS + 1, 1, 1);
02348 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
02349 spin_estimates),
02350                 1, NCLIMBINGS + 1, 1, 1);
02351 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
02352 label_relaxation),
02353                 0, NCLIMBINGS + 2, 1, 1);
02354 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
02355 spin_relaxation),
02356                 1, NCLIMBINGS + 2, 1, 1);

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02348
02349 // Creating the array of algorithms
02350 window->grid_algorithm = (GtkGrid *) gtk_grid_new ();
02351 window->button_algorithm[0] = (GtkRadioButton *)
02352     gtk_radio_button_new_with_mnemonic (NULL, label_algorithm[0]);
02353 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[0]),
02354     tip_algorithm[0]);
02355 gtk_grid_attach (window->grid_algorithm,
02356     GTK_WIDGET (window->button_algorithm[0]), 0, 0, 1, 1);
02357 g_signal_connect (window->button_algorithm[0], "clicked",
02358     window_set_algorithm, NULL);
02359 for (i = 0; ++i < NALGORITHMS;)
02360 {
02361     window->button_algorithm[i] = (GtkRadioButton *)
02362         gtk_radio_button_new_with_mnemonic
02363         (gtk_radio_button_get_group (window->button_algorithm[0]),
02364             label_algorithm[i]);
02365     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[i]),
02366         tip_algorithm[i]);
02367     gtk_grid_attach (window->grid_algorithm,
02368         GTK_WIDGET (window->button_algorithm[i]), 0, i, 1, 1);
02369     g_signal_connect (window->button_algorithm[i], "clicked",
02370         window_set_algorithm, NULL);
02371 }
02372 gtk_grid_attach (window->grid_algorithm,
02373     GTK_WIDGET (window->label_simulations),
02374     0, NALGORITHMS, 1, 1);
02375 gtk_grid_attach (window->grid_algorithm,
02376     GTK_WIDGET (window->spin_simulations), 1, NALGORITHMS, 1, 1);
02377 gtk_grid_attach (window->grid_algorithm,
02378     GTK_WIDGET (window->label_iterations),
02379     0, NALGORITHMS + 1, 1, 1);
02380 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
spin_iterations),
02381     1, NALGORITHMS + 1, 1, 1);
02382 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
label_tolerance),
02383     0, NALGORITHMS + 2, 1, 1);
02384 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
spin_tolerance),
02385     1, NALGORITHMS + 2, 1, 1);
02386 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
label_bests),
02387     0, NALGORITHMS + 3, 1, 1);
02388 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
spin_bests),
02389     1, NALGORITHMS + 3, 1, 1);
02390 gtk_grid_attach (window->grid_algorithm,
02391     GTK_WIDGET (window->label_population),
02392     0, NALGORITHMS + 4, 1, 1);
02393 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
spin_population),
02394     1, NALGORITHMS + 4, 1, 1);
02395 gtk_grid_attach (window->grid_algorithm,
02396     GTK_WIDGET (window->label_generations),
02397     0, NALGORITHMS + 5, 1, 1);
02398 gtk_grid_attach (window->grid_algorithm,
02399     GTK_WIDGET (window->spin_generations),
02400     1, NALGORITHMS + 5, 1, 1);
02401 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
label_mutation),
02402     0, NALGORITHMS + 6, 1, 1);
02403 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
spin_mutation),
02404     1, NALGORITHMS + 6, 1, 1);
02405 gtk_grid_attach (window->grid_algorithm,
02406     GTK_WIDGET (window->label_reproduction),
02407     0, NALGORITHMS + 7, 1, 1);
02408 gtk_grid_attach (window->grid_algorithm,
02409     GTK_WIDGET (window->spin_reproduction),
02410     1, NALGORITHMS + 7, 1, 1);
02411 gtk_grid_attach (window->grid_algorithm,
02412     GTK_WIDGET (window->label_adaptation),
02413     0, NALGORITHMS + 8, 1, 1);
02414 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
spin_adaptation),
02415     1, NALGORITHMS + 8, 1, 1);
02416 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
check_climbing),
02417     0, NALGORITHMS + 9, 2, 1);
02418 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
grid_climbing),
02419     0, NALGORITHMS + 10, 2, 1);
02420 gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (window->
label_threshold),
02421     0, NALGORITHMS + 11, 1, 1);
02422 gtk_grid_attach (window->grid_algorithm,

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02423         GTK_WIDGET (window->scrolled_threshold),
02424         1, NALGORITHMS + 11, 1, 1);
02425 window->frame_algorithm = (GtkFrame *) gtk_frame_new (_("Algorithm"));
02426 gtk_container_add (GTK_CONTAINER (window->frame_algorithm),
02427         GTK_WIDGET (window->grid_algorithm));
02428
02429 // Creating the variable widgets
02430 window->combo_variable = (GtkComboBoxText *) gtk_combo_box_text_new ();
02431 gtk_widget_set_tooltip_text
02432     (GTK_WIDGET (window->combo_variable), _("Variables selector"));
02433 window->id_variable = g_signal_connect
02434     (window->combo_variable, "changed", window_set_variable, NULL);
02435 window->button_add_variable = (GtkButton *)
02436     gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);
02437 g_signal_connect (window->button_add_variable, "clicked",
window_add_variable,
02438     NULL);
02439 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_variable),
02440     _("Add variable"));
02441 window->button_remove_variable = (GtkButton *)
02442     gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02443 g_signal_connect (window->button_remove_variable, "clicked",
02444     window_remove_variable, NULL);
02445 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_remove_variable),
02446     _("Remove variable"));
02447 window->label_variable = (GtkLabel *) gtk_label_new (_("Name"));
02448 window->entry_variable = (GtkEntry *) gtk_entry_new ();
02449 gtk_widget_set_tooltip_text
02450     (GTK_WIDGET (window->entry_variable), _("Variable name"));
02451 gtk_widget_set_hexpand (GTK_WIDGET (window->entry_variable), TRUE);
02452 window->id_variable_label = g_signal_connect
02453     (window->entry_variable, "changed", window_label_variable, NULL);
02454 window->label_min = (GtkLabel *) gtk_label_new (_("Minimum"));
02455 window->spin_min = (GtkSpinButton *) gtk_spin_button_new_with_range
02456     (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02457 gtk_widget_set_tooltip_text
02458     (GTK_WIDGET (window->spin_min), _("Minimum initial value of the variable"));
02459 window->scrolled_min
02460     = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02461 gtk_container_add (GTK_CONTAINER (window->scrolled_min),
02462     GTK_WIDGET (window->spin_min));
02463 g_signal_connect (window->spin_min, "value-changed",
02464     window_rangemin_variable, NULL);
02465 window->label_max = (GtkLabel *) gtk_label_new (_("Maximum"));
02466 window->spin_max = (GtkSpinButton *) gtk_spin_button_new_with_range
02467     (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02468 gtk_widget_set_tooltip_text
02469     (GTK_WIDGET (window->spin_max), _("Maximum initial value of the variable"));
02470 window->scrolled_max
02471     = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02472 gtk_container_add (GTK_CONTAINER (window->scrolled_max),
02473     GTK_WIDGET (window->spin_max));
02474 g_signal_connect (window->spin_max, "value-changed",
02475     window_rangemax_variable, NULL);
02476 window->check_minabs = (GtkCheckButton *)
02477     gtk_check_button_new_with_mnemonic (_("_Absolute minimum"));
02478 g_signal_connect (window->check_minabs, "toggled", window_update, NULL);
02479 window->spin_minabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02480     (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02481 gtk_widget_set_tooltip_text
02482     (GTK_WIDGET (window->spin_minabs),
02483     _("Minimum allowed value of the variable"));
02484 window->scrolled_minabs
02485     = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02486 gtk_container_add (GTK_CONTAINER (window->scrolled_minabs),
02487     GTK_WIDGET (window->spin_minabs));
02488 g_signal_connect (window->spin_minabs, "value-changed",
02489     window_rangeminabs_variable, NULL);
02490 window->check_maxabs = (GtkCheckButton *)
02491     gtk_check_button_new_with_mnemonic (_("_Absolute maximum"));
02492 g_signal_connect (window->check_maxabs, "toggled", window_update, NULL);
02493 window->spin_maxabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02494     (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02495 gtk_widget_set_tooltip_text
02496     (GTK_WIDGET (window->spin_maxabs),
02497     _("Maximum allowed value of the variable"));
02498 window->scrolled_maxabs
02499     = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02500 gtk_container_add (GTK_CONTAINER (window->scrolled_maxabs),
02501     GTK_WIDGET (window->spin_maxabs));
02502 g_signal_connect (window->spin_maxabs, "value-changed",
02503     window_rangemaxabs_variable, NULL);
02504 window->label_precision = (GtkLabel *) gtk_label_new (_("Precision digits"));
02505 window->spin_precision = (GtkSpinButton *)
02506     gtk_spin_button_new_with_range (0., (gdouble) DEFAULT_PRECISION, 1.);
02507 gtk_widget_set_tooltip_text
02508     (GTK_WIDGET (window->spin_precision),

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02509     _("Number of precision floating point digits\n"
02510       "0 is for integer numbers"));
02511 g_signal_connect (window->spin_precision, "value-changed",
02512                  window_precision_variable, NULL);
02513 window->label_sweeps = (GtkLabel *) gtk_label_new (_("Sweeps number"));
02514 window->spin_sweeps =
02515   (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02516 gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_sweeps),
02517   _("Number of steps sweeping the variable"));
02518 g_signal_connect (window->spin_sweeps, "value-changed",
02519                  window_update_variable, NULL);
02520 window->label_bits = (GtkLabel *) gtk_label_new (_("Bits number"));
02521 window->spin_bits
02522   = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
02523 gtk_widget_set_tooltip_text
02524   (GTK_WIDGET (window->spin_bits),
02525   _("Number of bits to encode the variable"));
02526 g_signal_connect
02527   (window->spin_bits, "value-changed", window_update_variable, NULL);
02528 window->label_step = (GtkLabel *) gtk_label_new (_("Step size"));
02529 window->spin_step = (GtkSpinButton *) gtk_spin_button_new_with_range
02530   (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02531 gtk_widget_set_tooltip_text
02532   (GTK_WIDGET (window->spin_step),
02533   _("Initial step size for the hill climbing method"));
02534 window->scrolled_step
02535   = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02536 gtk_container_add (GTK_CONTAINER (window->scrolled_step),
02537   GTK_WIDGET (window->spin_step));
02538 g_signal_connect
02539   (window->spin_step, "value-changed", window_step_variable, NULL);
02540 window->grid_variable = (GtkGrid *) gtk_grid_new ();
02541 gtk_grid_attach (window->grid_variable,
02542   GTK_WIDGET (window->combo_variable), 0, 0, 2, 1);
02543 gtk_grid_attach (window->grid_variable,
02544   GTK_WIDGET (window->button_add_variable), 2, 0, 1, 1);
02545 gtk_grid_attach (window->grid_variable,
02546   GTK_WIDGET (window->button_remove_variable), 3, 0, 1, 1);
02547 gtk_grid_attach (window->grid_variable,
02548   GTK_WIDGET (window->label_variable), 0, 1, 1, 1);
02549 gtk_grid_attach (window->grid_variable,
02550   GTK_WIDGET (window->entry_variable), 1, 1, 3, 1);
02551 gtk_grid_attach (window->grid_variable,
02552   GTK_WIDGET (window->label_min), 0, 2, 1, 1);
02553 gtk_grid_attach (window->grid_variable,
02554   GTK_WIDGET (window->scrolled_min), 1, 2, 3, 1);
02555 gtk_grid_attach (window->grid_variable,
02556   GTK_WIDGET (window->label_max), 0, 3, 1, 1);
02557 gtk_grid_attach (window->grid_variable,
02558   GTK_WIDGET (window->scrolled_max), 1, 3, 3, 1);
02559 gtk_grid_attach (window->grid_variable,
02560   GTK_WIDGET (window->check_minabs), 0, 4, 1, 1);
02561 gtk_grid_attach (window->grid_variable,
02562   GTK_WIDGET (window->scrolled_minabs), 1, 4, 3, 1);
02563 gtk_grid_attach (window->grid_variable,
02564   GTK_WIDGET (window->check_maxabs), 0, 5, 1, 1);
02565 gtk_grid_attach (window->grid_variable,
02566   GTK_WIDGET (window->scrolled_maxabs), 1, 5, 3, 1);
02567 gtk_grid_attach (window->grid_variable,
02568   GTK_WIDGET (window->label_precision), 0, 6, 1, 1);
02569 gtk_grid_attach (window->grid_variable,
02570   GTK_WIDGET (window->spin_precision), 1, 6, 3, 1);
02571 gtk_grid_attach (window->grid_variable,
02572   GTK_WIDGET (window->label_sweeps), 0, 7, 1, 1);
02573 gtk_grid_attach (window->grid_variable,
02574   GTK_WIDGET (window->spin_sweeps), 1, 7, 3, 1);
02575 gtk_grid_attach (window->grid_variable,
02576   GTK_WIDGET (window->label_bits), 0, 8, 1, 1);
02577 gtk_grid_attach (window->grid_variable,
02578   GTK_WIDGET (window->spin_bits), 1, 8, 3, 1);
02579 gtk_grid_attach (window->grid_variable,
02580   GTK_WIDGET (window->label_step), 0, 9, 1, 1);
02581 gtk_grid_attach (window->grid_variable,
02582   GTK_WIDGET (window->scrolled_step), 1, 9, 3, 1);
02583 window->frame_variable = (GtkFrame *) gtk_frame_new (_("Variable"));
02584 gtk_container_add (GTK_CONTAINER (window->frame_variable),
02585   GTK_WIDGET (window->grid_variable));
02586
02587 // Creating the experiment widgets
02588 window->combo_experiment = (GtkComboBoxText *) gtk_combo_box_text_new ();
02589 gtk_widget_set_tooltip_text (GTK_WIDGET (window->combo_experiment),
02590   _("Experiment selector"));
02591 window->id_experiment = g_signal_connect
02592   (window->combo_experiment, "changed", window_set_experiment, NULL);
02593
02594 window->button_add_experiment = (GtkButton *)
02595   gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);

```

```

02595 g_signal_connect
02596     (window->button_add_experiment, "clicked",
window_add_experiment, NULL);
02597 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_experiment),
02598     _("Add experiment"));
02599 window->button_remove_experiment = (GtkButton *)
02600     gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02601 g_signal_connect (window->button_remove_experiment, "clicked",
02602     window_remove_experiment, NULL);
02603 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_remove_experiment),
02604     _("Remove experiment"));
02605 window->label_experiment
02606     = (GtkLabel *) gtk_label_new (_("Experimental data file"));
02607 window->button_experiment = (GtkFileChooserButton *)
02608     gtk_file_chooser_button_new (_("Experimental data file"),
02609     GTK_FILE_CHOOSER_ACTION_OPEN);
02610 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_experiment),
02611     _("Experimental data file"));
02612 window->id_experiment_name
02613     = g_signal_connect (window->button_experiment, "selection-changed",
02614     window_name_experiment, NULL);
02615 gtk_widget_set_hexpend (GTK_WIDGET (window->button_experiment), TRUE);
02616 window->label_weight = (GtkLabel *) gtk_label_new (_("Weight"));
02617 window->spin_weight
02618     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02619 gtk_widget_set_tooltip_text
02620     (GTK_WIDGET (window->spin_weight),
02621     _("Weight factor to build the objective function"));
02622 g_signal_connect
02623     (window->spin_weight, "value-changed", window_weight_experiment,
NULL);
02624 window->grid_experiment = (GtkGrid *) gtk_grid_new ();
02625 gtk_grid_attach (window->grid_experiment,
02626     GTK_WIDGET (window->combo_experiment), 0, 0, 2, 1);
02627 gtk_grid_attach (window->grid_experiment,
02628     GTK_WIDGET (window->button_add_experiment), 2, 0, 1, 1);
02629 gtk_grid_attach (window->grid_experiment,
02630     GTK_WIDGET (window->button_remove_experiment), 3, 0, 1, 1);
02631 gtk_grid_attach (window->grid_experiment,
02632     GTK_WIDGET (window->label_experiment), 0, 1, 1, 1);
02633 gtk_grid_attach (window->grid_experiment,
02634     GTK_WIDGET (window->button_experiment), 1, 1, 3, 1);
02635 gtk_grid_attach (window->grid_experiment,
02636     GTK_WIDGET (window->label_weight), 0, 2, 1, 1);
02637 gtk_grid_attach (window->grid_experiment,
02638     GTK_WIDGET (window->spin_weight), 1, 2, 3, 1);
02639 for (i = 0; i < MAX_NINPUTS; ++i)
02640 {
02641     snprintf (buffer3, 64, "%s %u", _("Input template"), i + 1);
02642     window->check_template[i] = (GtkCheckButton *)
02643         gtk_check_button_new_with_label (buffer3);
02644     window->id_template[i]
02645         = g_signal_connect (window->check_template[i], "toggled",
02646         window_inputs_experiment, NULL);
02647     gtk_grid_attach (window->grid_experiment,
02648         GTK_WIDGET (window->check_template[i]), 0, 3 + i, 1, 1);
02649     window->button_template[i] = (GtkFileChooserButton *)
02650         gtk_file_chooser_button_new (_("Input template"),
02651         GTK_FILE_CHOOSER_ACTION_OPEN);
02652     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_template[i]),
02653         _("Experimental input template file"));
02654     window->id_input[i] =
02655         g_signal_connect_swapped (window->button_template[i],
02656         "selection-changed",
02657         (GCallback) window_template_experiment,
02658         (void *) (size_t) i);
02659     gtk_grid_attach (window->grid_experiment,
02660         GTK_WIDGET (window->button_template[i]), 1, 3 + i, 3, 1);
02661 }
02662 window->frame_experiment = (GtkFrame *) gtk_frame_new (_("Experiment"));
02663 gtk_container_add (GTK_CONTAINER (window->frame_experiment),
02664     GTK_WIDGET (window->grid_experiment));
02665
02666 // Creating the error norm widgets
02667 window->frame_norm = (GtkFrame *) gtk_frame_new (_("Error norm"));
02668 window->grid_norm = (GtkGrid *) gtk_grid_new ();
02669 gtk_container_add (GTK_CONTAINER (window->frame_norm),
02670     GTK_WIDGET (window->grid_norm));
02671 window->button_norm[0] = (GtkRadioButton *)
02672     gtk_radio_button_new_with_mnemonic (NULL, label_norm[0]);
02673 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[0]),
02674     tip_norm[0]);
02675 gtk_grid_attach (window->grid_norm,
02676     GTK_WIDGET (window->button_norm[0]), 0, 0, 1, 1);
02677 g_signal_connect (window->button_norm[0], "clicked", window_update, NULL);
02678 for (i = 0; ++i < NNORMS;)
02679 {

```

```

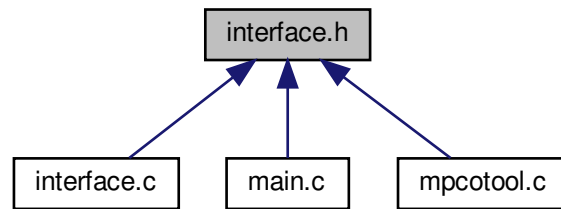
02680     window->button_norm[i] = (GtkRadioButton *)
02681         gtk_radio_button_new_with_mnemonic
02682         (gtk_radio_button_get_group (window->button_norm[0]), label_norm[i]);
02683     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[i]),
02684         tip_norm[i]);
02685     gtk_grid_attach (window->grid_norm,
02686         GTK_WIDGET (window->button_norm[i]), 0, i, 1, 1);
02687     g_signal_connect (window->button_norm[i], "clicked",
02688         window_update, NULL);
02689 }
02690 window->label_p = (GtkLabel *) gtk_label_new (_("P parameter"));
02691 gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->label_p), 1, 1, 1, 1);
02692 window->spin_p = (GtkSpinButton *)
02693     gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE, 0.01);
02694 gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_p),
02695     _("P parameter for the P error norm"));
02696 window->scrolled_p =
02697     (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02698 gtk_container_add (GTK_CONTAINER (window->scrolled_p),
02699     GTK_WIDGET (window->spin_p));
02700 gtk_widget_set_hexpend (GTK_WIDGET (window->scrolled_p), TRUE);
02701 gtk_widget_set_halign (GTK_WIDGET (window->scrolled_p), GTK_ALIGN_FILL);
02702 gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->scrolled_p),
02703     1, 2, 1, 2);
02704 // Creating the grid and attaching the widgets to the grid
02705 window->grid = (GtkGrid *) gtk_grid_new ();
02706 gtk_grid_attach (window->grid, GTK_WIDGET (window->bar_buttons), 0, 0, 3, 1);
02707 gtk_grid_attach (window->grid, GTK_WIDGET (window->grid_files), 0, 1, 1, 1);
02708 gtk_grid_attach (window->grid,
02709     GTK_WIDGET (window->frame_algorithm), 0, 2, 1, 1);
02710 gtk_grid_attach (window->grid,
02711     GTK_WIDGET (window->frame_variable), 1, 2, 1, 1);
02712 gtk_grid_attach (window->grid,
02713     GTK_WIDGET (window->frame_experiment), 2, 2, 1, 1);
02714 gtk_grid_attach (window->grid, GTK_WIDGET (window->frame_norm), 1, 1, 2, 1);
02715 gtk_container_add (GTK_CONTAINER (window->window), GTK_WIDGET (window->
02716     grid));
02717 // Setting the window logo
02718 window->logo = gdk_pixbuf_new_from_xpm_data (logo);
02719 gtk_window_set_icon (window->window, window->logo);
02720 // Showing the window
02721 gtk_widget_show_all (GTK_WIDGET (window->window));
02722 // In GTK+ 3.16 and 3.18 the default scrolled size is wrong
02723 #if GTK_MINOR_VERSION >= 16
02724     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_min), -1, 40);
02725     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_max), -1, 40);
02726     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_minabs), -1, 40);
02727     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_maxabs), -1, 40);
02728     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_step), -1, 40);
02729     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_p), -1, 40);
02730     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_threshold), -1, 40);
02731 #endif
02732 // Reading initial example
02733 input_new ();
02734 buffer2 = g_get_current_dir ();
02735 buffer = g_build_filename (buffer2, "..", "tests", "test1", INPUT_FILE, NULL);
02736 g_free (buffer2);
02737 window_read (buffer);
02738 g_free (buffer);
02739 #if DEBUG_INTERFACE
02740     fprintf (stderr, "window_new: start\n");
02741 #endif
02742 }

```

## 4.13 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

- unsigned int [gtk\\_array\\_get\\_active](#) (GtkRadioButton \*array[], unsigned int n)
- void [input\\_save](#) (char \*filename)
- void [options\\_new](#) ()
- void [running\\_new](#) ()
- unsigned int [window\\_get\\_algorithm](#) ()
- unsigned int [window\\_get\\_climbing](#) ()
- unsigned int [window\\_get\\_norm](#) ()
- void [window\\_save\\_climbing](#) ()
- int [window\\_save](#) ()
- void [window\\_run](#) ()
- void [window\\_help](#) ()
- void [window\\_update\\_climbing](#) ()
- void [window\\_update](#) ()
- void [window\\_set\\_algorithm](#) ()
- void [window\\_set\\_experiment](#) ()
- void [window\\_remove\\_experiment](#) ()
- void [window\\_add\\_experiment](#) ()
- void [window\\_name\\_experiment](#) ()
- void [window\\_weight\\_experiment](#) ()

- void [window\\_inputs\\_experiment](#) ()
- void [window\\_template\\_experiment](#) (void \*data)
- void [window\\_set\\_variable](#) ()
- void [window\\_remove\\_variable](#) ()
- void [window\\_add\\_variable](#) ()
- void [window\\_label\\_variable](#) ()
- void [window\\_precision\\_variable](#) ()
- void [window\\_rangemin\\_variable](#) ()
- void [window\\_rangemax\\_variable](#) ()
- void [window\\_rangeminabs\\_variable](#) ()
- void [window\\_rangemaxabs\\_variable](#) ()
- void [window\\_update\\_variable](#) ()
- int [window\\_read](#) (char \*filename)
- void [window\\_open](#) ()
- void [window\\_new](#) (GtkApplication \*application)

### Variables

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

### 4.13.1 Detailed Description

Header file to define the graphical interface functions.

#### Authors

Javier Burguete.

#### Copyright

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

### 4.13.2 Function Documentation

#### 4.13.2.1 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 469 of file [utils.c](#).

```

00471 {
00472     unsigned int i;
00473     for (i = 0; i < n; ++i)
00474         if (gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (array[i])))
00475             break;
00476     return i;
00477 }
```

## 4.13.2.2 input\_save()

```

void input_save (
    char * filename )
```

Function to save the input file.

## Parameters

<i>filename</i>	<a href="#">Input</a> file name.
-----------------	----------------------------------

Definition at line 584 of file [interface.c](#).

```

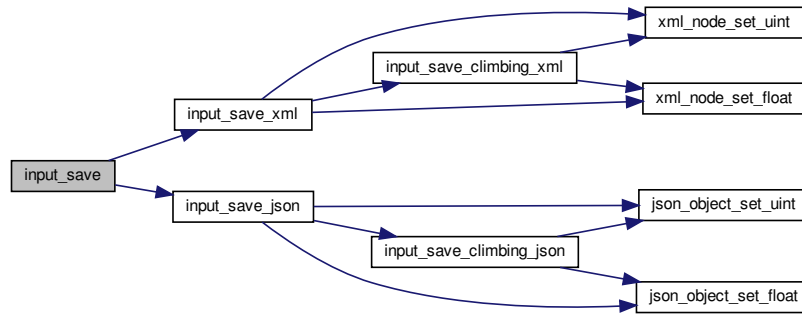
00585 {
00586     xmlDoc *doc;
00587     JsonGenerator *generator;
00588
00589     #if DEBUG_INTERFACE
00590     fprintf (stderr, "input_save: start\n");
00591     #endif
00592
00593     // Getting the input file directory
00594     input->name = g_path_get_basename (filename);
00595     input->directory = g_path_get_dirname (filename);
00596
00597     if (input->type == INPUT_TYPE_XML)
00598     {
00599         // Opening the input file
00600         doc = xmlNewDoc ((const xmlChar *) "1.0");
00601         input_save_xml (doc);
00602
00603         // Saving the XML file
00604         xmlSaveFormatFile (filename, doc, 1);
00605
00606         // Freeing memory
00607         xmlFreeDoc (doc);
00608     }
00609     else
00610     {
00611         // Opening the input file
00612         generator = json_generator_new ();
00613         json_generator_set_pretty (generator, TRUE);
00614         input_save_json (generator);
00615
00616         // Saving the JSON file
00617         json_generator_to_file (generator, filename, NULL);
00618
00619         // Freeing memory
```

```

00620     g_object_unref (generator);
00621 }
00622
00623 #if DEBUG_INTERFACE
00624 fprintf (stderr, "input_save: end\n");
00625 #endif
00626 }

```

Here is the call graph for this function:



#### 4.13.2.3 options\_new()

```
void options_new ( )
```

Function to open the options dialog.

Definition at line 632 of file [interface.c](#).

```

00633 {
00634 #if DEBUG_INTERFACE
00635 fprintf (stderr, "options_new: start\n");
00636 #endif
00637 options->label_seed = (GtkLabel *)
00638     gtk_label_new (_("Pseudo-random numbers generator seed"));
00639 options->spin_seed = (GtkSpinButton *)
00640     gtk_spin_button_new_with_range (0., (gdouble) G_MAXULONG, 1.);
00641 gtk_widget_set_tooltip_text
00642     (GTK_WIDGET (options->spin_seed),
00643      _("Seed to init the pseudo-random numbers generator"));
00644 gtk_spin_button_set_value (options->spin_seed, (gdouble) input->
seed);
00645 options->label_threads = (GtkLabel *)
00646     gtk_label_new (_("Threads number for the stochastic algorithm"));
00647 options->spin_threads
00648     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
00649 gtk_widget_set_tooltip_text
00650     (GTK_WIDGET (options->spin_threads),
00651      _("Number of threads to perform the calibration/optimization for "
00652        "the stochastic algorithm"));
00653 gtk_spin_button_set_value (options->spin_threads, (gdouble)
nthreads);
00654 options->label_climbing = (GtkLabel *)
00655     gtk_label_new (_("Threads number for the hill climbing method"));
00656 options->spin_climbing =
00657     (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
00658 gtk_widget_set_tooltip_text
00659     (GTK_WIDGET (options->spin_climbing),
00660      _("Number of threads to perform the calibration/optimization for the "
00661        "hill climbing method"));

```

```

00662  gtk_spin_button_set_value (options->spin_climbing,
00663                               (gdouble) nthreads_climbing);
00664  options->grid = (GtkGrid *) gtk_grid_new ();
00665  gtk_grid_attach (options->grid, GTK_WIDGET (options->
label_seed), 0, 0, 1, 1);
00666  gtk_grid_attach (options->grid, GTK_WIDGET (options->
spin_seed), 1, 0, 1, 1);
00667  gtk_grid_attach (options->grid, GTK_WIDGET (options->
label_threads),
00668                  0, 1, 1, 1);
00669  gtk_grid_attach (options->grid, GTK_WIDGET (options->
spin_threads),
00670                  1, 1, 1, 1);
00671  gtk_grid_attach (options->grid, GTK_WIDGET (options->
label_climbing), 0, 2, 1,
00672                  1);
00673  gtk_grid_attach (options->grid, GTK_WIDGET (options->
spin_climbing), 1, 2, 1,
00674                  1);
00675  gtk_widget_show_all (GTK_WIDGET (options->grid));
00676  options->dialog = (GtkDialog *)
00677  gtk_dialog_new_with_buttons (_("Options"),
00678                               window->window,
00679                               GTK_DIALOG_MODAL,
00680                               _("_OK"), GTK_RESPONSE_OK,
00681                               _("_Cancel"), GTK_RESPONSE_CANCEL, NULL);
00682  gtk_container_add
00683  (GTK_CONTAINER (gtk_dialog_get_content_area (options->dialog)),
00684   GTK_WIDGET (options->grid));
00685  if (gtk_dialog_run (options->dialog) == GTK_RESPONSE_OK)
00686  {
00687      input->seed
00688      = (unsigned long int) gtk_spin_button_get_value (options->
spin_seed);
00689      nthreads = gtk_spin_button_get_value_as_int (options->
spin_threads);
00690      nthreads_climbing
00691      = gtk_spin_button_get_value_as_int (options->spin_climbing);
00692  }
00693  gtk_widget_destroy (GTK_WIDGET (options->dialog));
00694  #if DEBUG_INTERFACE
00695  fprintf (stderr, "options_new: end\n");
00696  #endif
00697  }

```

#### 4.13.2.4 running\_new()

```
void running_new ( )
```

Function to open the running dialog.

Definition at line 703 of file [interface.c](#).

```

00704  {
00705  #if DEBUG_INTERFACE
00706  fprintf (stderr, "running_new: start\n");
00707  #endif
00708  running->label = (GtkLabel *) gtk_label_new (_("Calculating ..."));
00709  running->spinner = (GtkSpinner *) gtk_spinner_new ();
00710  running->grid = (GtkGrid *) gtk_grid_new ();
00711  gtk_grid_attach (running->grid, GTK_WIDGET (running->label), 0, 0, 1, 1);
00712  gtk_grid_attach (running->grid, GTK_WIDGET (running->spinner), 0, 1, 1, 1);
00713  running->dialog = (GtkDialog *)
00714  gtk_dialog_new_with_buttons (_("Calculating"),
00715                               window->window, GTK_DIALOG_MODAL, NULL, NULL);
00716  gtk_container_add (GTK_CONTAINER
00717  (gtk_dialog_get_content_area (running->dialog)),
00718   GTK_WIDGET (running->grid));
00719  gtk_spinner_start (running->spinner);
00720  gtk_widget_show_all (GTK_WIDGET (running->dialog));
00721  #if DEBUG_INTERFACE
00722  fprintf (stderr, "running_new: end\n");
00723  #endif
00724  }

```



## 4.13.2.5 window\_add\_experiment()

```
void window_add_experiment ( )
```

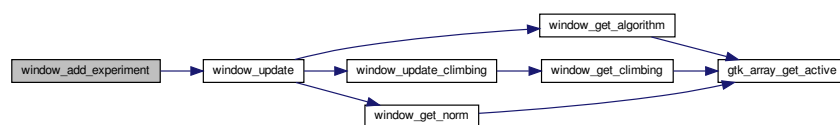
Function to add an experiment in the main window.

Definition at line 1392 of file [interface.c](#).

```

01393 {
01394     unsigned int i, j;
01395     #if DEBUG_INTERFACE
01396     fprintf (stderr, "window_add_experiment: start\n");
01397     #endif
01398     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01399     g_signal_handler_block (window->combo_experiment, window->
01400         id_experiment);
01401     gtk_combo_box_text_insert_text
01402         (window->combo_experiment, i, input->experiment[i].
01403         name);
01404     g_signal_handler_unblock (window->combo_experiment,
01405         window->id_experiment);
01406     input->experiment = (Experiment *) g_realloc
01407         (input->experiment, (input->nexperiments + 1) * sizeof (
01408         Experiment));
01409     for (j = input->nexperiments - 1; j > i; --j)
01410         memmove (input->experiment + j + 1, input->experiment + j,
01411             sizeof (Experiment));
01412     input->experiment[j + 1].weight = input->experiment[j].
01413     weight;
01414     input->experiment[j + 1].ninputs = input->
01415     experiment[j].ninputs;
01416     if (input->type == INPUT_TYPE_XML)
01417     {
01418         input->experiment[j + 1].name
01419             = (char *) xmlStrdup ((xmlChar *) input->experiment[j].
01420             name);
01421         for (j = 0; j < input->experiment->ninputs; ++j)
01422             input->experiment[i + 1].stencil[j]
01423                 = (char *) xmlStrdup ((xmlChar *) input->experiment[i].
01424                 stencil[j]);
01425     }
01426     else
01427     {
01428         input->experiment[j + 1].name = g_strdup (input->
01429         experiment[j].name);
01430         for (j = 0; j < input->experiment->ninputs; ++j)
01431             input->experiment[i + 1].stencil[j]
01432                 = g_strdup (input->experiment[i].stencil[j]);
01433     }
01434     ++input->nexperiments;
01435     for (j = 0; j < input->experiment->ninputs; ++j)
01436         g_signal_handler_block (window->button_template[j],
01437             window->id_input[j]);
01438     g_signal_handler_block
01439         (window->button_experiment, window->
01440         id_experiment_name);
01441     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i + 1);
01442     g_signal_handler_unblock
01443         (window->button_experiment, window->
01444         id_experiment_name);
01445     for (j = 0; j < input->experiment->ninputs; ++j)
01446         g_signal_handler_unblock (window->button_template[j],
01447             window->id_input[j]);
01448     window_update ();
01449     #if DEBUG_INTERFACE
01450     fprintf (stderr, "window_add_experiment: end\n");
01451     #endif
01452 }
```

Here is the call graph for this function:



#### 4.13.2.6 window\_add\_variable()

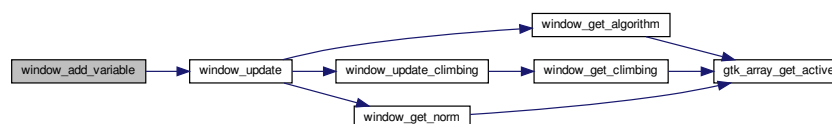
```
void window_add_variable ( )
```

Function to add a variable in the main window.

Definition at line 1655 of file [interface.c](#).

```
01656 {
01657     unsigned int i, j;
01658     #if DEBUG_INTERFACE
01659     fprintf (stderr, "window_add_variable: start\n");
01660     #endif
01661     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01662     g_signal_handler_block (window->combo_variable, window->
01663         id_variable);
01664     gtk_combo_box_text_insert_text (window->combo_variable, i,
01665         input->variable[i].name);
01666     g_signal_handler_unblock (window->combo_variable, window->
01667         id_variable);
01668     input->variable = (Variable *) g_realloc
01669         (input->variable, (input->nvariables + 1) * sizeof (
01670         Variable));
01671     for (j = input->nvariables - 1; j > i; --j)
01672         memcpy (input->variable + j + 1, input->variable + j, sizeof (
01673         Variable));
01674     memcpy (input->variable + j + 1, input->variable + j, sizeof (
01675         Variable));
01676     if (input->type == INPUT_TYPE_XML)
01677         input->variable[j + 1].name
01678             = (char *) xmlStrdup ((xmlChar *) input->variable[j].name);
01679     else
01680         input->variable[j + 1].name = g_strdup (input->
01681         variable[j].name);
01682     ++input->nvariables;
01683     g_signal_handler_block (window->entry_variable, window->
01684         id_variable_label);
01685     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i + 1);
01686     g_signal_handler_unblock (window->entry_variable, window->
01687         id_variable_label);
01688     window_update ();
01689     #if DEBUG_INTERFACE
01690     fprintf (stderr, "window_add_variable: end\n");
01691     #endif
01692 }
```

Here is the call graph for this function:



#### 4.13.2.7 window\_get\_algorithm()

```
unsigned int window_get_algorithm ( )
```

Function to get the stochastic algorithm number.

##### Returns

Stochastic algorithm number.

Definition at line 732 of file [interface.c](#).

```
00733 {  
00734     unsigned int i;  
00735     #if DEBUG_INTERFACE  
00736     fprintf (stderr, "window_get_algorithm: start\n");  
00737     #endif  
00738     i = gtk_array_get_active (window->button_algorithm,  
        NATGORITHMS);  
00739     #if DEBUG_INTERFACE  
00740     fprintf (stderr, "window_get_algorithm: %u\n", i);  
00741     fprintf (stderr, "window_get_algorithm: end\n");  
00742     #endif  
00743     return i;  
00744 }
```

Here is the call graph for this function:



#### 4.13.2.8 window\_get\_climbing()

```
unsigned int window_get_climbing ( )
```

Function to get the hill climbing method number.

##### Returns

Hill climbing method number.

Definition at line 752 of file [interface.c](#).

```
00753 {
00754     unsigned int i;
00755     #if DEBUG_INTERFACE
00756     fprintf (stderr, "window_get_climbing: start\n");
00757     #endif
00758     i = gtk_array_get_active (window->button_climbing,
00759                             NCLIMBINGS);
00759     #if DEBUG_INTERFACE
00760     fprintf (stderr, "window_get_climbing: %u\n", i);
00761     fprintf (stderr, "window_get_climbing: end\n");
00762     #endif
00763     return i;
00764 }
```

Here is the call graph for this function:



#### 4.13.2.9 window\_get\_norm()

```
unsigned int window_get_norm ( )
```

Function to get the norm method number.

##### Returns

Norm method number.

Definition at line 772 of file [interface.c](#).

```
00773 {
00774     unsigned int i;
00775     #if DEBUG_INTERFACE
00776     fprintf (stderr, "window_get_norm: start\n");
00777     #endif
00778     i = gtk_array_get_active (window->button_norm,
00779                             NNORMS);
00779     #if DEBUG_INTERFACE
00780     fprintf (stderr, "window_get_norm: %u\n", i);
00781     fprintf (stderr, "window_get_norm: end\n");
00782     #endif
00783     return i;
00784 }
```

Here is the call graph for this function:



## 4.13.2.10 window\_help()

```
void window_help ( )
```

Function to show a help dialog.

Definition at line 1029 of file [interface.c](#).

```
01030 {
01031     char *buffer, *buffer2;
01032     #if DEBUG_INTERFACE
01033     fprintf (stderr, "window_help: start\n");
01034     #endif
01035     buffer2 = g_build_filename (window->application_directory, "..", "manuals",
01036                               _("user-manual.pdf"), NULL);
01037     buffer = g_filename_to_uri (buffer2, NULL, NULL);
01038     g_free (buffer2);
01039     #if GTK_MINOR_VERSION >= 22
01040     gtk_show_uri_on_window (window->window, buffer, GDK_CURRENT_TIME, NULL);
01041     #else
01042     gtk_show_uri (NULL, buffer, GDK_CURRENT_TIME, NULL);
01043     #endif
01044     #if DEBUG_INTERFACE
01045     fprintf (stderr, "window_help: uri=%s\n", buffer);
01046     #endif
01047     g_free (buffer);
01048     #if DEBUG_INTERFACE
01049     fprintf (stderr, "window_help: end\n");
01050     #endif
01051 }
```

## 4.13.2.11 window\_inputs\_experiment()

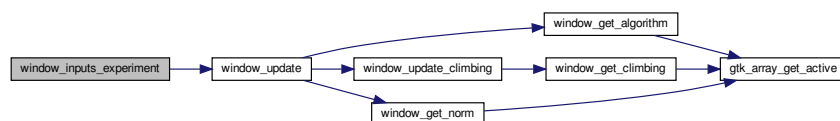
```
void window_inputs_experiment ( )
```

Function to update the experiment input templates number in the main window.

Definition at line 1492 of file [interface.c](#).

```
01493 {
01494     unsigned int j;
01495     #if DEBUG_INTERFACE
01496     fprintf (stderr, "window_inputs_experiment: start\n");
01497     #endif
01498     j = input->experiment->ninputs - 1;
01499     if (j
01500         && !gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON
01501                                           (window->check_template[j])))
01502         --input->experiment->ninputs;
01503     if (input->experiment->ninputs < MAX_NINPUTS
01504         && gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON
01505                                           (window->check_template[j])))
01506         ++input->experiment->ninputs;
01507     window_update ();
01508     #if DEBUG_INTERFACE
01509     fprintf (stderr, "window_inputs_experiment: end\n");
01510     #endif
01511 }
```

Here is the call graph for this function:



#### 4.13.2.12 window\_label\_variable()

```
void window_label_variable ( )
```

Function to set the variable label in the main window.

Definition at line 1690 of file [interface.c](#).

```
01691 {
01692     unsigned int i;
01693     const char *buffer;
01694     #if DEBUG_INTERFACE
01695     fprintf (stderr, "window_label_variable: start\n");
01696     #endif
01697     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01698     buffer = gtk_entry_get_text (window->entry_variable);
01699     g_signal_handler_block (window->combo_variable, window->
01700         id_variable);
01700     gtk_combo_box_text_remove (window->combo_variable, i);
01701     gtk_combo_box_text_insert_text (window->combo_variable, i, buffer);
01702     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i);
01703     g_signal_handler_unblock (window->combo_variable, window->
01704         id_variable);
01704     #if DEBUG_INTERFACE
01705     fprintf (stderr, "window_label_variable: end\n");
01706     #endif
01707 }
```

#### 4.13.2.13 window\_name\_experiment()

```
void window_name_experiment ( )
```

Function to set the experiment name in the main window.

Definition at line 1445 of file [interface.c](#).

```
01446 {
01447     unsigned int i;
01448     char *buffer;
01449     GFile *file1, *file2;
01450     #if DEBUG_INTERFACE
01451     fprintf (stderr, "window_name_experiment: start\n");
01452     #endif
01453     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01454     file1
01455     = gtk_file_chooser_get_file (GTK_FILE_CHOOSER (window->
01456         button_experiment));
01456     file2 = g_file_new_for_path (input->directory);
01457     buffer = g_file_get_relative_path (file2, file1);
01458     g_signal_handler_block (window->combo_experiment, window->
01459         id_experiment);
01459     gtk_combo_box_text_remove (window->combo_experiment, i);
01460     gtk_combo_box_text_insert_text (window->combo_experiment, i, buffer);
01461     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i);
01462     g_signal_handler_unblock (window->combo_experiment,
01463         window->id_experiment);
01463     g_free (buffer);
01464     g_object_unref (file2);
01465     g_object_unref (file1);
01466     #if DEBUG_INTERFACE
01467     fprintf (stderr, "window_name_experiment: end\n");
01468     #endif
01469 }
```

#### 4.13.2.14 window\_new()

```
void window_new (
    GtkApplication * application )
```

Function to open the main window.

## Parameters

<i>application</i>	GtkApplication struct.
--------------------	------------------------

Definition at line 2065 of file [interface.c](#).

```

02066 {
02067     unsigned int i;
02068     char *buffer, *buffer2, buffer3[64];
02069     char *label_algorithm[NALGORITHMS] = {
02070         "_Monte-Carlo", _("_Sweep"), _("_Genetic"), _("_Orthogonal")
02071     };
02072     char *tip_algorithm[NALGORITHMS] = {
02073         _("Monte-Carlo brute force algorithm"),
02074         _("Sweep brute force algorithm"),
02075         _("Genetic algorithm"),
02076         _("Orthogonal sampling brute force algorithm"),
02077     };
02078     char *label_climbing[NCLIMBINGS] = {
02079         _("_Coordinates climbing"), _("_Random climbing")
02080     };
02081     char *tip_climbing[NCLIMBINGS] = {
02082         _("Coordinates climbing estimate method"),
02083         _("Random climbing estimate method")
02084     };
02085     char *label_norm[NNORMS] = { "L2", "L", "Lp", "L1" };
02086     char *tip_norm[NNORMS] = {
02087         _("Euclidean error norm (L2)"),
02088         _("Maximum error norm (L)"),
02089         _("P error norm (Lp)"),
02090         _("Taxicab error norm (L1)")
02091     };
02092
02093     #if DEBUG_INTERFACE
02094         fprintf(stderr, "window_new: start\n");
02095     #endif
02096
02097     // Creating the window
02098     window->window = main_window
02099         = (GtkWindow *) gtk_application_window_new (application);
02100
02101     // Finish when closing the window
02102     g_signal_connect_swapped (window->window, "delete-event",
02103                             G_CALLBACK (g_application_quit),
02104                             G_APPLICATION (application));
02105
02106     // Setting the window title
02107     gtk_window_set_title (window->window, "MPCOTool");
02108
02109     // Creating the open button
02110     window->button_open = (GtkToolButton *) gtk_tool_button_new
02111         (gtk_image_new_from_icon_name ("document-open",
02112                                     GTK_ICON_SIZE_LARGE_TOOLBAR), _("Open"));
02113     g_signal_connect (window->button_open, "clicked", window_open, NULL);
02114
02115     // Creating the save button
02116     window->button_save = (GtkToolButton *) gtk_tool_button_new
02117         (gtk_image_new_from_icon_name ("document-save",
02118                                     GTK_ICON_SIZE_LARGE_TOOLBAR), _("Save"));
02119     g_signal_connect (window->button_save, "clicked", (GCallback)
02120 window_save,
02121                     NULL);
02122
02123     // Creating the run button
02124     window->button_run = (GtkToolButton *) gtk_tool_button_new
02125         (gtk_image_new_from_icon_name ("system-run",
02126                                     GTK_ICON_SIZE_LARGE_TOOLBAR), _("Run"));
02127     g_signal_connect (window->button_run, "clicked", window_run, NULL);
02128
02129     // Creating the options button
02130     window->button_options = (GtkToolButton *) gtk_tool_button_new
02131         (gtk_image_new_from_icon_name ("preferences-system",
02132                                     GTK_ICON_SIZE_LARGE_TOOLBAR), _("Options"));
02133     g_signal_connect (window->button_options, "clicked",
02134 options_new, NULL);
02135
02136     // Creating the help button
02137     window->button_help = (GtkToolButton *) gtk_tool_button_new
02138         (gtk_image_new_from_icon_name ("help-browser",
02139                                     GTK_ICON_SIZE_LARGE_TOOLBAR), _("Help"));
02140     g_signal_connect (window->button_help, "clicked", window_help, NULL);
02141

```

```

02140 // Creating the about button
02141 window->button_about = (GtkToolButton *) gtk_tool_button_new
02142     (gtk_image_new_from_icon_name ("help-about",
02143         GTK_ICON_SIZE_LARGE_TOOLBAR), _("About"));
02144 g_signal_connect (window->button_about, "clicked",
window_about, NULL);
02145
02146 // Creating the exit button
02147 window->button_exit = (GtkToolButton *) gtk_tool_button_new
02148     (gtk_image_new_from_icon_name ("application-exit",
02149         GTK_ICON_SIZE_LARGE_TOOLBAR), _("Exit"));
02150 g_signal_connect_swapped (window->button_exit, "clicked",
02151     G_CALLBACK (g_application_quit),
02152     G_APPLICATION (application));
02153
02154 // Creating the buttons bar
02155 window->bar_buttons = (GtkToolbar *) gtk_toolbar_new ();
02156 gtk_toolbar_insert
02157     (window->bar_buttons, GTK_TOOL_ITEM (window->
button_open), 0);
02158 gtk_toolbar_insert
02159     (window->bar_buttons, GTK_TOOL_ITEM (window->
button_save), 1);
02160 gtk_toolbar_insert
02161     (window->bar_buttons, GTK_TOOL_ITEM (window->
button_run), 2);
02162 gtk_toolbar_insert
02163     (window->bar_buttons, GTK_TOOL_ITEM (window->
button_options), 3);
02164 gtk_toolbar_insert
02165     (window->bar_buttons, GTK_TOOL_ITEM (window->
button_help), 4);
02166 gtk_toolbar_insert
02167     (window->bar_buttons, GTK_TOOL_ITEM (window->
button_about), 5);
02168 gtk_toolbar_insert
02169     (window->bar_buttons, GTK_TOOL_ITEM (window->
button_exit), 6);
02170 gtk_toolbar_set_style (window->bar_buttons, GTK_TOOLBAR_BOTH);
02171
02172 // Creating the simulator program label and entry
02173 window->label_simulator = (GtkLabel *) gtk_label_new _("Simulator program");
02174 window->button_simulator = (GtkFileChooserButton *)
02175     gtk_file_chooser_button_new _("Simulator program",
02176         GTK_FILE_CHOOSER_ACTION_OPEN);
02177 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_simulator),
02178     _("Simulator program executable file"));
02179 gtk_widget_set_hexpand (GTK_WIDGET (window->button_simulator), TRUE);
02180
02181 // Creating the evaluator program label and entry
02182 window->check_evaluator = (GtkCheckButton *)
02183     gtk_check_button_new_with_mnemonic _("Evaluator program");
02184 g_signal_connect (window->check_evaluator, "toggled",
window_update, NULL);
02185 window->button_evaluator = (GtkFileChooserButton *)
02186     gtk_file_chooser_button_new _("Evaluator program",
02187         GTK_FILE_CHOOSER_ACTION_OPEN);
02188 gtk_widget_set_tooltip_text
02189     (GTK_WIDGET (window->button_evaluator),
02190     _("Optional evaluator program executable file"));
02191
02192 // Creating the results files labels and entries
02193 window->label_result = (GtkLabel *) gtk_label_new _("Result file");
02194 window->entry_result = (GtkEntry *) gtk_entry_new ();
02195 gtk_widget_set_tooltip_text
02196     (GTK_WIDGET (window->entry_result), _("Best results file"));
02197 window->label_variables = (GtkLabel *) gtk_label_new _("Variables file");
02198 window->entry_variables = (GtkEntry *) gtk_entry_new ();
02199 gtk_widget_set_tooltip_text
02200     (GTK_WIDGET (window->entry_variables), _("All simulated results file"));
02201
02202 // Creating the files grid and attaching widgets
02203 window->grid_files = (GtkGrid *) gtk_grid_new ();
02204 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
label_simulator),
02205     0, 0, 1, 1);
02206 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
button_simulator),
02207     1, 0, 1, 1);
02208 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
check_evaluator),
02209     0, 1, 1, 1);
02210 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
button_evaluator),
02211     1, 1, 1, 1);
02212 gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
label_result),

```



```

02213         0, 2, 1, 1);
02214     gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
entry_result),
02215         1, 2, 1, 1);
02216     gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
label_variables),
02217         0, 3, 1, 1);
02218     gtk_grid_attach (window->grid_files, GTK_WIDGET (window->
entry_variables),
02219         1, 3, 1, 1);
02220
02221     // Creating the algorithm properties
02222     window->label_simulations = (GtkLabel *) gtk_label_new
02223     (_("Simulations number"));
02224     window->spin_simulations
02225     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02226     gtk_widget_set_tooltip_text
02227     (GTK_WIDGET (window->spin_simulations),
02228     _("Number of simulations to perform for each iteration"));
02229     gtk_widget_set_hexpand (GTK_WIDGET (window->spin_simulations), TRUE);
02230     window->label_iterations = (GtkLabel *)
02231     gtk_label_new (_("Iterations number"));
02232     window->spin_iterations
02233     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02234     gtk_widget_set_tooltip_text
02235     (GTK_WIDGET (window->spin_iterations), _("Number of iterations"));
02236     g_signal_connect
02237     (window->spin_iterations, "value-changed",
window_update, NULL);
02238     gtk_widget_set_hexpand (GTK_WIDGET (window->spin_iterations), TRUE);
02239     window->label_tolerance = (GtkLabel *) gtk_label_new (_("Tolerance"));
02240     window->spin_tolerance =
02241     (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02242     gtk_widget_set_tooltip_text
02243     (GTK_WIDGET (window->spin_tolerance),
02244     _("Tolerance to set the variable interval on the next iteration"));
02245     window->label_bests = (GtkLabel *) gtk_label_new (_("Bests number"));
02246     window->spin_bests
02247     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02248     gtk_widget_set_tooltip_text
02249     (GTK_WIDGET (window->spin_bests),
02250     _("Number of best simulations used to set the variable interval "
02251     "on the next iteration"));
02252     window->label_population
02253     = (GtkLabel *) gtk_label_new (_("Population number"));
02254     window->spin_population
02255     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02256     gtk_widget_set_tooltip_text
02257     (GTK_WIDGET (window->spin_population),
02258     _("Number of population for the genetic algorithm"));
02259     gtk_widget_set_hexpand (GTK_WIDGET (window->spin_population), TRUE);
02260     window->label_generations
02261     = (GtkLabel *) gtk_label_new (_("Generations number"));
02262     window->spin_generations
02263     = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e6, 1.);
02264     gtk_widget_set_tooltip_text
02265     (GTK_WIDGET (window->spin_generations),
02266     _("Number of generations for the genetic algorithm"));
02267     window->label_mutation = (GtkLabel *) gtk_label_new (_("Mutation ratio"));
02268     window->spin_mutation
02269     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02270     gtk_widget_set_tooltip_text
02271     (GTK_WIDGET (window->spin_mutation),
02272     _("Ratio of mutation for the genetic algorithm"));
02273     window->label_reproduction
02274     = (GtkLabel *) gtk_label_new (_("Reproduction ratio"));
02275     window->spin_reproduction
02276     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02277     gtk_widget_set_tooltip_text
02278     (GTK_WIDGET (window->spin_reproduction),
02279     _("Ratio of reproduction for the genetic algorithm"));
02280     window->label_adaptation = (GtkLabel *) gtk_label_new (_("Adaptation ratio"));
02281     window->spin_adaptation
02282     = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02283     gtk_widget_set_tooltip_text
02284     (GTK_WIDGET (window->spin_adaptation),
02285     _("Ratio of adaptation for the genetic algorithm"));
02286     window->label_threshold = (GtkLabel *) gtk_label_new (_("Threshold"));
02287     window->spin_threshold = (GtkSpinButton *)
02288     gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE,
02289     precision[DEFAULT_PRECISION]);
02290     gtk_widget_set_tooltip_text
02291     (GTK_WIDGET (window->spin_threshold),
02292     _("Threshold in the objective function to finish the simulations"));
02293     window->scrolled_threshold =
02294     (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02295     gtk_container_add (GTK_CONTAINER (window->scrolled_threshold),

```

```

02296             GTK_WIDGET (window->spin_threshold));
02297 // gtk_widget_set_hexpand (GTK_WIDGET (window->scrolled_threshold), TRUE);
02298 // gtk_widget_set_halign (GTK_WIDGET (window->scrolled_threshold),
02299 //             GTK_ALIGN_FILL);
02300
02301 // Creating the hill climbing method properties
02302 window->check_climbing = (GtkCheckButton *)
02303     gtk_check_button_new_with_mnemonic (_("Hill climbing method"));
02304 g_signal_connect (window->check_climbing, "clicked",
window_update, NULL);
02305 window->grid_climbing = (GtkGrid *) gtk_grid_new ();
02306 window->button_climbing[0] = (GtkRadioButton *)
02307     gtk_radio_button_new_with_mnemonic (NULL, label_climbing[0]);
02308 gtk_grid_attach (window->grid_climbing,
02309     GTK_WIDGET (window->button_climbing[0]), 0, 0, 1, 1);
02310 g_signal_connect (window->button_climbing[0], "clicked",
window_update, NULL);
02311 for (i = 0; ++i < NCLIMBINGS;)
02312 {
02313     window->button_climbing[i] = (GtkRadioButton *)
02314         gtk_radio_button_new_with_mnemonic
02315             (gtk_radio_button_get_group (window->button_climbing[0]),
02316             label_climbing[i]);
02317     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_climbing[i]),
02318         tip_climbing[i]);
02319     gtk_grid_attach (window->grid_climbing,
02320         GTK_WIDGET (window->button_climbing[i]), 0, i, 1, 1);
02321     g_signal_connect (window->button_climbing[i], "clicked",
window_update,
02322         NULL);
02323 }
02324 window->label_steps = (GtkLabel *) gtk_label_new (_("Steps number"));
02325 window->spin_steps = (GtkSpinButton *)
02326     gtk_spin_button_new_with_range (1., 1.e12, 1.);
02327 gtk_widget_set_hexpand (GTK_WIDGET (window->spin_steps), TRUE);
02328 window->label_estimates
02329     = (GtkLabel *) gtk_label_new (_("Climbing estimates number"));
02330 window->spin_estimates = (GtkSpinButton *)
02331     gtk_spin_button_new_with_range (1., 1.e3, 1.);
02332 window->label_relaxation
02333     = (GtkLabel *) gtk_label_new (_("Relaxation parameter"));
02334 window->spin_relaxation = (GtkSpinButton *)
02335     gtk_spin_button_new_with_range (0., 2., 0.001);
02336 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
label_steps),
02337     0, NCLIMBINGS, 1, 1);
02338 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
spin_steps),
02339     1, NCLIMBINGS, 1, 1);
02340 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
label_estimates),
02341     0, NCLIMBINGS + 1, 1, 1);
02342 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
spin_estimates),
02343     1, NCLIMBINGS + 1, 1, 1);
02344 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
label_relaxation),
02345     0, NCLIMBINGS + 2, 1, 1);
02346 gtk_grid_attach (window->grid_climbing, GTK_WIDGET (window->
spin_relaxation),
02347     1, NCLIMBINGS + 2, 1, 1);
02348
02349 // Creating the array of algorithms
02350 window->grid_algorithm = (GtkGrid *) gtk_grid_new ();
02351 window->button_algorithm[0] = (GtkRadioButton *)
02352     gtk_radio_button_new_with_mnemonic (NULL, label_algorithm[0]);
02353 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[0]),
02354     tip_algorithm[0]);
02355 gtk_grid_attach (window->grid_algorithm,
02356     GTK_WIDGET (window->button_algorithm[0]), 0, 0, 1, 1);
02357 g_signal_connect (window->button_algorithm[0], "clicked",
02358     window_set_algorithm, NULL);
02359 for (i = 0; ++i < NALGORITHMS;)
02360 {
02361     window->button_algorithm[i] = (GtkRadioButton *)
02362         gtk_radio_button_new_with_mnemonic
02363             (gtk_radio_button_get_group (window->button_algorithm[0]),
02364             label_algorithm[i]);
02365     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_algorithm[i]),
02366         tip_algorithm[i]);
02367     gtk_grid_attach (window->grid_algorithm,
02368         GTK_WIDGET (window->button_algorithm[i]), 0, i, 1, 1);
02369     g_signal_connect (window->button_algorithm[i], "clicked",
02370         window_set_algorithm, NULL);
02371 }
02372 gtk_grid_attach (window->grid_algorithm,
02373     GTK_WIDGET (window->label_simulations),

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02374         0, NALGORITHMS, 1, 1);
02375     gtk_grid_attach (window->grid_algorithm,
02376         GTK_WIDGET (window->spin_simulations), 1, NALGORITHMS, 1, 1);
02377     gtk_grid_attach (window->grid_algorithm,
02378         GTK_WIDGET (window->label_iterations),
02379         0, NALGORITHMS + 1, 1, 1);
02380     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02381         window->spin_iterations),
02382         1, NALGORITHMS + 1, 1, 1);
02383     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02384         window->label_tolerance),
02385         0, NALGORITHMS + 2, 1, 1);
02386     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02387         window->spin_tolerance),
02388         1, NALGORITHMS + 2, 1, 1);
02389     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02390         window->label_bests),
02391         0, NALGORITHMS + 3, 1, 1);
02392     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02393         window->spin_bests),
02394         1, NALGORITHMS + 3, 1, 1);
02395     gtk_grid_attach (window->grid_algorithm,
02396         GTK_WIDGET (window->label_population),
02397         0, NALGORITHMS + 4, 1, 1);
02398     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02399         window->spin_population),
02400         1, NALGORITHMS + 4, 1, 1);
02401     gtk_grid_attach (window->grid_algorithm,
02402         GTK_WIDGET (window->label_generations),
02403         0, NALGORITHMS + 5, 1, 1);
02404     gtk_grid_attach (window->grid_algorithm,
02405         GTK_WIDGET (window->spin_generations),
02406         1, NALGORITHMS + 5, 1, 1);
02407     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02408         window->label_mutation),
02409         0, NALGORITHMS + 6, 1, 1);
02410     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02411         window->spin_mutation),
02412         1, NALGORITHMS + 6, 1, 1);
02413     gtk_grid_attach (window->grid_algorithm,
02414         GTK_WIDGET (window->label_reproduction),
02415         0, NALGORITHMS + 7, 1, 1);
02416     gtk_grid_attach (window->grid_algorithm,
02417         GTK_WIDGET (window->spin_reproduction),
02418         1, NALGORITHMS + 7, 1, 1);
02419     gtk_grid_attach (window->grid_algorithm,
02420         GTK_WIDGET (window->label_adaptation),
02421         0, NALGORITHMS + 8, 1, 1);
02422     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02423         window->spin_adaptation),
02424         1, NALGORITHMS + 8, 1, 1);
02425     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02426         window->check_climbing),
02427         0, NALGORITHMS + 9, 2, 1);
02428     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02429         window->grid_climbing),
02430         0, NALGORITHMS + 10, 2, 1);
02431     gtk_grid_attach (window->grid_algorithm, GTK_WIDGET (
02432         window->label_threshold),
02433         0, NALGORITHMS + 11, 1, 1);
02434     gtk_grid_attach (window->grid_algorithm,
02435         GTK_WIDGET (window->scrolled_threshold),
02436         1, NALGORITHMS + 11, 1, 1);
02437     window->frame_algorithm = (GtkFrame *) gtk_frame_new (_("Algorithm"));
02438     gtk_container_add (GTK_CONTAINER (window->frame_algorithm),
02439         GTK_WIDGET (window->grid_algorithm));
02440
02441     // Creating the variable widgets
02442     window->combo_variable = (GtkComboBoxText *) gtk_combo_box_text_new ();
02443     gtk_widget_set_tooltip_text
02444         (GTK_WIDGET (window->combo_variable), _("Variables selector"));
02445     window->id_variable = g_signal_connect
02446         (window->combo_variable, "changed", window_set_variable, NULL);
02447     window->button_add_variable = (GtkButton *)
02448         gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);
02449     g_signal_connect (window->button_add_variable, "clicked",
02450         window_add_variable,
02451         NULL);
02452     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_variable),
02453         _("Add variable"));
02454     window->button_remove_variable = (GtkButton *)
02455         gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02456     g_signal_connect (window->button_remove_variable, "clicked",
02457         window_remove_variable, NULL);
02458     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_remove_variable),
02459         _("Remove variable"));
02460     window->label_variable = (GtkLabel *) gtk_label_new (_("Name"));

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02448     window->entry_variable = (GtkEntry *) gtk_entry_new ();
02449     gtk_widget_set_tooltip_text
02450         (GTK_WIDGET (window->entry_variable), _("Variable name"));
02451     gtk_widget_set_hexpand (GTK_WIDGET (window->entry_variable), TRUE);
02452     window->id_variable_label = g_signal_connect
02453         (window->entry_variable, "changed",
window_label_variable, NULL);
02454     window->label_min = (GtkLabel *) gtk_label_new (_("Minimum"));
02455     window->spin_min = (GtkSpinButton *) gtk_spin_button_new_with_range
02456         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02457     gtk_widget_set_tooltip_text
02458         (GTK_WIDGET (window->spin_min), _("Minimum initial value of the variable"));
02459     window->scrolled_min
02460         = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02461     gtk_container_add (GTK_CONTAINER (window->scrolled_min),
02462         GTK_WIDGET (window->spin_min));
02463     g_signal_connect (window->spin_min, "value-changed",
02464         window_rangemin_variable, NULL);
02465     window->label_max = (GtkLabel *) gtk_label_new (_("Maximum"));
02466     window->spin_max = (GtkSpinButton *) gtk_spin_button_new_with_range
02467         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02468     gtk_widget_set_tooltip_text
02469         (GTK_WIDGET (window->spin_max), _("Maximum initial value of the variable"));
02470     window->scrolled_max
02471         = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02472     gtk_container_add (GTK_CONTAINER (window->scrolled_max),
02473         GTK_WIDGET (window->spin_max));
02474     g_signal_connect (window->spin_max, "value-changed",
02475         window_rangemax_variable, NULL);
02476     window->check_minabs = (GtkCheckButton *)
02477         gtk_check_button_new_with_mnemonic (_("_Absolute minimum"));
02478     g_signal_connect (window->check_minabs, "toggled",
window_update, NULL);
02479     window->spin_minabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02480         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02481     gtk_widget_set_tooltip_text
02482         (GTK_WIDGET (window->spin_minabs),
02483         _("Minimum allowed value of the variable"));
02484     window->scrolled_minabs
02485         = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02486     gtk_container_add (GTK_CONTAINER (window->scrolled_minabs),
02487         GTK_WIDGET (window->spin_minabs));
02488     g_signal_connect (window->spin_minabs, "value-changed",
02489         window_rangeminabs_variable, NULL);
02490     window->check_maxabs = (GtkCheckButton *)
02491         gtk_check_button_new_with_mnemonic (_("_Absolute maximum"));
02492     g_signal_connect (window->check_maxabs, "toggled",
window_update, NULL);
02493     window->spin_maxabs = (GtkSpinButton *) gtk_spin_button_new_with_range
02494         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);
02495     gtk_widget_set_tooltip_text
02496         (GTK_WIDGET (window->spin_maxabs),
02497         _("Maximum allowed value of the variable"));
02498     window->scrolled_maxabs
02499         = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02500     gtk_container_add (GTK_CONTAINER (window->scrolled_maxabs),
02501         GTK_WIDGET (window->spin_maxabs));
02502     g_signal_connect (window->spin_maxabs, "value-changed",
02503         window_rangemaxabs_variable, NULL);
02504     window->label_precision = (GtkLabel *) gtk_label_new (_("Precision digits"));
02505     window->spin_precision = (GtkSpinButton *)
02506         gtk_spin_button_new_with_range (0., (gdouble) DEFAULT_PRECISION, 1.);
02507     gtk_widget_set_tooltip_text
02508         (GTK_WIDGET (window->spin_precision),
02509         _("Number of precision floating point digits\n"
02510         "0 is for integer numbers"));
02511     g_signal_connect (window->spin_precision, "value-changed",
02512         window_precision_variable, NULL);
02513     window->label_sweeps = (GtkLabel *) gtk_label_new (_("Sweeps number"));
02514     window->spin_sweeps =
02515         (GtkSpinButton *) gtk_spin_button_new_with_range (1., 1.e12, 1.);
02516     gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_sweeps),
02517         _("Number of steps sweeping the variable"));
02518     g_signal_connect (window->spin_sweeps, "value-changed",
02519         window_update_variable, NULL);
02520     window->label_bits = (GtkLabel *) gtk_label_new (_("Bits number"));
02521     window->spin_bits
02522         = (GtkSpinButton *) gtk_spin_button_new_with_range (1., 64., 1.);
02523     gtk_widget_set_tooltip_text
02524         (GTK_WIDGET (window->spin_bits),
02525         _("Number of bits to encode the variable"));
02526     g_signal_connect
02527         (window->spin_bits, "value-changed", window_update_variable, NULL);
;
02528     window->label_step = (GtkLabel *) gtk_label_new (_("Step size"));
02529     window->spin_step = (GtkSpinButton *) gtk_spin_button_new_with_range
02530         (-G_MAXDOUBLE, G_MAXDOUBLE, precision[DEFAULT_PRECISION]);

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02531 gtk_widget_set_tooltip_text
02532     (GTK_WIDGET (window->spin_step),
02533      _("Initial step size for the hill climbing method"));
02534 window->scrolled_step
02535     = (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);
02536 gtk_container_add (GTK_CONTAINER (window->scrolled_step),
02537                    GTK_WIDGET (window->spin_step));
02538 g_signal_connect
02539     (window->spin_step, "value-changed", window_step_variable, NULL);
02540 window->grid_variable = (GtkGrid *) gtk_grid_new ();
02541 gtk_grid_attach (window->grid_variable,
02542                 GTK_WIDGET (window->combo_variable), 0, 0, 2, 1);
02543 gtk_grid_attach (window->grid_variable,
02544                 GTK_WIDGET (window->button_add_variable), 2, 0, 1, 1);
02545 gtk_grid_attach (window->grid_variable,
02546                 GTK_WIDGET (window->button_remove_variable), 3, 0, 1, 1);
02547 gtk_grid_attach (window->grid_variable,
02548                 GTK_WIDGET (window->label_variable), 0, 1, 1, 1);
02549 gtk_grid_attach (window->grid_variable,
02550                 GTK_WIDGET (window->entry_variable), 1, 1, 3, 1);
02551 gtk_grid_attach (window->grid_variable,
02552                 GTK_WIDGET (window->label_min), 0, 2, 1, 1);
02553 gtk_grid_attach (window->grid_variable,
02554                 GTK_WIDGET (window->scrolled_min), 1, 2, 3, 1);
02555 gtk_grid_attach (window->grid_variable,
02556                 GTK_WIDGET (window->label_max), 0, 3, 1, 1);
02557 gtk_grid_attach (window->grid_variable,
02558                 GTK_WIDGET (window->scrolled_max), 1, 3, 3, 1);
02559 gtk_grid_attach (window->grid_variable,
02560                 GTK_WIDGET (window->check_minabs), 0, 4, 1, 1);
02561 gtk_grid_attach (window->grid_variable,
02562                 GTK_WIDGET (window->scrolled_minabs), 1, 4, 3, 1);
02563 gtk_grid_attach (window->grid_variable,
02564                 GTK_WIDGET (window->check_maxabs), 0, 5, 1, 1);
02565 gtk_grid_attach (window->grid_variable,
02566                 GTK_WIDGET (window->scrolled_maxabs), 1, 5, 3, 1);
02567 gtk_grid_attach (window->grid_variable,
02568                 GTK_WIDGET (window->label_precision), 0, 6, 1, 1);
02569 gtk_grid_attach (window->grid_variable,
02570                 GTK_WIDGET (window->spin_precision), 1, 6, 3, 1);
02571 gtk_grid_attach (window->grid_variable,
02572                 GTK_WIDGET (window->label_sweeps), 0, 7, 1, 1);
02573 gtk_grid_attach (window->grid_variable,
02574                 GTK_WIDGET (window->spin_sweeps), 1, 7, 3, 1);
02575 gtk_grid_attach (window->grid_variable,
02576                 GTK_WIDGET (window->label_bits), 0, 8, 1, 1);
02577 gtk_grid_attach (window->grid_variable,
02578                 GTK_WIDGET (window->spin_bits), 1, 8, 3, 1);
02579 gtk_grid_attach (window->grid_variable,
02580                 GTK_WIDGET (window->label_step), 0, 9, 1, 1);
02581 gtk_grid_attach (window->grid_variable,
02582                 GTK_WIDGET (window->scrolled_step), 1, 9, 3, 1);
02583 window->frame_variable = (GtkFrame *) gtk_frame_new (_("Variable"));
02584 gtk_container_add (GTK_CONTAINER (window->frame_variable),
02585                    GTK_WIDGET (window->grid_variable));
02586
02587 // Creating the experiment widgets
02588 window->combo_experiment = (GtkComboBoxText *) gtk_combo_box_text_new ();
02589 gtk_widget_set_tooltip_text (GTK_WIDGET (window->combo_experiment),
02590                              _("Experiment selector"));
02591 window->id_experiment = g_signal_connect
02592     (window->combo_experiment, "changed",
02593      window_set_experiment, NULL);
02594 window->button_add_experiment = (GtkButton *)
02595     gtk_button_new_from_icon_name ("list-add", GTK_ICON_SIZE_BUTTON);
02596 g_signal_connect
02597     (window->button_add_experiment, "clicked",
02598      window_add_experiment, NULL);
02599 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_add_experiment),
02600                              _("Add experiment"));
02601 window->button_remove_experiment = (GtkButton *)
02602     gtk_button_new_from_icon_name ("list-remove", GTK_ICON_SIZE_BUTTON);
02603 g_signal_connect (window->button_remove_experiment, "clicked",
02604                  window_remove_experiment, NULL);
02605 gtk_widget_set_tooltip_text (GTK_WIDGET (window->
02606 button_remove_experiment),
02607                              _("Remove experiment"));
02608 window->label_experiment
02609     = (GtkLabel *) gtk_label_new (_("Experimental data file"));
02610 window->button_experiment = (GtkFileChooserButton *)
02611     gtk_file_chooser_button_new (_("Experimental data file"),
02612                                 GTK_FILE_CHOOSER_ACTION_OPEN);
02613 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_experiment),
02614                              _("Experimental data file"));
02615 window->id_experiment_name
02616     = g_signal_connect (window->button_experiment, "selection-changed",
02617                        window_name_experiment, NULL);

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02615 gtk_widget_set_hexpand (GTK_WIDGET (window->button_experiment), TRUE);
02616 window->label_weight = (GtkLabel *) gtk_label_new (_("Weight"));
02617 window->spin_weight
02618 = (GtkSpinButton *) gtk_spin_button_new_with_range (0., 1., 0.001);
02619 gtk_widget_set_tooltip_text
02620 (GTK_WIDGET (window->spin_weight),
02621 _("Weight factor to build the objective function"));
02622 g_signal_connect
02623 (window->spin_weight, "value-changed",
window_weight_experiment, NULL);
02624 window->grid_experiment = (GtkGrid *) gtk_grid_new ();
02625 gtk_grid_attach (window->grid_experiment,
02626 GTK_WIDGET (window->combo_experiment), 0, 0, 2, 1);
02627 gtk_grid_attach (window->grid_experiment,
02628 GTK_WIDGET (window->button_add_experiment), 2, 0, 1, 1);
02629 gtk_grid_attach (window->grid_experiment,
02630 GTK_WIDGET (window->button_remove_experiment), 3, 0, 1, 1);
;
02631 gtk_grid_attach (window->grid_experiment,
02632 GTK_WIDGET (window->label_experiment), 0, 1, 1, 1);
02633 gtk_grid_attach (window->grid_experiment,
02634 GTK_WIDGET (window->button_experiment), 1, 1, 3, 1);
02635 gtk_grid_attach (window->grid_experiment,
02636 GTK_WIDGET (window->label_weight), 0, 2, 1, 1);
02637 gtk_grid_attach (window->grid_experiment,
02638 GTK_WIDGET (window->spin_weight), 1, 2, 3, 1);
02639 for (i = 0; i < MAX_NINPITS; ++i)
02640 {
02641     snprintf (buffer3, 64, "%s %u", _("Input template"), i + 1);
02642     window->check_template[i] = (GtkCheckButton *)
02643     gtk_check_button_new_with_label (buffer3);
02644     window->id_template[i]
02645     = g_signal_connect (window->check_template[i], "toggled",
02646     window_inputs_experiment, NULL);
02647     gtk_grid_attach (window->grid_experiment,
02648     GTK_WIDGET (window->check_template[i]), 0, 3 + i, 1, 1);
02649     window->button_template[i] = (GtkFileChooserButton *)
02650     gtk_file_chooser_button_new (_("Input template"),
02651     GTK_FILE_CHOOSER_ACTION_OPEN);
02652     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_template[i]),
02653     _("Experimental input template file"));
02654     window->id_input[i] =
02655     g_signal_connect_swapped (window->button_template[i],
02656     "selection-changed",
02657     (GCallback) window_template_experiment,
02658     (void *) (size_t) i);
02659     gtk_grid_attach (window->grid_experiment,
02660     GTK_WIDGET (window->button_template[i]), 1, 3 + i, 3, 1);
02661 }
02662 window->frame_experiment = (GtkFrame *) gtk_frame_new (_("Experiment"));
02663 gtk_container_add (GTK_CONTAINER (window->frame_experiment),
02664 GTK_WIDGET (window->grid_experiment));
02665
02666 // Creating the error norm widgets
02667 window->frame_norm = (GtkFrame *) gtk_frame_new (_("Error norm"));
02668 window->grid_norm = (GtkGrid *) gtk_grid_new ();
02669 gtk_container_add (GTK_CONTAINER (window->frame_norm),
02670 GTK_WIDGET (window->grid_norm));
02671 window->button_norm[0] = (GtkRadioButton *)
02672     gtk_radio_button_new_with_mnemonic (NULL, label_norm[0]);
02673 gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[0]),
02674     tip_norm[0]);
02675 gtk_grid_attach (window->grid_norm,
02676     GTK_WIDGET (window->button_norm[0]), 0, 0, 1, 1);
02677 g_signal_connect (window->button_norm[0], "clicked",
window_update, NULL);
02678 for (i = 0; ++i < NNORMS;)
02679 {
02680     window->button_norm[i] = (GtkRadioButton *)
02681     gtk_radio_button_new_with_mnemonic
02682     (gtk_radio_button_get_group (window->button_norm[0]), label_norm[i]);
02683     gtk_widget_set_tooltip_text (GTK_WIDGET (window->button_norm[i]),
02684     tip_norm[i]);
02685     gtk_grid_attach (window->grid_norm,
02686     GTK_WIDGET (window->button_norm[i]), 0, i, 1, 1);
02687     g_signal_connect (window->button_norm[i], "clicked",
window_update, NULL);
02688 }
02689 window->label_p = (GtkLabel *) gtk_label_new (_("P parameter"));
02690 gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->
label_p), 1, 1, 1, 1);
02691 window->spin_p = (GtkSpinButton *)
02692     gtk_spin_button_new_with_range (-G_MAXDOUBLE, G_MAXDOUBLE, 0.01);
02693 gtk_widget_set_tooltip_text (GTK_WIDGET (window->spin_p),
02694     _("P parameter for the P error norm"));
02695 window->scrolled_p =
02696     (GtkScrolledWindow *) gtk_scrolled_window_new (NULL, NULL);

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02697     gtk_container_add (GTK_CONTAINER (window->scrolled_p),
02698                        GTK_WIDGET (window->spin_p));
02699     gtk_widget_set_hexpand (GTK_WIDGET (window->scrolled_p), TRUE);
02700     gtk_widget_set_halign (GTK_WIDGET (window->scrolled_p), GTK_ALIGN_FILL);
02701     gtk_grid_attach (window->grid_norm, GTK_WIDGET (window->
scrolled_p),
02702                    1, 2, 1, 2);
02703
02704     // Creating the grid and attaching the widgets to the grid
02705     window->grid = (GtkGrid *) gtk_grid_new ();
02706     gtk_grid_attach (window->grid, GTK_WIDGET (window->bar_buttons), 0, 0, 3, 1);
02707     gtk_grid_attach (window->grid, GTK_WIDGET (window->grid_files), 0, 1, 1, 1);
02708     gtk_grid_attach (window->grid,
02709                     GTK_WIDGET (window->frame_algorithm), 0, 2, 1, 1);
02710     gtk_grid_attach (window->grid,
02711                     GTK_WIDGET (window->frame_variable), 1, 2, 1, 1);
02712     gtk_grid_attach (window->grid,
02713                     GTK_WIDGET (window->frame_experiment), 2, 2, 1, 1);
02714     gtk_grid_attach (window->grid, GTK_WIDGET (window->frame_norm), 1, 1, 2, 1);
02715     gtk_container_add (GTK_CONTAINER (window->window), GTK_WIDGET (
window->grid));
02716
02717     // Setting the window logo
02718     window->logo = gdk_pixbuf_new_from_xpm_data (logo);
02719     gtk_window_set_icon (window->window, window->logo);
02720
02721     // Showing the window
02722     gtk_widget_show_all (GTK_WIDGET (window->window));
02723
02724     // In GTK+ 3.16 and 3.18 the default scrolled size is wrong
02725     #if GTK_MINOR_VERSION >= 16
02726     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_min), -1, 40);
02727     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_max), -1, 40);
02728     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_minabs), -1, 40);
02729     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_maxabs), -1, 40);
02730     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_step), -1, 40);
02731     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_p), -1, 40);
02732     gtk_widget_set_size_request (GTK_WIDGET (window->scrolled_threshold), -1, 40);
02733     #endif
02734
02735     // Reading initial example
02736     input_new ();
02737     buffer2 = g_get_current_dir ();
02738     buffer = g_build_filename (buffer2, "..", "tests", "test1", INPUT_FILE, NULL);
02739     g_free (buffer2);
02740     window_read (buffer);
02741     g_free (buffer);
02742
02743     #if DEBUG_INTERFACE
02744     fprintf (stderr, "window_new: start\n");
02745     #endif
02746 }

```

#### 4.13.2.15 window\_open()

```
void window_open ( )
```

Function to open the input data.

Definition at line 1979 of file [interface.c](#).

```

01980 {
01981     GtkFileChooserDialog *dlg;
01982     GtkFileFilter *filter;
01983     char *buffer, *directory, *name;
01984
01985     #if DEBUG_INTERFACE
01986     fprintf (stderr, "window_open: start\n");
01987     #endif
01988
01989     // Saving a backup of the current input file
01990     directory = g_strdup (input->directory);
01991     name = g_strdup (input->name);
01992
01993     // Opening dialog

```



```

01994     dlg = (GtkFileChooserDialog *)
01995         gtk_file_chooser_dialog_new (_("Open input file"),
01996                                     window->window,
01997                                     GTK_FILE_CHOOSER_ACTION_OPEN,
01998                                     _("_Cancel"), GTK_RESPONSE_CANCEL,
01999                                     _("_OK"), GTK_RESPONSE_OK, NULL);
02000
02001     // Adding XML filter
02002     filter = (GtkFileFilter *) gtk_file_filter_new ();
02003     gtk_file_filter_set_name (filter, "XML");
02004     gtk_file_filter_add_pattern (filter, "*.xml");
02005     gtk_file_filter_add_pattern (filter, "*.XML");
02006     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter);
02007
02008     // Adding JSON filter
02009     filter = (GtkFileFilter *) gtk_file_filter_new ();
02010     gtk_file_filter_set_name (filter, "JSON");
02011     gtk_file_filter_add_pattern (filter, "*.json");
02012     gtk_file_filter_add_pattern (filter, "*.JSON");
02013     gtk_file_filter_add_pattern (filter, "*.js");
02014     gtk_file_filter_add_pattern (filter, "*.JS");
02015     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter);
02016
02017     // If OK saving
02018     while (gtk_dialog_run (GTK_DIALOG (dlg)) == GTK_RESPONSE_OK)
02019     {
02020
02021         // Traying to open the input file
02022         buffer = gtk_file_chooser_get_filename (GTK_FILE_CHOOSER (dlg));
02023         if (!window_read (buffer))
02024         {
02025             #if DEBUG_INTERFACE
02026                 fprintf (stderr, "window_open: error reading input file\n");
02027             #endif
02028             g_free (buffer);
02029
02030             // Reading backup file on error
02031             buffer = g_build_filename (directory, name, NULL);
02032             input->result = input->variables = NULL;
02033             if (!input_open (buffer))
02034             {
02035
02036                 // Closing on backup file reading error
02037                 #if DEBUG_INTERFACE
02038                     fprintf (stderr, "window_read: error reading backup file\n");
02039                 #endif
02040                 g_free (buffer);
02041                 break;
02042             }
02043             g_free (buffer);
02044         }
02045         else
02046         {
02047             g_free (buffer);
02048             break;
02049         }
02050     }
02051
02052     // Freeing and closing
02053     g_free (name);
02054     g_free (directory);
02055     gtk_widget_destroy (GTK_WIDGET (dlg));
02056     #if DEBUG_INTERFACE
02057         fprintf (stderr, "window_open: end\n");
02058     #endif
02059 }

```

#### 4.13.2.16 window\_precision\_variable()

```
void window_precision_variable ( )
```

Function to update the variable precision in the main window.

Definition at line 1713 of file [interface.c](#).



```

01714 {
01715     unsigned int i;
01716     #if DEBUG_INTERFACE
01717         fprintf (stderr, "window_precision_variable: start\n");
01718     #endif
01719     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01720     input->variable[i].precision
01721     = (unsigned int) gtk_spin_button_get_value_as_int (window->
    spin_precision);
01722     gtk_spin_button_set_digits (window->spin_min, input->
    variable[i].precision);
01723     gtk_spin_button_set_digits (window->spin_max, input->
    variable[i].precision);
01724     gtk_spin_button_set_digits (window->spin_minabs,
01725     input->variable[i].precision);
01726     gtk_spin_button_set_digits (window->spin_maxabs,
01727     input->variable[i].precision);
01728     #if DEBUG_INTERFACE
01729         fprintf (stderr, "window_precision_variable: end\n");
01730     #endif
01731 }

```

#### 4.13.2.17 window\_rangemax\_variable()

```
void window_rangemax_variable ( )
```

Function to update the variable rangemax in the main window.

Definition at line 1754 of file [interface.c](#).

```

01755 {
01756     unsigned int i;
01757     #if DEBUG_INTERFACE
01758         fprintf (stderr, "window_rangemax_variable: start\n");
01759     #endif
01760     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01761     input->variable[i].rangemax = gtk_spin_button_get_value (
    window->spin_max);
01762     #if DEBUG_INTERFACE
01763         fprintf (stderr, "window_rangemax_variable: end\n");
01764     #endif
01765 }

```

#### 4.13.2.18 window\_rangemaxabs\_variable()

```
void window_rangemaxabs_variable ( )
```

Function to update the variable rangemaxabs in the main window.

Definition at line 1789 of file [interface.c](#).

```

01790 {
01791     unsigned int i;
01792     #if DEBUG_INTERFACE
01793         fprintf (stderr, "window_rangemaxabs_variable: start\n");
01794     #endif
01795     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01796     input->variable[i].rangemaxabs
01797     = gtk_spin_button_get_value (window->spin_maxabs);
01798     #if DEBUG_INTERFACE
01799         fprintf (stderr, "window_rangemaxabs_variable: end\n");
01800     #endif
01801 }

```

#### 4.13.2.19 window\_rangemin\_variable()

```
void window_rangemin_variable ( )
```

Function to update the variable rangemin in the main window.

Definition at line 1737 of file [interface.c](#).

```
01738 {
01739     unsigned int i;
01740     #if DEBUG_INTERFACE
01741     fprintf (stderr, "window_rangemin_variable: start\n");
01742     #endif
01743     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01744     input->variable[i].rangemin = gtk_spin_button_get_value (
01745         window->spin_min);
01746     #if DEBUG_INTERFACE
01747     fprintf (stderr, "window_rangemin_variable: end\n");
01748     #endif
01749 }
```

#### 4.13.2.20 window\_rangeminabs\_variable()

```
void window_rangeminabs_variable ( )
```

Function to update the variable rangeminabs in the main window.

Definition at line 1771 of file [interface.c](#).

```
01772 {
01773     unsigned int i;
01774     #if DEBUG_INTERFACE
01775     fprintf (stderr, "window_rangeminabs_variable: start\n");
01776     #endif
01777     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01778     input->variable[i].rangeminabs
01779         = gtk_spin_button_get_value (window->spin_minabs);
01780     #if DEBUG_INTERFACE
01781     fprintf (stderr, "window_rangeminabs_variable: end\n");
01782     #endif
01783 }
```

#### 4.13.2.21 window\_read()

```
int window_read (
    char * filename )
```

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 1863 of file [interface.c](#).

```

01864 {
01865     unsigned int i;
01866     char *buffer;
01867     #if DEBUG_INTERFACE
01868     fprintf (stderr, "window_read: start\n");
01869     #endif
01870
01871     // Reading new input file
01872     input_free ();
01873     input->result = input->variables = NULL;
01874     if (!input_open (filename))
01875     {
01876     #if DEBUG_INTERFACE
01877         fprintf (stderr, "window_read: end\n");
01878     #endif
01879         return 0;
01880     }
01881
01882     // Setting GTK+ widgets data
01883     gtk_entry_set_text (window->entry_result, input->result);
01884     gtk_entry_set_text (window->entry_variables, input->
variables);
01885     buffer = g_build_filename (input->directory, input->
simulator, NULL);
01886     gtk_file_chooser_set_filename (GTK_FILE_CHOOSER
(window->button_simulator), buffer);
01887     g_free (buffer);
01888     gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON (window->check_evaluator),
(size_t) input->evaluator);
01889     if (input->evaluator)
01890     {
01891         buffer = g_build_filename (input->directory, input->
evaluator, NULL);
01892         gtk_file_chooser_set_filename (GTK_FILE_CHOOSER
(window->button_evaluator), buffer);
01893         g_free (buffer);
01894     }
01895     gtk_toggle_button_set_active
(GTK_TOGGLE_BUTTON (window->button_algorithm[input->
algorithm]), TRUE);
01896     switch (input->algorithm)
01897     {
01898     case ALGORITHM_MONTE_CARLO:
01899         gtk_spin_button_set_value (window->spin_simulations,
(gdouble) input->nsimulations);
01900         // fallthrough
01901     case ALGORITHM_SWEEP:
01902     case ALGORITHM_ORTHOGONAL:
01903         gtk_spin_button_set_value (window->spin_iterations,
(gdouble) input->niterations);
01904         gtk_spin_button_set_value (window->spin_bests, (gdouble)
input->nbest);
01905         gtk_spin_button_set_value (window->spin_tolerance,
input->tolerance);
01906         gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON
(window->check_climbing),
input->nsteps);
01907         if (input->nsteps)
01908         {
01909             gtk_toggle_button_set_active
(GTK_TOGGLE_BUTTON (window->button_climbing[
input->climbing]),
TRUE);
01910             gtk_spin_button_set_value (window->spin_steps,
(gdouble) input->nsteps);
01911             gtk_spin_button_set_value (window->spin_relaxation,
(gdouble) input->relaxation);
01912             switch (input->climbing)
01913             {
01914             case CLIMBING_METHOD_RANDOM:
01915                 gtk_spin_button_set_value (window->spin_estimates,
(gdouble) input->nestimates);
01916             }
01917         }
01918         break;
01919     default:

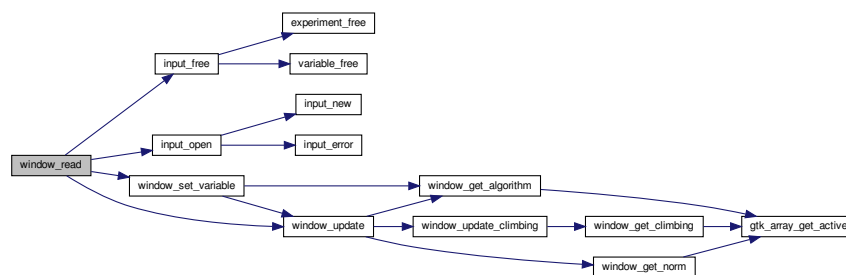
```

```

01932     gtk_spin_button_set_value (window->spin_population,
01933                               (gdouble) input->nsimulations);
01934     gtk_spin_button_set_value (window->spin_generations,
01935                               (gdouble) input->niterations);
01936     gtk_spin_button_set_value (window->spin_mutation, input->
mutation_ratio);
01937     gtk_spin_button_set_value (window->spin_reproduction,
01938                               input->reproduction_ratio);
01939     gtk_spin_button_set_value (window->spin_adaptation,
01940                               input->adaptation_ratio);
01941 }
01942 gtk_toggle_button_set_active
01943 (GTK_TOGGLE_BUTTON (window->button_norm[input->norm]), TRUE);
01944 gtk_spin_button_set_value (window->spin_p, input->p);
01945 gtk_spin_button_set_value (window->spin_threshold, input->
threshold);
01946 g_signal_handler_block (window->combo_experiment, window->
id_experiment);
01947 g_signal_handler_block (window->button_experiment,
01948                         window->id_experiment_name);
01949 gtk_combo_box_text_remove_all (window->combo_experiment);
01950 for (i = 0; i < input->nexperiments; ++i)
01951     gtk_combo_box_text_append_text (window->combo_experiment,
01952                                     input->experiment[i].name);
01953 g_signal_handler_unblock
01954 (window->button_experiment, window->
id_experiment_name);
01955 g_signal_handler_unblock (window->combo_experiment,
window->id_experiment);
01956 gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), 0);
01957 g_signal_handler_block (window->combo_variable, window->
id_variable);
01958 g_signal_handler_block (window->entry_variable, window->
id_variable_label);
01959 gtk_combo_box_text_remove_all (window->combo_variable);
01960 for (i = 0; i < input->nvariables; ++i)
01961     gtk_combo_box_text_append_text (window->combo_variable,
01962                                     input->variable[i].name);
01963 g_signal_handler_unblock (window->entry_variable, window->
id_variable_label);
01964 g_signal_handler_unblock (window->combo_variable, window->
id_variable);
01965 gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), 0);
01966 window_set_variable ();
01967 window_update ();
01968
01969 #if DEBUG_INTERFACE
01970 fprintf (stderr, "window_read: end\n");
01971 #endif
01972 return 1;
01973 }

```

Here is the call graph for this function:



#### 4.13.2.22 window\_remove\_experiment()

```
void window_remove_experiment ( )
```

Function to remove an experiment in the main window.

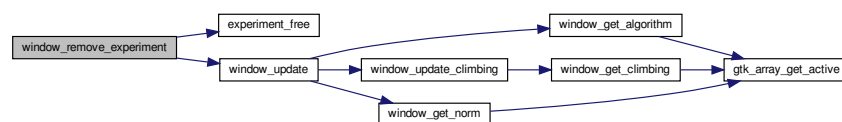
Definition at line 1355 of file [interface.c](#).

```

01356 {
01357     unsigned int i, j;
01358     #if DEBUG_INTERFACE
01359     fprintf (stderr, "window_remove_experiment: start\n");
01360     #endif
01361     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01362     g_signal_handler_block (window->combo_experiment, window->
        id_experiment);
01363     gtk_combo_box_text_remove (window->combo_experiment, i);
01364     g_signal_handler_unblock (window->combo_experiment,
        window->id_experiment);
01365     experiment_free (input->experiment + i, input->
        type);
01366     --input->nexperiments;
01367     for (j = i; j < input->nexperiments; ++j)
01368         memcpy (input->experiment + j, input->experiment + j + 1,
01369             sizeof (Experiment));
01370     j = input->nexperiments - 1;
01371     if (i > j)
01372         i = j;
01373     for (j = 0; j < input->experiment->ninputs; ++j)
01374         g_signal_handler_block (window->button_template[j],
        window->id_input[j]);
01375     g_signal_handler_block
01376         (window->button_experiment, window->
        id_experiment_name);
01377     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_experiment), i);
01378     g_signal_handler_unblock
01379         (window->button_experiment, window->
        id_experiment_name);
01380     for (j = 0; j < input->experiment->ninputs; ++j)
01381         g_signal_handler_unblock (window->button_template[j],
        window->id_input[j]);
01382     window_update ();
01383     #if DEBUG_INTERFACE
01384     fprintf (stderr, "window_remove_experiment: end\n");
01385     #endif
01386 }

```

Here is the call graph for this function:



#### 4.13.2.23 window\_remove\_variable()

```
void window_remove_variable ( )
```

Function to remove a variable in the main window.

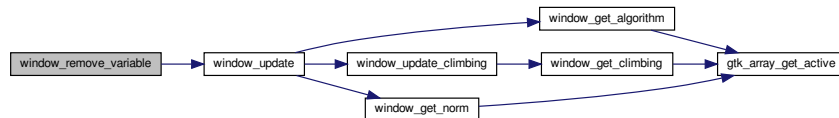
Definition at line 1625 of file [interface.c](#).

```

01626 {
01627     unsigned int i, j;
01628     #if DEBUG_INTERFACE
01629     fprintf (stderr, "window_remove_variable: start\n");
01630     #endif
01631     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01632     g_signal_handler_block (window->combo_variable, window->
id_variable);
01633     gtk_combo_box_text_remove (window->combo_variable, i);
01634     g_signal_handler_unblock (window->combo_variable, window->
id_variable);
01635     xmlFree (input->variable[i].name);
01636     --input->nvariables;
01637     for (j = i; j < input->nvariables; ++j)
01638         memcpy (input->variable + j, input->variable + j + 1, sizeof (
Variable));
01639     j = input->nvariables - 1;
01640     if (i > j)
01641         i = j;
01642     g_signal_handler_block (window->entry_variable, window->
id_variable_label);
01643     gtk_combo_box_set_active (GTK_COMBO_BOX (window->combo_variable), i);
01644     g_signal_handler_unblock (window->entry_variable, window->
id_variable_label);
01645     window_update ();
01646     #if DEBUG_INTERFACE
01647     fprintf (stderr, "window_remove_variable: end\n");
01648     #endif
01649 }

```

Here is the call graph for this function:



#### 4.13.2.24 window\_run()

```
void window_run ( )
```

Function to run a optimization.

Definition at line 974 of file [interface.c](#).

```

00975 {
00976     unsigned int i;
00977     char *msg, *msg2, buffer[64], buffer2[64];
00978     #if DEBUG_INTERFACE
00979     fprintf (stderr, "window_run: start\n");
00980     #endif
00981     if (!window_save ())
00982     {
00983         #if DEBUG_INTERFACE
00984         fprintf (stderr, "window_run: end\n");
00985         #endif
00986         return;
00987     }
00988     running_new ();
00989     while (gtk_events_pending ())
00990         gtk_main_iteration ();
00991     optimize_open ();
00992     #if DEBUG_INTERFACE
00993     fprintf (stderr, "window_run: closing running dialog\n");
00994     #endif

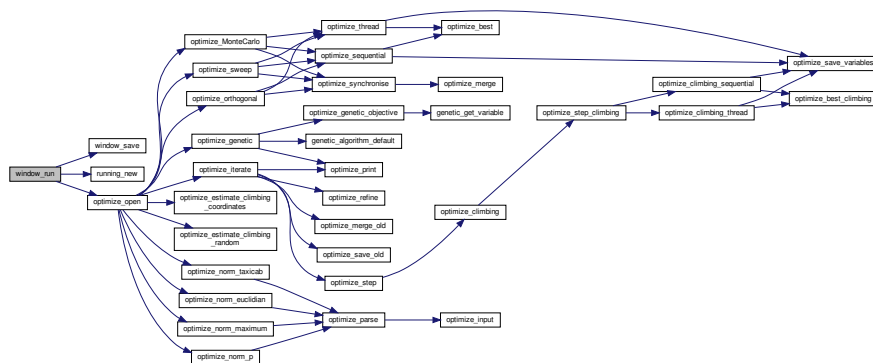
```

```

00995  gtk_spinner_stop (running->spinner);
00996  gtk_widget_destroy (GTK_WIDGET (running->dialog));
00997  #if DEBUG_INTERFACE
00998  fprintf (stderr, "window_run: displaying results\n");
00999  #endif
01000  snprintf (buffer, 64, "error = %.15le\n", optimize->error_old[0]);
01001  msg2 = g_strdup (buffer);
01002  for (i = 0; i < optimize->nvariables; ++i, msg2 = msg)
01003  {
01004      snprintf (buffer, 64, "%s = %s\n",
01005               input->variable[i].name, format[input->
variable[i].precision]);
01006      snprintf (buffer2, 64, buffer, optimize->value_old[i]);
01007      msg = g_strconcat (msg2, buffer2, NULL);
01008      g_free (msg2);
01009  }
01010  snprintf (buffer, 64, "%s = %.6lg s", _("Calculation time"),
01011           optimize->calculation_time);
01012  msg = g_strconcat (msg2, buffer, NULL);
01013  g_free (msg2);
01014  show_message (_("Best result"), msg, INFO_TYPE);
01015  g_free (msg);
01016  #if DEBUG_INTERFACE
01017  fprintf (stderr, "window_run: freeing memory\n");
01018  #endif
01019  optimize_free ();
01020  #if DEBUG_INTERFACE
01021  fprintf (stderr, "window_run: end\n");
01022  #endif
01023  }

```

Here is the call graph for this function:



#### 4.13.2.25 window\_save()

```
int window_save ( )
```

Function to save the input file.

#### Returns

1 on OK, 0 on Cancel.

Definition at line 823 of file [interface.c](#).

```

00824 {
00825     GtkFileChooserDialog *dlg;
00826     GtkFileFilter *filter1, *filter2;
00827     char *buffer;
00828
00829 #if DEBUG_INTERFACE
00830     fprintf (stderr, "window_save: start\n");
00831 #endif
00832
00833     // Opening the saving dialog
00834     dlg = (GtkFileChooserDialog *)
00835         gtk_file_chooser_dialog_new (_("Save file"),
00836                                     window->window,
00837                                     GTK_FILE_CHOOSER_ACTION_SAVE,
00838                                     _("_Cancel"), GTK_RESPONSE_CANCEL,
00839                                     _("_OK"), GTK_RESPONSE_OK, NULL);
00840     gtk_file_chooser_set_do_overwrite_confirmation (GTK_FILE_CHOOSER (dlg), TRUE);
00841     buffer = g_build_filename (input->directory, input->name, NULL);
00842     gtk_file_chooser_set_filename (GTK_FILE_CHOOSER (dlg), buffer);
00843     g_free (buffer);
00844
00845     // Adding XML filter
00846     filter1 = (GtkFileFilter *) gtk_file_filter_new ();
00847     gtk_file_filter_set_name (filter1, "XML");
00848     gtk_file_filter_add_pattern (filter1, "*.xml");
00849     gtk_file_filter_add_pattern (filter1, "*.XML");
00850     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter1);
00851
00852     // Adding JSON filter
00853     filter2 = (GtkFileFilter *) gtk_file_filter_new ();
00854     gtk_file_filter_set_name (filter2, "JSON");
00855     gtk_file_filter_add_pattern (filter2, "*.json");
00856     gtk_file_filter_add_pattern (filter2, "*.JSON");
00857     gtk_file_filter_add_pattern (filter2, "*.js");
00858     gtk_file_filter_add_pattern (filter2, "*.JS");
00859     gtk_file_chooser_add_filter (GTK_FILE_CHOOSER (dlg), filter2);
00860
00861     if (input->type == INPUT_TYPE_XML)
00862         gtk_file_chooser_set_filter (GTK_FILE_CHOOSER (dlg), filter1);
00863     else
00864         gtk_file_chooser_set_filter (GTK_FILE_CHOOSER (dlg), filter2);
00865
00866     // If OK response then saving
00867     if (gtk_dialog_run (GTK_DIALOG (dlg)) == GTK_RESPONSE_OK)
00868     {
00869         // Setting input file type
00870         filter1 = gtk_file_chooser_get_filter (GTK_FILE_CHOOSER (dlg));
00871         buffer = (char *) gtk_file_filter_get_name (filter1);
00872         if (!strcmp (buffer, "XML"))
00873             input->type = INPUT_TYPE_XML;
00874         else
00875             input->type = INPUT_TYPE_JSON;
00876
00877         // Adding properties to the root XML node
00878         input->simulator = gtk_file_chooser_get_filename
00879             (GTK_FILE_CHOOSER (window->button_simulator));
00880         if (gtk_toggle_button_get_active
00881             (GTK_TOGGLE_BUTTON (window->check_evaluator)))
00882             input->evaluator = gtk_file_chooser_get_filename
00883                 (GTK_FILE_CHOOSER (window->button_evaluator));
00884         else
00885             input->evaluator = NULL;
00886         if (input->type == INPUT_TYPE_XML)
00887         {
00888             input->result
00889                 = (char *) xmlStrdup ((const xmlChar *)
00890                                         gtk_entry_get_text (window->entry_result));
00891             input->variables
00892                 = (char *) xmlStrdup ((const xmlChar *)
00893                                         gtk_entry_get_text (window->
00894 entry_variables));
00895         }
00896         else
00897         {
00898             input->result = g_strdup (gtk_entry_get_text (window->
00899 entry_result));
00900             input->variables =
00901                 g_strdup (gtk_entry_get_text (window->entry_variables));
00902         }
00903
00904         // Setting the algorithm
00905         switch (window_get_algorithm ())
00906         {
00907             case ALGORITHM_MONTE_CARLO:
00908                 input->algorithm = ALGORITHM_MONTE_CARLO;
00909                 input->nsimulations
00910                     = gtk_spin_button_get_value_as_int (window->spin_simulations);

```



```

00909         input->niterations
00910         = gtk_spin_button_get_value_as_int (window->spin_iterations);
00911         input->tolerance = gtk_spin_button_get_value (window->
spin_tolerance);
00912         input->nbest = gtk_spin_button_get_value_as_int (window->
spin_bests);
00913         window_save_climbing ();
00914         break;
00915     case ALGORITHM_SWEEP:
00916         input->algorithm = ALGORITHM_SWEEP;
00917         input->niterations
00918         = gtk_spin_button_get_value_as_int (window->spin_iterations);
00919         input->tolerance = gtk_spin_button_get_value (window->
spin_tolerance);
00920         input->nbest = gtk_spin_button_get_value_as_int (window->
spin_bests);
00921         window_save_climbing ();
00922         break;
00923     case ALGORITHM_ORTHOGONAL:
00924         input->algorithm = ALGORITHM_ORTHOGONAL;
00925         input->niterations
00926         = gtk_spin_button_get_value_as_int (window->spin_iterations);
00927         input->tolerance = gtk_spin_button_get_value (window->
spin_tolerance);
00928         input->nbest = gtk_spin_button_get_value_as_int (window->
spin_bests);
00929         window_save_climbing ();
00930         break;
00931     default:
00932         input->algorithm = ALGORITHM_GENETIC;
00933         input->nsimulations
00934         = gtk_spin_button_get_value_as_int (window->spin_population);
00935         input->niterations
00936         = gtk_spin_button_get_value_as_int (window->spin_generations);
00937         input->mutation_ratio
00938         = gtk_spin_button_get_value (window->spin_mutation);
00939         input->reproduction_ratio
00940         = gtk_spin_button_get_value (window->spin_reproduction);
00941         input->adaptation_ratio
00942         = gtk_spin_button_get_value (window->spin_adaptation);
00943         break;
00944     }
00945     input->norm = window_get_norm ();
00946     input->p = gtk_spin_button_get_value (window->spin_p);
00947     input->threshold = gtk_spin_button_get_value (window->
spin_threshold);
00948
00949     // Saving the XML file
00950     buffer = gtk_file_chooser_get_filename (GTK_FILE_CHOOSER (dlg));
00951     input_save (buffer);
00952
00953     // Closing and freeing memory
00954     g_free (buffer);
00955     gtk_widget_destroy (GTK_WIDGET (dlg));
00956 #if DEBUG_INTERFACE
00957     fprintf (stderr, "window_save: end\n");
00958 #endif
00959     return 1;
00960 }
00961
00962 // Closing and freeing memory
00963 gtk_widget_destroy (GTK_WIDGET (dlg));
00964 #if DEBUG_INTERFACE
00965     fprintf (stderr, "window_save: end\n");
00966 #endif
00967     return 0;
00968 }

```

#### 4.13.2.26 window\_save\_climbing()

```
void window_save_climbing ( )
```

Function to save the hill climbing method data in the input file.

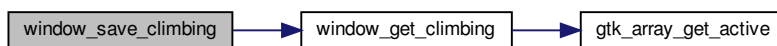
Definition at line 790 of file [interface.c](#).

```

00791 {
00792 #if DEBUG_INTERFACE
00793     fprintf (stderr, "window_save_climbing: start\n");
00794 #endif
00795     if (gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->
00796         check_climbing)))
00797     {
00798         input->nsteps = gtk_spin_button_get_value_as_int (window->
00799             spin_steps);
00800         input->relaxation = gtk_spin_button_get_value (window->
00801             spin_relaxation);
00802         switch (window_get_climbing ())
00803         {
00804             case CLIMBING_METHOD_COORDINATES:
00805                 input->climbing = CLIMBING_METHOD_COORDINATES;
00806                 break;
00807             default:
00808                 input->climbing = CLIMBING_METHOD_RANDOM;
00809                 input->nestimates
00810                     = gtk_spin_button_get_value_as_int (window->spin_estimates);
00811         }
00812     }
00813     else
00814         input->nsteps = 0;
00815 #if DEBUG_INTERFACE
00816     fprintf (stderr, "window_save_climbing: end\n");
00817 #endif
00818 }

```

Here is the call graph for this function:



#### 4.13.2.27 window\_set\_algorithm()

```
void window_set_algorithm ( )
```

Function to avoid memory errors changing the algorithm.

Definition at line 1281 of file [interface.c](#).

```

01282 {
01283     int i;
01284 #if DEBUG_INTERFACE
01285     fprintf (stderr, "window_set_algorithm: start\n");
01286 #endif
01287     i = window_get_algorithm ();
01288     switch (i)
01289     {
01290         case ALGORITHM_SWEEP:
01291         case ALGORITHM_ORTHOGONAL:
01292             i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01293             if (i < 0)
01294                 i = 0;
01295             gtk_spin_button_set_value (window->spin_sweeps,
01296                 (gdouble) input->variable[i].
01297                 nsweeps);
01298             break;
01299         case ALGORITHM_GENETIC:
01300             i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01301             if (i < 0)
01302                 i = 0;

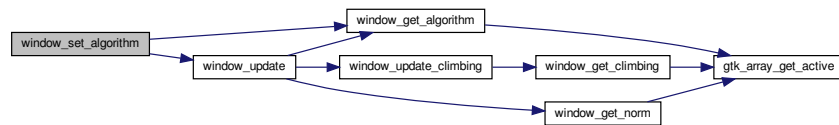
```

```

01302     gtk_spin_button_set_value (window->spin_bits,
01303                               (gdouble) input->variable[i].nbits);
01304 }
01305 window_update ();
01306 #if DEBUG_INTERFACE
01307 fprintf (stderr, "window_set_algorithm: end\n");
01308 #endif
01309 }

```

Here is the call graph for this function:



#### 4.13.2.28 window\_set\_experiment()

```
void window_set_experiment ( )
```

Function to set the experiment data in the main window.

Definition at line 1315 of file [interface.c](#).

```

01316 {
01317     unsigned int i, j;
01318     char *buffer1, *buffer2;
01319     #if DEBUG_INTERFACE
01320     fprintf (stderr, "window_set_experiment: start\n");
01321     #endif
01322     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01323     gtk_spin_button_set_value (window->spin_weight, input->
01324                               experiment[i].weight);
01324     buffer1 = gtk_combo_box_text_get_active_text (window->combo_experiment);
01325     buffer2 = g_build_filename (input->directory, buffer1, NULL);
01326     g_free (buffer1);
01327     g_signal_handler_block
01328     (window->button_experiment, window->
01329     id_experiment_name);
01329     gtk_file_chooser_set_filename
01330     (GTK_FILE_CHOOSER (window->button_experiment), buffer2);
01331     g_signal_handler_unblock
01332     (window->button_experiment, window->
01333     id_experiment_name);
01333     g_free (buffer2);
01334     for (j = 0; j < input->experiment->ninputs; ++j)
01335     {
01336         g_signal_handler_block (window->button_template[j],
01337                                window->id_input[j]);
01337         buffer2 =
01338         g_build_filename (input->directory, input->experiment[i].
01339                           stencil[j],
01340                           NULL);
01340         gtk_file_chooser_set_filename (GTK_FILE_CHOOSER
01341                                       (window->button_template[j]), buffer2);
01342         g_free (buffer2);
01343         g_signal_handler_unblock
01344         (window->button_template[j], window->id_input[j]);
01345     }
01346     #if DEBUG_INTERFACE
01347     fprintf (stderr, "window_set_experiment: end\n");
01348     #endif
01349 }

```

## 4.13.2.29 window\_set\_variable()

```
void window_set_variable ( )
```

Function to set the variable data in the main window.

Definition at line 1548 of file [interface.c](#).

```

01549 {
01550     unsigned int i;
01551     #if DEBUG_INTERFACE
01552         fprintf (stderr, "window_set_variable: start\n");
01553     #endif
01554     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01555     g_signal_handler_block (window->entry_variable, window->
01556         id_variable_label);
01557     gtk_entry_set_text (window->entry_variable, input->
01558         variable[i].name);
01559     g_signal_handler_unblock (window->entry_variable, window->
01560         id_variable_label);
01561     gtk_spin_button_set_value (window->spin_min, input->
01562         variable[i].rangemin);
01563     gtk_spin_button_set_value (window->spin_max, input->
01564         variable[i].rangemax);
01565     if (input->variable[i].rangeminabs != -G_MAXDOUBLE)
01566     {
01567         gtk_spin_button_set_value (window->spin_minabs,
01568             input->variable[i].rangeminabs);
01569         gtk_toggle_button_set_active
01570             (GTK_TOGGLE_BUTTON (window->check_minabs), 1);
01571     }
01572     else
01573     {
01574         gtk_spin_button_set_value (window->spin_minabs, -G_MAXDOUBLE);
01575         gtk_toggle_button_set_active
01576             (GTK_TOGGLE_BUTTON (window->check_minabs), 0);
01577     }
01578     if (input->variable[i].rangemaxabs != G_MAXDOUBLE)
01579     {
01580         gtk_spin_button_set_value (window->spin_maxabs,
01581             input->variable[i].rangemaxabs);
01582         gtk_toggle_button_set_active
01583             (GTK_TOGGLE_BUTTON (window->check_maxabs), 1);
01584     }
01585     else
01586     {
01587         gtk_spin_button_set_value (window->spin_maxabs, G_MAXDOUBLE);
01588         gtk_toggle_button_set_active
01589             (GTK_TOGGLE_BUTTON (window->check_maxabs), 0);
01590     }
01591     gtk_spin_button_set_value (window->spin_precision,
01592         input->variable[i].precision);
01593     gtk_spin_button_set_value (window->spin_steps, (gdouble) input->
01594         nsteps);
01595     if (input->nsteps)
01596         gtk_spin_button_set_value (window->spin_step, input->
01597             variable[i].step);
01598     #if DEBUG_INTERFACE
01599         fprintf (stderr, "window_set_variable: precision[%u]=%u\n", i,
01600             input->variable[i].precision);
01601     #endif
01602     switch (window_get_algorithm ())
01603     {
01604         case ALGORITHM_SWEEP:
01605             case ALGORITHM_ORTHOGONAL:
01606                 gtk_spin_button_set_value (window->spin_sweeps,
01607                     (gdouble) input->variable[i].
01608                     nsweeps);
01609     #if DEBUG_INTERFACE
01610         fprintf (stderr, "window_set_variable: nsweeps[%u]=%u\n", i,
01611             input->variable[i].nsweeps);
01612     #endif
01613         break;
01614         case ALGORITHM_GENETIC:
01615             gtk_spin_button_set_value (window->spin_bits,
01616                 (gdouble) input->variable[i].nbits);
01617     #if DEBUG_INTERFACE
01618         fprintf (stderr, "window_set_variable: nbits[%u]=%u\n", i,
01619             input->variable[i].nbits);
01620     #endif
01621         break;
01622     }

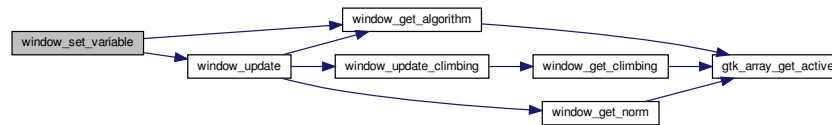
```

```

01615     window_update ();
01616     #if DEBUG_INTERFACE
01617     fprintf (stderr, "window_set_variable: end\n");
01618     #endif
01619 }

```

Here is the call graph for this function:



#### 4.13.2.30 window\_template\_experiment()

```

void window_template_experiment (
    void * data )

```

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 1517 of file [interface.c](#).

```

01519 {
01520     unsigned int i, j;
01521     char *buffer;
01522     GFile *file1, *file2;
01523     #if DEBUG_INTERFACE
01524     fprintf (stderr, "window_template_experiment: start\n");
01525     #endif
01526     i = (size_t) data;
01527     j = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01528     file1
01529     = gtk_file_chooser_get_file (GTK_FILE_CHOOSER (window->button_template[i]));
01530     file2 = g_file_new_for_path (input->directory);
01531     buffer = g_file_get_relative_path (file2, file1);
01532     if (input->type == INPUT_TYPE_XML)
01533         input->experiment[j].stencil[i] = (char *) xmlStrdup ((xmlChar *) buffer);
01534     else
01535         input->experiment[j].stencil[i] = g_strdup (buffer);
01536     g_free (buffer);
01537     g_object_unref (file2);
01538     g_object_unref (file1);
01539     #if DEBUG_INTERFACE
01540     fprintf (stderr, "window_template_experiment: end\n");
01541     #endif
01542 }

```

## 4.13.2.31 window\_update()

```
void window_update ( )
```

Function to update the main window view.

Definition at line 1124 of file [interface.c](#).

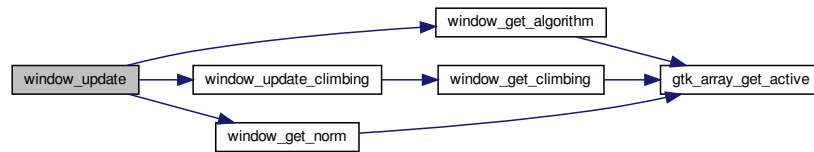
```
01125 {
01126     unsigned int i;
01127     #if DEBUG_INTERFACE
01128     fprintf (stderr, "window_update: start\n");
01129     #endif
01130     gtk_widget_set_sensitive
01131     (GTK_WIDGET (window->button_evaluator),
01132      gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON
01133      (window->check_evaluator)));
01134     gtk_widget_hide (GTK_WIDGET (window->label_simulations));
01135     gtk_widget_hide (GTK_WIDGET (window->spin_simulations));
01136     gtk_widget_hide (GTK_WIDGET (window->label_iterations));
01137     gtk_widget_hide (GTK_WIDGET (window->spin_iterations));
01138     gtk_widget_hide (GTK_WIDGET (window->label_tolerance));
01139     gtk_widget_hide (GTK_WIDGET (window->spin_tolerance));
01140     gtk_widget_hide (GTK_WIDGET (window->label_bests));
01141     gtk_widget_hide (GTK_WIDGET (window->spin_bests));
01142     gtk_widget_hide (GTK_WIDGET (window->label_population));
01143     gtk_widget_hide (GTK_WIDGET (window->spin_population));
01144     gtk_widget_hide (GTK_WIDGET (window->label_generations));
01145     gtk_widget_hide (GTK_WIDGET (window->spin_generations));
01146     gtk_widget_hide (GTK_WIDGET (window->label_mutation));
01147     gtk_widget_hide (GTK_WIDGET (window->spin_mutation));
01148     gtk_widget_hide (GTK_WIDGET (window->label_reproduction));
01149     gtk_widget_hide (GTK_WIDGET (window->spin_reproduction));
01150     gtk_widget_hide (GTK_WIDGET (window->label_adaptation));
01151     gtk_widget_hide (GTK_WIDGET (window->spin_adaptation));
01152     gtk_widget_hide (GTK_WIDGET (window->label_sweeps));
01153     gtk_widget_hide (GTK_WIDGET (window->spin_sweeps));
01154     gtk_widget_hide (GTK_WIDGET (window->label_bits));
01155     gtk_widget_hide (GTK_WIDGET (window->spin_bits));
01156     gtk_widget_hide (GTK_WIDGET (window->check_climbing));
01157     gtk_widget_hide (GTK_WIDGET (window->grid_climbing));
01158     gtk_widget_hide (GTK_WIDGET (window->label_step));
01159     gtk_widget_hide (GTK_WIDGET (window->spin_step));
01160     gtk_widget_hide (GTK_WIDGET (window->label_p));
01161     gtk_widget_hide (GTK_WIDGET (window->spin_p));
01162     i = gtk_spin_button_get_value_as_int (window->spin_iterations);
01163     switch (window_get_algorithm ())
01164     {
01165     case ALGORITHM_MONTE_CARLO:
01166         gtk_widget_show (GTK_WIDGET (window->label_simulations));
01167         gtk_widget_show (GTK_WIDGET (window->spin_simulations));
01168         gtk_widget_show (GTK_WIDGET (window->label_iterations));
01169         gtk_widget_show (GTK_WIDGET (window->spin_iterations));
01170         if (i > 1)
01171         {
01172             gtk_widget_show (GTK_WIDGET (window->label_tolerance));
01173             gtk_widget_show (GTK_WIDGET (window->spin_tolerance));
01174             gtk_widget_show (GTK_WIDGET (window->label_bests));
01175             gtk_widget_show (GTK_WIDGET (window->spin_bests));
01176         }
01177         window_update_climbing ();
01178         break;
01179     case ALGORITHM_SWEEP:
01180     case ALGORITHM_ORTHOGONAL:
01181         gtk_widget_show (GTK_WIDGET (window->label_iterations));
01182         gtk_widget_show (GTK_WIDGET (window->spin_iterations));
01183         if (i > 1)
01184         {
01185             gtk_widget_show (GTK_WIDGET (window->label_tolerance));
01186             gtk_widget_show (GTK_WIDGET (window->spin_tolerance));
01187             gtk_widget_show (GTK_WIDGET (window->label_bests));
01188             gtk_widget_show (GTK_WIDGET (window->spin_bests));
01189         }
01190         gtk_widget_show (GTK_WIDGET (window->label_sweeps));
01191         gtk_widget_show (GTK_WIDGET (window->spin_sweeps));
01192         gtk_widget_show (GTK_WIDGET (window->check_climbing));
01193         window_update_climbing ();
01194         break;
01195     default:
01196         gtk_widget_show (GTK_WIDGET (window->label_population));
01197         gtk_widget_show (GTK_WIDGET (window->spin_population));
01198         gtk_widget_show (GTK_WIDGET (window->label_generations));
01199     }
```

```

01199     gtk_widget_show (GTK_WIDGET (window->spin_generations));
01200     gtk_widget_show (GTK_WIDGET (window->label_mutation));
01201     gtk_widget_show (GTK_WIDGET (window->spin_mutation));
01202     gtk_widget_show (GTK_WIDGET (window->label_reproduction));
01203     gtk_widget_show (GTK_WIDGET (window->spin_reproduction));
01204     gtk_widget_show (GTK_WIDGET (window->label_adaptation));
01205     gtk_widget_show (GTK_WIDGET (window->spin_adaptation));
01206     gtk_widget_show (GTK_WIDGET (window->label_bits));
01207     gtk_widget_show (GTK_WIDGET (window->spin_bits));
01208 }
01209 gtk_widget_set_sensitive
01210 (GTK_WIDGET (window->button_remove_experiment),
input->nexperiments > 1);
01211 gtk_widget_set_sensitive
01212 (GTK_WIDGET (window->button_remove_variable),
input->nvariables > 1);
01213 for (i = 0; i < input->experiment->ninputs; ++i)
01214 {
01215     gtk_widget_show (GTK_WIDGET (window->check_template[i]));
01216     gtk_widget_show (GTK_WIDGET (window->button_template[i]));
01217     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i]), 0);
01218     gtk_widget_set_sensitive (GTK_WIDGET (window->button_template[i]), 1);
01219     g_signal_handler_block
01220     (window->check_template[i], window->
id_template[i]);
01221     g_signal_handler_block (window->button_template[i],
window->id_input[i]);
01222     gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON
(window->check_template[i]), 1);
01223     g_signal_handler_unblock (window->button_template[i],
01224     window->id_input[i]);
01225     g_signal_handler_unblock (window->check_template[i],
01226     window->id_template[i]);
01227 }
01228 if (i > 0)
01229 {
01230     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i - 1]), 1);
01231     gtk_widget_set_sensitive (GTK_WIDGET (window->button_template[i - 1]),
01232     gtk_toggle_button_get_active
01233     GTK_TOGGLE_BUTTON (window->check_template
[i - 1]));
01234 }
01235 if (i < MAX_NINPUTS)
01236 {
01237     gtk_widget_show (GTK_WIDGET (window->check_template[i]));
01238     gtk_widget_show (GTK_WIDGET (window->button_template[i]));
01239     gtk_widget_set_sensitive (GTK_WIDGET (window->check_template[i]), 1);
01240     gtk_widget_set_sensitive
01241     (GTK_WIDGET (window->button_template[i]),
01242     gtk_toggle_button_get_active
01243     GTK_TOGGLE_BUTTON (window->check_template[i]));
01244     g_signal_handler_block
01245     (window->check_template[i], window->
id_template[i]);
01246     g_signal_handler_block (window->button_template[i],
window->id_input[i]);
01247     gtk_toggle_button_set_active (GTK_TOGGLE_BUTTON
(window->check_template[i]), 0);
01248     g_signal_handler_unblock (window->button_template[i],
01249     window->id_input[i]);
01250     g_signal_handler_unblock (window->check_template[i],
01251     window->id_template[i]);
01252 }
01253 while (++i < MAX_NINPUTS)
01254 {
01255     gtk_widget_hide (GTK_WIDGET (window->check_template[i]));
01256     gtk_widget_hide (GTK_WIDGET (window->button_template[i]));
01257 }
01258 gtk_widget_set_sensitive
01259 (GTK_WIDGET (window->spin_minabs),
01260     gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->check_minabs)));
01261 gtk_widget_set_sensitive
01262 (GTK_WIDGET (window->spin_maxabs),
01263     gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->check_maxabs)));
01264 if (window_get_norm () == ERROR_NORM_P)
01265 {
01266     gtk_widget_show (GTK_WIDGET (window->label_p));
01267     gtk_widget_show (GTK_WIDGET (window->spin_p));
01268 }
01269 #if DEBUG_INTERFACE
01270 fprintf (stderr, "window_update: end\n");
01271 #endif
01272 }

```

Here is the call graph for this function:



#### 4.13.2.32 window\_update\_climbing()

```
void window_update_climbing ( )
```

Function to update hill climbing method widgets view in the main window.

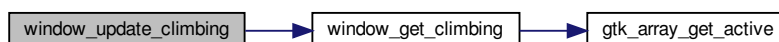
Definition at line 1093 of file [interface.c](#).

```

01094 {
01095     #if DEBUG_INTERFACE
01096         fprintf (stderr, "window_update_climbing: start\n");
01097     #endif
01098     gtk_widget_show (GTK_WIDGET (window->check_climbing));
01099     if (gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (window->
01100         check_climbing)))
01101     {
01102         gtk_widget_show (GTK_WIDGET (window->grid_climbing));
01103         gtk_widget_show (GTK_WIDGET (window->label_step));
01104         gtk_widget_show (GTK_WIDGET (window->spin_step));
01105     }
01106     switch (window_get_climbing ())
01107     {
01108     case CLIMBING_METHOD_COORDINATES:
01109         gtk_widget_hide (GTK_WIDGET (window->label_estimates));
01110         gtk_widget_hide (GTK_WIDGET (window->spin_estimates));
01111         break;
01112     default:
01113         gtk_widget_show (GTK_WIDGET (window->label_estimates));
01114         gtk_widget_show (GTK_WIDGET (window->spin_estimates));
01115     }
01116     #if DEBUG_INTERFACE
01117     fprintf (stderr, "window_update_climbing: end\n");
01118     #endif
01119 }

```

Here is the call graph for this function:





## 4.13.2.33 window\_update\_variable()

```
void window_update_variable ( )
```

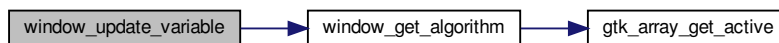
Function to update the variable data in the main window.

Definition at line 1824 of file [interface.c](#).

```

01825 {
01826     int i;
01827     #if DEBUG_INTERFACE
01828     fprintf (stderr, "window_update_variable: start\n");
01829     #endif
01830     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_variable));
01831     if (i < 0)
01832         i = 0;
01833     switch (window_get_algorithm ())
01834     {
01835         case ALGORITHM_SWEEP:
01836         case ALGORITHM_ORTHOGONAL:
01837             input->variable[i].nsweeps
01838             = gtk_spin_button_get_value_as_int (window->spin_sweeps);
01839     #if DEBUG_INTERFACE
01840         fprintf (stderr, "window_update_variable: nsweeps[%d]=%u\n", i,
01841                 input->variable[i].nsweeps);
01842     #endif
01843         break;
01844         case ALGORITHM_GENETIC:
01845             input->variable[i].nbits
01846             = gtk_spin_button_get_value_as_int (window->spin_bits);
01847     #if DEBUG_INTERFACE
01848         fprintf (stderr, "window_update_variable: nbits[%d]=%u\n", i,
01849                 input->variable[i].nbits);
01850     #endif
01851     }
01852     #if DEBUG_INTERFACE
01853     fprintf (stderr, "window_update_variable: end\n");
01854     #endif
01855 }
```

Here is the call graph for this function:



## 4.13.2.34 window\_weight\_experiment()

```
void window_weight_experiment ( )
```

Function to update the experiment weight in the main window.

Definition at line 1475 of file [interface.c](#).

```

01476 {
01477     unsigned int i;
01478     #if DEBUG_INTERFACE
01479     fprintf (stderr, "window_weight_experiment: start\n");
01480     #endif
01481     i = gtk_combo_box_get_active (GTK_COMBO_BOX (window->combo_experiment));
01482     input->experiment[i].weight = gtk_spin_button_get_value (
01483         window->spin_weight);
01484     #if DEBUG_INTERFACE
01485     fprintf (stderr, "window_weight_experiment: end\n");
01486     #endif
01487 }
```

## 4.14 interface.h

```

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 2012-2018, 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.
00015
00016     2. Redistributions in binary form must reproduce the above copyright notice,
00017        this list of conditions and the following disclaimer in the
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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 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 *bar_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 *FileChooserButton *button_simulator;
00072     GtkWidget *check_evaluator;
00073     GtkWidget *FileChooserButton *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     GtkWidget *radioButton *button_norm[NNORMS];
00081     GtkWidget *label_p;
00082     GtkWidget *spin_p;
00083     GtkWidget *scrolled_p;
00084     GtkWidget *frame_algorithm;

```

```

00110   GtkWidget *grid_algorithm;
00111   GtkRadioButton *button_algorithm[NALGORITHMS];
00113   GtkLabel *label_simulations;
00114   GtkSpinButton *spin_simulations;
00116   GtkLabel *label_iterations;
00117   GtkSpinButton *spin_iterations;
00119   GtkLabel *label_tolerance;
00120   GtkSpinButton *spin_tolerance;
00121   GtkLabel *label_bests;
00122   GtkSpinButton *spin_bests;
00123   GtkLabel *label_population;
00124   GtkSpinButton *spin_population;
00126   GtkLabel *label_generations;
00127   GtkSpinButton *spin_generations;
00129   GtkLabel *label_mutation;
00130   GtkSpinButton *spin_mutation;
00131   GtkLabel *label_reproduction;
00132   GtkSpinButton *spin_reproduction;
00134   GtkLabel *label_adaptation;
00135   GtkSpinButton *spin_adaptation;
00137   GtkCheckButton *check_climbing;
00139   GtkWidget *grid_climbing;
00141   GtkRadioButton *button_climbing[NCLIMBINGS];
00143   GtkLabel *label_steps;
00144   GtkSpinButton *spin_steps;
00145   GtkLabel *label_estimates;
00146   GtkSpinButton *spin_estimates;
00148   GtkLabel *label_relaxation;
00150   GtkSpinButton *spin_relaxation;
00152   GtkLabel *label_threshold;
00153   GtkSpinButton *spin_threshold;
00154   GtkScrolledWindow *scrolled_threshold;
00156   GtkFrame *frame_variable;
00157   GtkWidget *grid_variable;
00158   GtkComboBoxText *combo_variable;
00160   GtkButton *button_add_variable;
00161   GtkButton *button_remove_variable;
00162   GtkLabel *label_variable;
00163   GtkEntry *entry_variable;
00164   GtkLabel *label_min;
00165   GtkSpinButton *spin_min;
00166   GtkScrolledWindow *scrolled_min;
00167   GtkLabel *label_max;
00168   GtkSpinButton *spin_max;
00169   GtkScrolledWindow *scrolled_max;
00170   GtkCheckButton *check_minabs;
00171   GtkSpinButton *spin_minabs;
00172   GtkScrolledWindow *scrolled_minabs;
00173   GtkCheckButton *check_maxabs;
00174   GtkSpinButton *spin_maxabs;
00175   GtkScrolledWindow *scrolled_maxabs;
00176   GtkLabel *label_precision;
00177   GtkSpinButton *spin_precision;
00178   GtkLabel *label_sweeps;
00179   GtkSpinButton *spin_sweeps;
00180   GtkLabel *label_bits;
00181   GtkSpinButton *spin_bits;
00182   GtkLabel *label_step;
00183   GtkSpinButton *spin_step;
00184   GtkScrolledWindow *scrolled_step;
00185   GtkFrame *frame_experiment;
00186   GtkWidget *grid_experiment;
00187   GtkComboBoxText *combo_experiment;
00188   GtkButton *button_add_experiment;
00189   GtkButton *button_remove_experiment;
00190   GtkLabel *label_experiment;
00191   GtkFileChooserButton *button_experiment;
00193   GtkLabel *label_weight;
00194   GtkSpinButton *spin_weight;
00195   GtkCheckButton *check_template[MAX_NINPUTS];
00197   GtkFileChooserButton *button_template[MAX_NINPUTS];
00199   GdkPixbuf *logo;
00200   Experiment *experiment;
00201   Variable *variable;
00202   char *application_directory;
00203   gulong id_experiment;
00204   gulong id_experiment_name;
00205   gulong id_variable;
00206   gulong id_variable_label;
00207   gulong id_template[MAX_NINPUTS];
00209   gulong id_input[MAX_NINPUTS];
00211   unsigned int nexperiments;
00212   unsigned int nvariables;
00213 } Window;
00214
00215 // Global variables
00216 extern const char *logo[];

```

```

00217 extern Options options[1];
00218 extern Running running[1];
00219 extern Window window[1];
00220
00221 // Inline functions
00222 #if GTK_MINOR_VERSION < 10
00223 static inline GtkWidget *
00224 gtk_button_new_from_icon_name (const char *name, GtkIconSize size)
00225 {
00226     GtkWidget *button;
00227     GtkWidget *image;
00228     button = (GtkWidget *) gtk_button_new ();
00229     image = (GtkWidget *) gtk_image_new_from_icon_name (name, size);
00230     gtk_button_set_image (button, GTK_WIDGET (image));
00231     return button;
00232 }
00233 #endif
00234
00235 // Public functions
00236 unsigned int gtk_array_get_active (GtkRadioButton * array[], unsigned int n);
00237 void input_save (char *filename);
00238 void options_new ();
00239 void running_new ();
00240 unsigned int window_get_algorithm ();
00241 unsigned int window_get_climbing ();
00242 unsigned int window_get_norm ();
00243 void window_save_climbing ();
00244 int window_save ();
00245 void window_run ();
00246 void window_help ();
00247 void window_update_climbing ();
00248 void window_update ();
00249 void window_set_algorithm ();
00250 void window_set_experiment ();
00251 void window_remove_experiment ();
00252 void window_add_experiment ();
00253 void window_name_experiment ();
00254 void window_weight_experiment ();
00255 void window_inputs_experiment ();
00256 void window_template_experiment (void *data);
00257 void window_set_variable ();
00258 void window_remove_variable ();
00259 void window_add_variable ();
00260 void window_label_variable ();
00261 void window_precision_variable ();
00262 void window_rangemin_variable ();
00263 void window_rangemax_variable ();
00264 void window_rangeminabs_variable ();
00265 void window_rangemaxabs_variable ();
00266 void window_update_variable ();
00267 int window_read (char *filename);
00268 void window_open ();
00269 void window_new (GtkApplication * application);
00270
00271 #endif

```

## 4.15 main.c File Reference

Main source file.

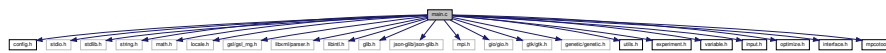
```

#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 "utils.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)`

#### 4.15.1 Detailed Description

Main source file.

## Authors

Javier Burguete and Borja Latorre.

**Copyright**

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

#### 4.16 main.c

```
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 2012-2018, AUTHORS.
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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 <locale.h>
00045 #include <gsl/gsl_rng.h>
00046 #include <libxml/parser.h>
00047 #include <libintl.h>
00048 #include <glib.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 #if HAVE_GTK
00057 #include <gio/gio.h>
00058 #include <gtk/gtk.h>
00059 #endif
00060 #include "genetic/genetic.h"
00061 #include "utils.h"
00062 #include "experiment.h"
00063 #include "variable.h"
00064 #include "input.h"
00065 #include "optimize.h"
00066 #if HAVE_GTK
00067 #include "interface.h"
00068 #endif
00069 #include "mpcotool.h"
00070
00071 int
00072 main (int argn, char **argc)
00073 {
00074     #if HAVE_GTK
00075         show_pending = process_pending;
00076     #endif
00077     return mpcotool (argn, argc);
00078 }

```

## 4.17 mpcotool.c File Reference

Main function 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 "utils.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` 0  
*Macro to debug main functions.*

## Functions

- int `mpcotool` (int argn, char \*\*argc)

## Variables

- GMutex `mutex` [1]  
*GMutex struct.*
- int `ntasks`  
*Tasks number.*
- unsigned int `nthreads`  
*Threads number.*

### 4.17.1 Detailed Description

Main function source file.

#### Authors

Javier Burguete and Borja Latorre.

#### Copyright

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Definition in file `mpcotool.c`.

### 4.17.2 Function Documentation

#### 4.17.2.1 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 83 of file [mpcotool.c](#).

```

00095 {
00096     #if HAVE_GTK
00097         GtkApplication *application;
00098         char *buffer;
00099     #endif
00100
00101     // Starting pseudo-random numbers generator
00102     #if DEBUG_MPCOTOOL
00103         fprintf (stderr, "mpcotool: starting pseudo-random numbers generator\n");
00104     #endif
00105     optimize->rng = gsl_rng_alloc (gsl_rng_taus2);
00106
00107     // Allowing spaces in the XML data file
00108     #if DEBUG_MPCOTOOL
00109         fprintf (stderr, "mpcotool: allowing spaces in the XML data file\n");
00110     #endif
00111     xmlKeepBlanksDefault (0);
00112
00113     // Starting MPI
00114     #if HAVE_MPI
00115     #if DEBUG_MPCOTOOL
00116         fprintf (stderr, "mpcotool: starting MPI\n");
00117     #endif
00118         MPI_Init (&argn, &argc);
00119         MPI_Comm_size (MPI_COMM_WORLD, &ntasks);
00120         MPI_Comm_rank (MPI_COMM_WORLD, &optimize->mpi_rank);
00121         printf ("rank=%d tasks=%d\n", optimize->mpi_rank, ntasks);
00122     #else
00123         ntasks = 1;
00124     #endif
00125
00126     // Resetting result and variables file names
00127     #if DEBUG_MPCOTOOL
00128         fprintf (stderr, "mpcotool: resetting result and variables file names\n");
00129     #endif
00130     input->result = input->variables = NULL;
00131
00132     // Getting threads number and pseudo-random numbers generator seed
00133     nthreads_climbing = nthreads = cores_number ();
00134     optimize->seed = DEFAULT_RANDOM_SEED;
00135
00136     #if HAVE_GTK
00137
00138     // Setting local language and international floating point numbers notation
00139     setlocale (LC_ALL, "");
00140     setlocale (LC_NUMERIC, "C");
00141     window->application_directory = g_get_current_dir ();
00142     buffer = g_build_filename (window->application_directory,
00143                               LOCALE_DIR, NULL);
00144     bindtextdomain (PROGRAM_INTERFACE, buffer);
00145     bind_textdomain_codeset (PROGRAM_INTERFACE, "UTF-8");
00146     textdomain (PROGRAM_INTERFACE);
00147
00148     // Initing GTK+
00149     gtk_disable_setlocale ();
00150     application = gtk_application_new ("es.csic.eead.auladei.sprinkler",
00151                                       G_APPLICATION_FLAGS_NONE);
00152     g_signal_connect (application, "activate", G_CALLBACK (window_new), NULL);
00153
00154     // Opening the main window
00155     g_application_run (G_APPLICATION (application), 0, NULL);
00156
00157     // Freeing memory
00158     input_free ();
00159     g_free (buffer);
00160     gtk_widget_destroy (GTK_WIDGET (window->window));
00161     g_object_unref (application);
00162     g_free (window->application_directory);
00163
00164     #else
00165
00166     // Checking syntax
00167     if (argn < 2)
00168         {

```



```

00168     printf ("The syntax is:\n"
00169            " ./mpcotoolbin [-nthreads x] [-seed s] data_file [result_file] "
00170            "[variables_file]\n");
00171     return 1;
00172 }
00173
00174 // Getting threads number and pseudo-random numbers generator seed
00175 #if DEBUG_MPCOTOOL
00176 fprintf (stderr, "mpcotool: getting threads number and pseudo-random numbers "
00177          "generator seed\n");
00178 #endif
00179 if (argn > 2 && !strcmp (argc[1], "-nthreads"))
00180 {
00181     nthreads_climbing = nthreads = atoi (argc[2]);
00182     if (!nthreads)
00183     {
00184         printf ("Bad threads number\n");
00185         return 2;
00186     }
00187     argc += 2;
00188     argn -= 2;
00189     if (argn > 2 && !strcmp (argc[1], "-seed"))
00190     {
00191         optimize->seed = atoi (argc[2]);
00192         argc += 2;
00193         argn -= 2;
00194     }
00195 }
00196 else if (argn > 2 && !strcmp (argc[1], "-seed"))
00197 {
00198     optimize->seed = atoi (argc[2]);
00199     argc += 2;
00200     argn -= 2;
00201     if (argn > 2 && !strcmp (argc[1], "-nthreads"))
00202     {
00203         nthreads_climbing = nthreads = atoi (argc[2]);
00204         if (!nthreads)
00205         {
00206             printf ("Bad threads number\n");
00207             return 2;
00208         }
00209         argc += 2;
00210         argn -= 2;
00211     }
00212 }
00213 printf ("nthreads=%u\n", nthreads);
00214 printf ("seed=%lu\n", optimize->seed);
00215
00216 // Checking arguments
00217 #if DEBUG_MPCOTOOL
00218 fprintf (stderr, "mpcotool: checking arguments\n");
00219 #endif
00220 if (argn > 4 || argn < 2)
00221 {
00222     printf ("The syntax is:\n"
00223            " ./mpcotoolbin [-nthreads x] [-seed s] data_file [result_file] "
00224            "[variables_file]\n");
00225     return 1;
00226 }
00227 if (argn > 2)
00228     input->result = (char *) xmlStrdup ((xmlChar *) argc[2]);
00229 if (argn == 4)
00230     input->variables = (char *) xmlStrdup ((xmlChar *) argc[3]);
00231
00232 // Making optimization
00233 #if DEBUG_MPCOTOOL
00234 fprintf (stderr, "mpcotool: making optimization\n");
00235 #endif
00236 if (input_open (argc[1]))
00237     optimize_open ();
00238
00239 // Freeing memory
00240 #if DEBUG_MPCOTOOL
00241 fprintf (stderr, "mpcotool: freeing memory and closing\n");
00242 #endif
00243 optimize_free ();
00244
00245 #endif
00246
00247 // Closing MPI
00248 #if HAVE_MPI
00249 MPI_Finalize ();
00250 #endif
00251
00252 // Freeing memory
00253 gsl_rng_free (optimize->rng);
00254

```



```

00052 #endif
00053 #if HAVE_MPI
00054 #include <mpi.h>
00055 #endif
00056 #if HAVE_GTK
00057 #include <gio/gio.h>
00058 #include <gtk/gtk.h>
00059 #endif
00060 #include "genetic/genetic.h"
00061 #include "utils.h"
00062 #include "experiment.h"
00063 #include "variable.h"
00064 #include "input.h"
00065 #include "optimize.h"
00066 #if HAVE_GTK
00067 #include "interface.h"
00068 #endif
00069 #include "mpcotool.h"
00070
00071 #define DEBUG_MPCOTOOL 0
00072
00073 GMutex mutex[1];
00074 int ntasks;
00075 unsigned int nthreads;
00076
00082 int
00083 mpcotool (int argn
00084 #if HAVE_GTK
00085     __attribute__ ((unused))
00086 #endif
00087     ,
00089     char **argc
00090 #if HAVE_GTK
00091     __attribute__ ((unused))
00092 #endif
00093 )
00094 {
00095     {
00096         #if HAVE_GTK
00097             GtkApplication *application;
00098             char *buffer;
00099         #endif
00100
00101         // Starting pseudo-random numbers generator
00102         #if DEBUG_MPCOTOOL
00103             fprintf (stderr, "mpcotool: starting pseudo-random numbers generator\n");
00104         #endif
00105         optimize->rng = gsl_rng_alloc (gsl_rng_taus2);
00106
00107         // Allowing spaces in the XML data file
00108         #if DEBUG_MPCOTOOL
00109             fprintf (stderr, "mpcotool: allowing spaces in the XML data file\n");
00110         #endif
00111         xmlKeepBlanksDefault (0);
00112
00113         // Starting MPI
00114         #if HAVE_MPI
00115         #if DEBUG_MPCOTOOL
00116             fprintf (stderr, "mpcotool: starting MPI\n");
00117         #endif
00118             MPI_Init (&argn, &argc);
00119             MPI_Comm_size (MPI_COMM_WORLD, &ntasks);
00120             MPI_Comm_rank (MPI_COMM_WORLD, &optimize->mpi_rank);
00121             printf ("rank=%d tasks=%d\n", optimize->mpi_rank, ntasks);
00122         #else
00123             ntasks = 1;
00124         #endif
00125
00126         // Resetting result and variables file names
00127         #if DEBUG_MPCOTOOL
00128             fprintf (stderr, "mpcotool: resetting result and variables file names\n");
00129         #endif
00130         input->result = input->variables = NULL;
00131
00132         // Getting threads number and pseudo-random numbers generator seed
00133         nthreads_climbing = nthreads = cores_number ();
00134         optimize->seed = DEFAULT_RANDOM_SEED;
00135
00136         #if HAVE_GTK
00137
00138         // Setting local language and international floating point numbers notation
00139         setlocale (LC_ALL, "");
00140         setlocale (LC_NUMERIC, "C");
00141         window->application_directory = g_get_current_dir ();
00142         buffer = g_build_filename (window->application_directory,
00143             LOCALE_DIR, NULL);
00143         bindtextdomain (PROGRAM_INTERFACE, buffer);
00144         bind_textdomain_codeset (PROGRAM_INTERFACE, "UTF-8");

```

```

00145     textdomain (PROGRAM_INTERFACE);
00146
00147     // Initing GTK+
00148     gtk_disable_setlocale ();
00149     application = gtk_application_new ("es.csic.eead.auladei.sprinkler",
00150                                     G_APPLICATION_FLAGS_NONE);
00151     g_signal_connect (application, "activate", G_CALLBACK (window_new), NULL);
00152
00153     // Opening the main window
00154     g_application_run (G_APPLICATION (application), 0, NULL);
00155
00156     // Freeing memory
00157     input_free ();
00158     g_free (buffer);
00159     gtk_widget_destroy (GTK_WIDGET (window->window));
00160     g_object_unref (application);
00161     g_free (window->application_directory);
00162
00163 #else
00164
00165     // Checking syntax
00166     if (argn < 2)
00167     {
00168         printf ("The syntax is:\n"
00169                 "    ./mpcotoolbin [-nthreads x] [-seed s] data_file [result_file] "
00170                 "[variables_file]\n");
00171         return 1;
00172     }
00173
00174     // Getting threads number and pseudo-random numbers generator seed
00175 #if DEBUG_MPCOTOOL
00176     fprintf (stderr, "mpcotool: getting threads number and pseudo-random numbers "
00177             "generator seed\n");
00178 #endif
00179     if (argn > 2 && !strcmp (argc[1], "-nthreads"))
00180     {
00181         nthreads_climbing = nthreads = atoi (argc[2]);
00182         if (!nthreads)
00183         {
00184             printf ("Bad threads number\n");
00185             return 2;
00186         }
00187         argc += 2;
00188         argn -= 2;
00189         if (argn > 2 && !strcmp (argc[1], "--seed"))
00190         {
00191             optimize->seed = atoi (argc[2]);
00192             argc += 2;
00193             argn -= 2;
00194         }
00195     }
00196     else if (argn > 2 && !strcmp (argc[1], "--seed"))
00197     {
00198         optimize->seed = atoi (argc[2]);
00199         argc += 2;
00200         argn -= 2;
00201         if (argn > 2 && !strcmp (argc[1], "-nthreads"))
00202         {
00203             nthreads_climbing = nthreads = atoi (argc[2]);
00204             if (!nthreads)
00205             {
00206                 printf ("Bad threads number\n");
00207                 return 2;
00208             }
00209             argc += 2;
00210             argn -= 2;
00211         }
00212     }
00213     printf ("nthreads=%u\n", nthreads);
00214     printf ("seed=%lu\n", optimize->seed);
00215
00216     // Checking arguments
00217 #if DEBUG_MPCOTOOL
00218     fprintf (stderr, "mpcotool: checking arguments\n");
00219 #endif
00220     if (argn > 4 || argn < 2)
00221     {
00222         printf ("The syntax is:\n"
00223                 "    ./mpcotoolbin [-nthreads x] [-seed s] data_file [result_file] "
00224                 "[variables_file]\n");
00225         return 1;
00226     }
00227     if (argn > 2)
00228         input->result = (char *) xmlStrdup ((xmlChar *) argc[2]);
00229     if (argn == 4)
00230         input->variables = (char *) xmlStrdup ((xmlChar *) argc[3]);
00231

```

```

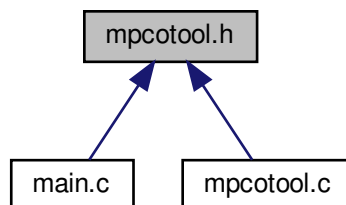
00232 // Making optimization
00233 #if DEBUG_MPCOTOOL
00234 fprintf (stderr, "mpcotool: making optimization\n");
00235 #endif
00236 if (input_open (argc[1]))
00237     optimize_open ();
00238 // Freeing memory
00239 #if DEBUG_MPCOTOOL
00240 fprintf (stderr, "mpcotool: freeing memory and closing\n");
00241 #endif
00242 optimize_free ();
00243 #endif
00244 // Closing MPI
00245 #if HAVE_MPI
00246 MPI_Finalize ();
00247 #endif
00248 // Freeing memory
00249 gsl_rng_free (optimize->rng);
00250 // Closing
00251 return 0;
00252 }

```

## 4.19 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)

#### 4.19.1 Detailed Description

Main function header file.

#### Authors

Javier Burguete and Borja Latorre.

#### Copyright

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

## 4.19.2 Function Documentation

### 4.19.2.1 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 83 of file [mpcotool.c](#).

```
00095 {
00096     #if HAVE_GTK
00097         GtkApplication *application;
00098         char *buffer;
00099     #endif
00100
00101     // Starting pseudo-random numbers generator
00102     #if DEBUG_MPCOTOOL
00103         fprintf (stderr, "mpcotool: starting pseudo-random numbers generator\n");
00104     #endif
00105     optimize->rng = gsl_rng_alloc (gsl_rng_taus2);
00106
00107     // Allowing spaces in the XML data file
00108     #if DEBUG_MPCOTOOL
00109         fprintf (stderr, "mpcotool: allowing spaces in the XML data file\n");
00110     #endif
00111     xmlKeepBlanksDefault (0);
00112
00113     // Starting MPI
00114     #if HAVE_MPI
00115     #if DEBUG_MPCOTOOL
00116         fprintf (stderr, "mpcotool: starting MPI\n");
00117     #endif
00118         MPI_Init (&argn, &argc);
00119         MPI_Comm_size (MPI_COMM_WORLD, &ntasks);
00120         MPI_Comm_rank (MPI_COMM_WORLD, &optimize->mpi_rank);
00121         printf ("rank=%d tasks=%d\n", optimize->mpi_rank, ntasks);
00122     #else
00123         ntasks = 1;
00124     #endif
00125
00126     // Resetting result and variables file names
00127     #if DEBUG_MPCOTOOL
00128         fprintf (stderr, "mpcotool: resetting result and variables file names\n");
00129     #endif
00130     input->result = input->variables = NULL;
00131
00132     // Getting threads number and pseudo-random numbers generator seed
00133     nthreads_climbing = nthreads = cores_number ();
00134     optimize->seed = DEFAULT_RANDOM_SEED;
00135
00136     #if HAVE_GTK
00137
00138     // Setting local language and international floating point numbers notation
```

```

00139  setlocale (LC_ALL, "");
00140  setlocale (LC_NUMERIC, "C");
00141  window->application_directory = g_get_current_dir ();
00142  buffer = g_build_filename (window->application_directory,
LOCAL_DIR, NULL);
00143  bindtextdomain (PROGRAM_INTERFACE, buffer);
00144  bind_textdomain_codeset (PROGRAM_INTERFACE, "UTF-8");
00145  textdomain (PROGRAM_INTERFACE);
00146
00147  // Initing GTK+
00148  gtk_disable_setlocale ();
00149  application = gtk_application_new ("es.csic.eead.auladei.sprinkler",
G_APPLICATION_FLAGS_NONE);
00150  g_signal_connect (application, "activate", G_CALLBACK (window_new), NULL);
00151
00152  // Opening the main window
00153  g_application_run (G_APPLICATION (application), 0, NULL);
00154
00155  // Freeing memory
00156  input_free ();
00157  g_free (buffer);
00158  gtk_widget_destroy (GTK_WIDGET (window->window));
00159  g_object_unref (application);
00160  g_free (window->application_directory);
00161
00162  #else
00163
00164  // Checking syntax
00165  if (argn < 2)
00166  {
00167      printf ("The syntax is:\n"
"./mpcotoolbin [-nthreads x] [-seed s] data_file [result_file] "
"[variables_file]\n");
00168      return 1;
00169  }
00170
00171  // Getting threads number and pseudo-random numbers generator seed
00172  #if DEBUG_MPCOTOOL
00173  fprintf (stderr, "mpcotool: getting threads number and pseudo-random numbers "
"generator seed\n");
00174  #endif
00175  if (argn > 2 && !strcmp (argc[1], "-nthreads"))
00176  {
00177      nthreads_climbing = nthreads = atoi (argc[2]);
00178      if (!nthreads)
00179      {
00180          printf ("Bad threads number\n");
00181          return 2;
00182      }
00183      argc += 2;
00184      argn -= 2;
00185      if (argn > 2 && !strcmp (argc[1], "-seed"))
00186      {
00187          optimize->seed = atoi (argc[2]);
00188          argc += 2;
00189          argn -= 2;
00190      }
00191  }
00192  else if (argn > 2 && !strcmp (argc[1], "-seed"))
00193  {
00194      optimize->seed = atoi (argc[2]);
00195      argc += 2;
00196      argn -= 2;
00197      if (argn > 2 && !strcmp (argc[1], "-nthreads"))
00198      {
00199          nthreads_climbing = nthreads = atoi (argc[2]);
00200          if (!nthreads)
00201          {
00202              printf ("Bad threads number\n");
00203              return 2;
00204          }
00205          argc += 2;
00206          argn -= 2;
00207      }
00208  }
00209  printf ("nthreads=%u\n", nthreads);
00210  printf ("seed=%lu\n", optimize->seed);
00211
00212  // Checking arguments
00213  #if DEBUG_MPCOTOOL
00214  fprintf (stderr, "mpcotool: checking arguments\n");
00215  #endif
00216  if (argn > 4 || argn < 2)
00217  {
00218      printf ("The syntax is:\n"
"./mpcotoolbin [-nthreads x] [-seed s] data_file [result_file] "
"[variables_file]\n");
00219  }

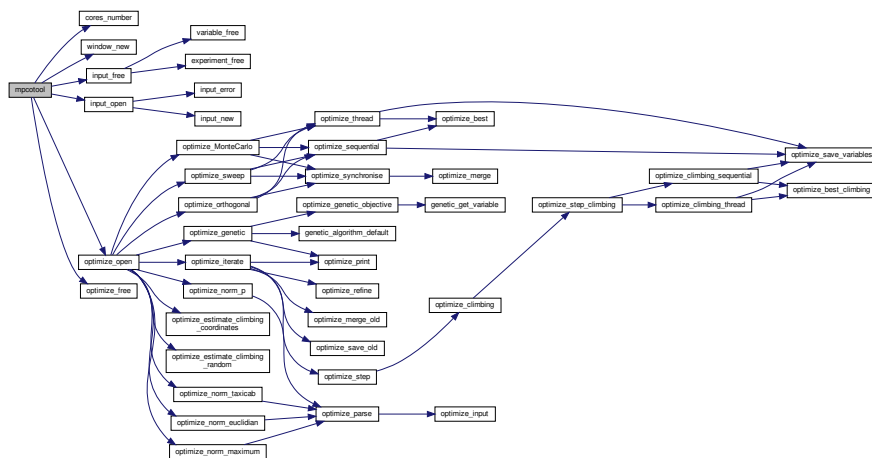
```

```

00225     return 1;
00226 }
00227 if (argn > 2)
00228     input->result = (char *) xmlStrdup ((xmlChar *) argc[2]);
00229 if (argn == 4)
00230     input->variables = (char *) xmlStrdup ((xmlChar *) argc[3]);
00231
00232 // Making optimization
00233 #if DEBUG_MPCOTOOL
00234 fprintf (stderr, "mpcotool: making optimization\n");
00235 #endif
00236 if (input_open (argc[1]))
00237     optimize_open ();
00238
00239 // Freeing memory
00240 #if DEBUG_MPCOTOOL
00241 fprintf (stderr, "mpcotool: freeing memory and closing\n");
00242 #endif
00243 optimize_free ();
00244
00245 #endif
00246
00247 // Closing MPI
00248 #if HAVE_MPI
00249 MPI_Finalize ();
00250 #endif
00251
00252 // Freeing memory
00253 gsl_rng_free (optimize->rng);
00254
00255 // Closing
00256 return 0;
00257 }

```

Here is the call graph for this function:



## 4.20 mpcotool.h

```

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 2012-2018, 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 #ifndef MPCOTOOL__H
00033 #define MPCOTOOL__H 1
00034
00035 extern int mpcotool (int argn, char **argc);
00036
00037 #endif

```

## 4.21 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 "genetic/genetic.h"
#include "utils.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

- void [optimize\\_input](#) (unsigned int simulation, char \*[input](#), GMappedFile \*[stencil](#))
- double [optimize\\_parse](#) (unsigned int simulation, unsigned int experiment)
- double [optimize\\_norm\\_euclidian](#) (unsigned int simulation)
- double [optimize\\_norm\\_maximum](#) (unsigned int simulation)
- double [optimize\\_norm\\_p](#) (unsigned int simulation)
- double [optimize\\_norm\\_taxicab](#) (unsigned int simulation)
- void [optimize\\_print](#) ()
- void [optimize\\_save\\_variables](#) (unsigned int simulation, double error)
- void [optimize\\_best](#) (unsigned int simulation, double value)
- void [optimize\\_sequential](#) ()
- void \* [optimize\\_thread](#) ([ParallelData](#) \*data)
- void [optimize\\_merge](#) (unsigned int nsaveds, unsigned int \*simulation\_best, double \*error\_best)
- void [optimize\\_synchronise](#) ()
- void [optimize\\_sweep](#) ()
- void [optimize\\_MonteCarlo](#) ()
- void [optimize\\_orthogonal](#) ()
- void [optimize\\_best\\_climbing](#) (unsigned int simulation, double value)
- void [optimize\\_climbing\\_sequential](#) (unsigned int simulation)
- void \* [optimize\\_climbing\\_thread](#) ([ParallelData](#) \*data)
- double [optimize\\_estimate\\_climbing\\_random](#) (unsigned int variable, unsigned int estimate)
- double [optimize\\_estimate\\_climbing\\_coordinates](#) (unsigned int variable, unsigned int estimate)
- void [optimize\\_step\\_climbing](#) (unsigned int simulation)
- void [optimize\\_climbing](#) ()
- double [optimize\\_genetic\\_objective](#) ( **Entity** \*entity)
- void [optimize\\_genetic](#) ()
- void [optimize\\_save\\_old](#) ()
- void [optimize\\_merge\\_old](#) ()
- void [optimize\\_refine](#) ()
- void [optimize\\_step](#) ()
- void [optimize\\_iterate](#) ()
- void [optimize\\_free](#) ()
- void [optimize\\_open](#) ()

## Variables

- unsigned int [nthreads\\_climbing](#)  
*Number of threads for the hill climbing method.*
- void(\* [optimize\\_algorithm](#) )()  
*Pointer to the function to perform a optimization algorithm step.*
- double(\* [optimize\\_estimate\\_climbing](#) )(unsigned int variable, unsigned int estimate)  
*Pointer to the function to estimate the climbing.*
- double(\* [optimize\\_norm](#) )(unsigned int simulation)  
*Pointer to the error norm function.*
- [Optimize optimize](#) [1]  
*Optimization data.*

### 4.21.1 Detailed Description

Source file to define the optimization functions.

#### Authors

Javier Burguete and Borja Latorre.

#### Copyright

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

### 4.21.2 Function Documentation

#### 4.21.2.1 optimize\_best()

```
void optimize_best (
    unsigned int simulation,
    double value )
```

Function to save the best simulations.

#### Parameters

<i>simulation</i>	Simulation number.
<i>value</i>	Objective function value.

Definition at line [448](#) of file [optimize.c](#).

```
00450 {
00451     unsigned int i, j;
00452     double e;
00453     #if DEBUG_OPTIMIZE
00454     fprintf (stderr, "optimize_best: start\n");
00455     fprintf (stderr, "optimize_best: nsaveds=%u nbest=%u\n",
00456             optimize->nsaveds, optimize->nbest);
00457     #endif
00458     if (optimize->nsaveds < optimize->nbest
00459         || value < optimize->error_best[optimize->nsaveds - 1])
00460     {
00461         if (optimize->nsaveds < optimize->nbest)
00462             ++optimize->nsaveds;
00463         optimize->error_best[optimize->nsaveds - 1] = value;
00464         optimize->simulation_best[optimize->nsaveds - 1] = simulation;
00465         for (i = optimize->nsaveds; --i;)
00466         {
00467             if (optimize->error_best[i] < optimize->
00468                 error_best[i - 1])
00469             {
00469                 j = optimize->simulation_best[i];
00470                 e = optimize->error_best[i];
00471                 optimize->simulation_best[i] = optimize->
00472                     simulation_best[i - 1];
```

```

00472         optimize->error_best[i] = optimize->
error_best[i - 1];
00473         optimize->simulation_best[i - 1] = j;
00474         optimize->error_best[i - 1] = e;
00475     }
00476     else
00477         break;
00478     }
00479 }
00480 #if DEBUG_OPTIMIZE
00481 fprintf (stderr, "optimize_best: end\n");
00482 #endif
00483 }

```

#### 4.21.2.2 optimize\_best\_climbing()

```

void optimize_best_climbing (
    unsigned int simulation,
    double value )

```

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 [810](#) of file [optimize.c](#).

```

00812 {
00813     #if DEBUG_OPTIMIZE
00814         fprintf (stderr, "optimize_best_climbing: start\n");
00815         fprintf (stderr,
00816             "optimize_best_climbing: simulation=%u value=%.14le best=%.14le\n",
00817             simulation, value, optimize->error_best[0]);
00818     #endif
00819     if (value < optimize->error_best[0])
00820     {
00821         optimize->error_best[0] = value;
00822         optimize->simulation_best[0] = simulation;
00823     #if DEBUG_OPTIMIZE
00824         fprintf (stderr,
00825             "optimize_best_climbing: BEST simulation=%u value=%.14le\n",
00826             simulation, value);
00827     #endif
00828     }
00829     #if DEBUG_OPTIMIZE
00830         fprintf (stderr, "optimize_best_climbing: end\n");
00831     #endif
00832 }

```

#### 4.21.2.3 optimize\_climbing()

```

void optimize_climbing ( )

```

Function to optimize with a hill climbing method.

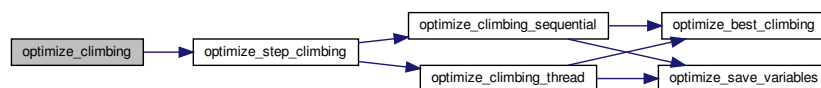
Definition at line [1038](#) of file [optimize.c](#).

```

01039 {
01040     unsigned int i, j, k, b, s, adjust;
01041     #if DEBUG_OPTIMIZE
01042     fprintf (stderr, "optimize_climbing: start\n");
01043     #endif
01044     for (i = 0; i < optimize->nvariables; ++i)
01045         optimize->climbing[i] = 0.;
01046     b = optimize->simulation_best[0] * optimize->
nvariables;
01047     s = optimize->nsimulations;
01048     adjust = 1;
01049     for (i = 0; i < optimize->nsteps; ++i, s += optimize->
nestimates, b = k)
01050     {
01051         #if DEBUG_OPTIMIZE
01052         fprintf (stderr, "optimize_climbing: step=%u old_best=%u\n",
01053             i, optimize->simulation_best[0]);
01054         #endif
01055         optimize_step_climbing (s);
01056         k = optimize->simulation_best[0] * optimize->
nvariables;
01057         #if DEBUG_OPTIMIZE
01058         fprintf (stderr, "optimize_climbing: step=%u best=%u\n",
01059             i, optimize->simulation_best[0]);
01060         #endif
01061         if (k == b)
01062         {
01063             if (adjust)
01064             for (j = 0; j < optimize->nvariables; ++j)
01065                 optimize->step[j] *= 0.5;
01066             for (j = 0; j < optimize->nvariables; ++j)
01067                 optimize->climbing[j] = 0.;
01068             adjust = 1;
01069         }
01070         else
01071         {
01072             for (j = 0; j < optimize->nvariables; ++j)
01073             {
01074                 #if DEBUG_OPTIMIZE
01075                 fprintf (stderr,
01076                     "optimize_climbing: best%u=%%.14le old%u=%%.14le\n",
01077                     j, optimize->value[k + j], j, optimize->
value[b + j]);
01078                 #endif
01079                 optimize->climbing[j]
01080                     = (1. - optimize->relaxation) * optimize->
climbing[j]
01081                     + optimize->relaxation
01082                     * (optimize->value[k + j] - optimize->value[b + j]);
01083                 #if DEBUG_OPTIMIZE
01084                 fprintf (stderr, "optimize_climbing: climbing%u=%%.14le\n",
01085                     j, optimize->climbing[j]);
01086                 #endif
01087             }
01088             adjust = 0;
01089         }
01090     }
01091     #if DEBUG_OPTIMIZE
01092     fprintf (stderr, "optimize_climbing: end\n");
01093     #endif
01094 }

```

Here is the call graph for this function:



#### 4.21.2.4 optimize\_climbing\_sequential()

```

void optimize_climbing_sequential (
    unsigned int simulation )

```

Function to estimate the hill climbing sequentially.

#### Parameters

<i>simulation</i>	Simulation number.
-------------------	--------------------

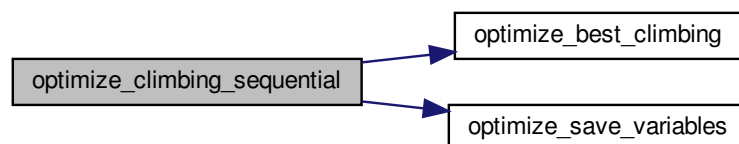
Definition at line 838 of file [optimize.c](#).

```

00839 {
00840     double e;
00841     unsigned int i, j;
00842     #if DEBUG_OPTIMIZE
00843     fprintf (stderr, "optimize_climbing_sequential: start\n");
00844     fprintf (stderr, "optimize_climbing_sequential: nstart_climbing=%u "
00845             "nend_climbing=%u\n",
00846             optimize->nstart_climbing, optimize->
nend_climbing);
00847     #endif
00848     for (i = optimize->nstart_climbing; i < optimize->nend_climbing; ++i)
00849     {
00850         j = simulation + i;
00851         e = optimize_norm (j);
00852         optimize_best_climbing (j, e);
00853         optimize_save_variables (j, e);
00854         if (e < optimize->threshold)
00855         {
00856             optimize->stop = 1;
00857             break;
00858         }
00859     }
00860     #if DEBUG_OPTIMIZE
00861     fprintf (stderr, "optimize_climbing_sequential: i=%u e=%lg\n", i, e);
00862     #endif
00863     #if DEBUG_OPTIMIZE
00864     fprintf (stderr, "optimize_climbing_sequential: end\n");
00865     #endif
00866 }

```

Here is the call graph for this function:



#### 4.21.2.5 optimize\_climbing\_thread()

```

void* optimize_climbing_thread (
    ParallelData * data )

```

Function to estimate the hill climbing on a thread.

#### Returns

NULL

## Parameters

<i>data</i>	Function data.
-------------	----------------

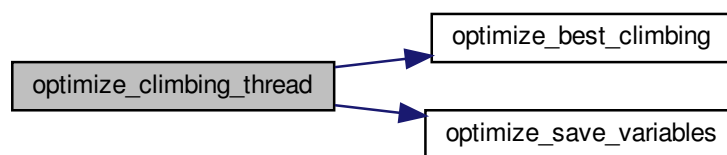
Definition at line 874 of file [optimize.c](#).

```

00875 {
00876     unsigned int i, thread;
00877     double e;
00878     #if DEBUG_OPTIMIZE
00879     fprintf (stderr, "optimize_climbing_thread: start\n");
00880     #endif
00881     thread = data->thread;
00882     #if DEBUG_OPTIMIZE
00883     fprintf (stderr, "optimize_climbing_thread: thread=%u start=%u end=%u\n",
00884             thread,
00885             optimize->thread_climbing[thread],
00886             optimize->thread_climbing[thread + 1]);
00887     #endif
00888     for (i = optimize->thread_climbing[thread];
00889          i < optimize->thread_climbing[thread + 1]; ++i)
00890     {
00891         e = optimize_norm (i);
00892         g_mutex_lock (mutex);
00893         optimize_best_climbing (i, e);
00894         optimize_save_variables (i, e);
00895         if (e < optimize->threshold)
00896             optimize->stop = 1;
00897         g_mutex_unlock (mutex);
00898         if (optimize->stop)
00899             break;
00900     #if DEBUG_OPTIMIZE
00901     fprintf (stderr, "optimize_climbing_thread: i=%u e=%lg\n", i, e);
00902     #endif
00903     }
00904     #if DEBUG_OPTIMIZE
00905     fprintf (stderr, "optimize_climbing_thread: end\n");
00906     #endif
00907     g_thread_exit (NULL);
00908     return NULL;
00909 }

```

Here is the call graph for this function:



## 4.21.2.6 optimize\_estimate\_climbing\_coordinates()

```

double optimize_estimate_climbing_coordinates (
    unsigned int variable,
    unsigned int estimate )

```

Function to estimate a component of the hill climbing vector.

## Parameters

<i>variable</i>	Variable number.
<i>estimate</i>	Estimate number.

Definition at line 939 of file [optimize.c](#).

```

00943 {
00944     double x;
00945     #if DEBUG_OPTIMIZE
00946     fprintf (stderr, "optimize_estimate_climbing_coordinates: start\n");
00947     #endif
00948     x = optimize->climbing[variable];
00949     if (estimate >= (2 * variable) && estimate < (2 * variable + 2))
00950     {
00951         if (estimate & 1)
00952             x += optimize->step[variable];
00953         else
00954             x -= optimize->step[variable];
00955     }
00956     #if DEBUG_OPTIMIZE
00957     fprintf (stderr,
00958             "optimize_estimate_climbing_coordinates: climbing%u=%lg\n",
00959             variable, x);
00960     fprintf (stderr, "optimize_estimate_climbing_coordinates: end\n");
00961     #endif
00962     return x;
00963 }
```

4.21.2.7 `optimize_estimate_climbing_random()`

```

double optimize_estimate_climbing_random (
    unsigned int variable,
    unsigned int estimate )
```

Function to estimate a component of the hill climbing vector.

## Parameters

<i>variable</i>	Variable number.
<i>estimate</i>	Estimate number.

Definition at line 915 of file [optimize.c](#).

```

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->
00927         step[variable];
00928     #if DEBUG_OPTIMIZE
00929     fprintf (stderr, "optimize_estimate_climbing_random: climbing%u=%lg\n",
00930             variable, x);
00931     fprintf (stderr, "optimize_estimate_climbing_random: end\n");
00932     #endif
00933     return x;
00934 }
```



## 4.21.2.8 optimize\_free()

```
void optimize_free ( )
```

Function to free the memory used by the [Optimize](#) struct.

Definition at line 1395 of file [optimize.c](#).

```
01396 {
01397     unsigned int i, j;
01398     #if DEBUG_OPTIMIZE
01399     fprintf (stderr, "optimize_free: start\n");
01400     #endif
01401     for (j = 0; j < optimize->ninputs; ++j)
01402     {
01403         for (i = 0; i < optimize->nexperiments; ++i)
01404             g_mapped_file_unref (optimize->file[j][i]);
01405         g_free (optimize->file[j]);
01406     }
01407     g_free (optimize->error_old);
01408     g_free (optimize->value_old);
01409     g_free (optimize->value);
01410     g_free (optimize->genetic_variable);
01411     #if DEBUG_OPTIMIZE
01412     fprintf (stderr, "optimize_free: end\n");
01413     #endif
01414 }
```

## 4.21.2.9 optimize\_genetic()

```
void optimize_genetic ( )
```

Function to optimize with the genetic algorithm.

Definition at line 1135 of file [optimize.c](#).

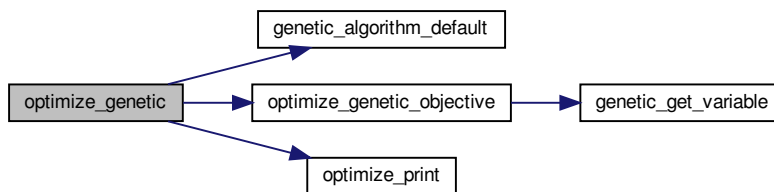
```
01136 {
01137     double *best_variable = NULL;
01138     char *best_genome = NULL;
01139     double best_objective = 0.;
01140     #if DEBUG_OPTIMIZE
01141     fprintf (stderr, "optimize_genetic: start\n");
01142     fprintf (stderr, "optimize_genetic: ntasks=%u nthreads=%u\n", ntasks,
01143             nthreads);
01144     fprintf (stderr,
01145             "optimize_genetic: nvariables=%u population=%u generations=%u\n",
01146             optimize->nvariables, optimize->
01147             nsimulations, optimize->niterations);
01148     fprintf (stderr,
01149             "optimize_genetic: mutation=%lg reproduction=%lg adaptation=%lg\n",
01150             optimize->mutation_ratio, optimize->
01151             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
```

```

01168     = (double *) g_malloc (optimize->nvariables * sizeof (double));
01169     optimize->error_old[0] = best_objective;
01170     memcpy (optimize->value_old, best_variable,
01171            optimize->nvariables * sizeof (double));
01172     g_free (best_genome);
01173     g_free (best_variable);
01174     optimize_print ();
01175     #if DEBUG_OPTIMIZE
01176     fprintf (stderr, "optimize_genetic: end\n");
01177     #endif
01178 }

```

Here is the call graph for this function:



#### 4.21.2.10 optimize\_genetic\_objective()

```

double optimize_genetic_objective (
    Entity * entity )

```

Function to calculate the objective function of an entity.

##### Returns

objective function value.

##### Parameters

<i>entity</i>	entity data.
---------------	--------------

Definition at line 1102 of file [optimize.c](#).

```

01103 {
01104     unsigned int j;
01105     double objective;
01106     char buffer[64];
01107     #if DEBUG_OPTIMIZE
01108     fprintf (stderr, "optimize_genetic_objective: start\n");
01109     #endif
01110     for (j = 0; j < optimize->nvariables; ++j)
01111     {
01112         optimize->value[entity->id * optimize->nvariables + j]
01113         = genetic_get_variable (entity, optimize->genetic_variable + j);
01114     }
01115     objective = optimize_norm (entity->id);

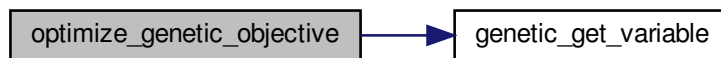
```

```

01116     g_mutex_lock (mutex);
01117     for (j = 0; j < optimize->nvariables; ++j)
01118     {
01119         snprintf (buffer, 64, "%s ", format[optimize->precision[j]]);
01120         fprintf (optimize->file_variables, buffer,
01121                 genetic_get_variable (entity, optimize->genetic_variable + j));
01122     }
01123     fprintf (optimize->file_variables, "%.14le\n", objective);
01124     g_mutex_unlock (mutex);
01125     #if DEBUG_OPTIMIZE
01126     fprintf (stderr, "optimize_genetic_objective: end\n");
01127     #endif
01128     return objective;
01129 }

```

Here is the call graph for this function:



#### 4.21.2.11 optimize\_input()

```

void optimize_input (
    unsigned int simulation,
    char * input,
    GMappedFile * stencil )

```

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 93 of file [optimize.c](#).

```

00096 {
00097     char buffer[32], value[32];
00098     GRegex *regex;
00099     FILE *file;
00100     char *buffer2, *buffer3 = NULL, *content;
00101     gsize length;
00102     unsigned int i;
00103
00104     #if DEBUG_OPTIMIZE
00105     fprintf (stderr, "optimize_input: start\n");
00106     #endif
00107
00108     // Checking the file
00109     if (!stencil)
00110         goto optimize_input_end;

```

```

00111
00112 // Opening stencil
00113 content = g_mapped_file_get_contents (stencil);
00114 length = g_mapped_file_get_length (stencil);
00115 #if DEBUG_OPTIMIZE
00116 fprintf (stderr, "optimize_input: length=%lu\ncontent:\n%s", length, content);
00117 #endif
00118 file = g_fopen (input, "w");
00119
00120 // Parsing stencil
00121 for (i = 0; i < optimize->nvariables; ++i)
00122 {
00123 #if DEBUG_OPTIMIZE
00124 fprintf (stderr, "optimize_input: variable=%u\n", i);
00125 #endif
00126 snprintf (buffer, 32, "@variable%u@", i + 1);
00127 regex = g_regex_new (buffer, (GRegexCompileFlags) 0, (GRegexMatchFlags) 0,
00128 NULL);
00129 if (i == 0)
00130 {
00131 buffer2 = g_regex_replace_literal (regex, content, length, 0,
00132 optimize->label[i],
00133 (GRegexMatchFlags) 0, NULL);
00134 #if DEBUG_OPTIMIZE
00135 fprintf (stderr, "optimize_input: buffer2\n%s", buffer2);
00136 #endif
00137 }
00138 else
00139 {
00140 length = strlen (buffer3);
00141 buffer2 = g_regex_replace_literal (regex, buffer3, length, 0,
00142 optimize->label[i],
00143 (GRegexMatchFlags) 0, NULL);
00144 g_free (buffer3);
00145 }
00146 g_regex_unref (regex);
00147 length = strlen (buffer2);
00148 snprintf (buffer, 32, "@value%u@", i + 1);
00149 regex = g_regex_new (buffer, (GRegexCompileFlags) 0, (GRegexMatchFlags) 0,
00150 NULL);
00151 snprintf (value, 32, format[optimize->precision[i]],
00152 optimize->value[simulation * optimize->
nvariables + i]);
00153 #if DEBUG_OPTIMIZE
00154 fprintf (stderr, "optimize_input: value=%s\n", value);
00155 #endif
00156 #endif
00157 buffer3 = g_regex_replace_literal (regex, buffer2, length, 0, value,
00158 (GRegexMatchFlags) 0, NULL);
00159 g_free (buffer2);
00160 g_regex_unref (regex);
00161 }
00162
00163 // Saving input file
00164 fwrite (buffer3, strlen (buffer3), sizeof (char), file);
00165 g_free (buffer3);
00166 fclose (file);
00167
00168 optimize_input_end:
00169 #if DEBUG_OPTIMIZE
00170 fprintf (stderr, "optimize_input: end\n");
00171 #endif
00172 return;
00173 }

```

#### 4.21.2.12 optimize\_iterate()

```
void optimize_iterate ( )
```

Function to iterate the algorithm.

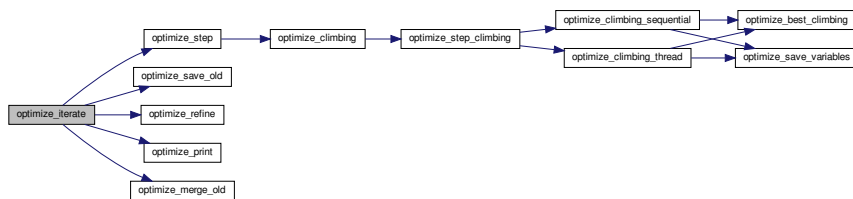
Definition at line 1365 of file [optimize.c](#).

```

01366 {
01367     unsigned int i;
01368     #if DEBUG_OPTIMIZE
01369     fprintf (stderr, "optimize_iterate: start\n");
01370     #endif
01371     optimize->error_old = (double *) g_malloc (optimize->
nbest * sizeof (double));
01372     optimize->value_old =
01373     (double *) g_malloc (optimize->nbest * optimize->
nvariables *
01374     sizeof (double));
01375     optimize_step ();
01376     optimize_save_old ();
01377     optimize_refine ();
01378     optimize_print ();
01379     for (i = 1; i < optimize->niterations && !optimize->
stop; ++i)
01380     {
01381         optimize_step ();
01382         optimize_merge_old ();
01383         optimize_refine ();
01384         optimize_print ();
01385     }
01386     #if DEBUG_OPTIMIZE
01387     fprintf (stderr, "optimize_iterate: end\n");
01388     #endif
01389 }

```

Here is the call graph for this function:



#### 4.21.2.13 optimize\_merge()

```

void optimize_merge (
    unsigned int nsaveds,
    unsigned int * simulation_best,
    double * error_best )

```

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 561 of file [optimize.c](#).

```

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     i = j = k = 0;
00573     do
00574     {
00575         if (i == optimize->nsaveds)
00576         {
00577             s[k] = simulation_best[j];
00578             e[k] = error_best[j];
00579             ++j;
00580             ++k;
00581             if (j == nsaveds)
00582                 break;
00583         }
00584         else if (j == nsaveds)
00585         {
00586             s[k] = optimize->simulation_best[i];
00587             e[k] = optimize->error_best[i];
00588             ++i;
00589             ++k;
00590             if (i == optimize->nsaveds)
00591                 break;
00592         }
00593         else if (optimize->error_best[i] > error_best[j])
00594         {
00595             s[k] = simulation_best[j];
00596             e[k] = error_best[j];
00597             ++j;
00598             ++k;
00599         }
00600         else
00601         {
00602             s[k] = optimize->simulation_best[i];
00603             e[k] = optimize->error_best[i];
00604             ++i;
00605             ++k;
00606         }
00607     }
00608     while (k < optimize->nbest);
00609     optimize->nsaveds = k;
00610     memcpy (optimize->simulation_best, s, k * sizeof (unsigned int));
00611     memcpy (optimize->error_best, e, k * sizeof (double));
00612     #if DEBUG_OPTIMIZE
00613     fprintf (stderr, "optimize_merge: end\n");
00614     #endif
00615 }

```

#### 4.21.2.14 optimize\_merge\_old()

```
void optimize_merge_old ( )
```

Function to merge the best results with the previous step best results on iterative methods.

Definition at line 1216 of file [optimize.c](#).

```

01217 {
01218     unsigned int i, j, k;
01219     double v[optimize->nbest * optimize->nvariables], e[
01220         optimize->nbest],
01221         *enew, *eold;
01222     #if DEBUG_OPTIMIZE
01223     fprintf (stderr, "optimize_merge_old: start\n");
01224     #endif
01225     anew = optimize->error_best;
01226     eold = optimize->error_old;
01227     i = j = k = 0;
01228     do
01229     {
01230         if (*enew < *eold)
01231         {
01232             memcpy (v + k * optimize->nvariables,
01233                 optimize->value
01234                 + optimize->simulation_best[i] *

```

```

    optimize->nvariables,
01234         optimize->nvariables * sizeof (double));
01235     e[k] = *enew;
01236     ++k;
01237     ++enew;
01238     ++i;
01239 }
01240 else
01241 {
01242     memcpy (v + k * optimize->nvariables,
01243             optimize->value_old + j * optimize->
nvariables,
01244             optimize->nvariables * sizeof (double));
01245     e[k] = *eold;
01246     ++k;
01247     ++eold;
01248     ++j;
01249 }
01250 }
01251 while (k < optimize->nbest);
01252 memcpy (optimize->value_old, v, k * optimize->
nvariables * sizeof (double));
01253 memcpy (optimize->error_old, e, k * sizeof (double));
01254 #if DEBUG_OPTIMIZE
01255 fprintf (stderr, "optimize_merge_old: end\n");
01256 #endif
01257 }

```

#### 4.21.2.15 optimize\_MonteCarlo()

```
void optimize_MonteCarlo ( )
```

Function to optimize with the Monte-Carlo algorithm.

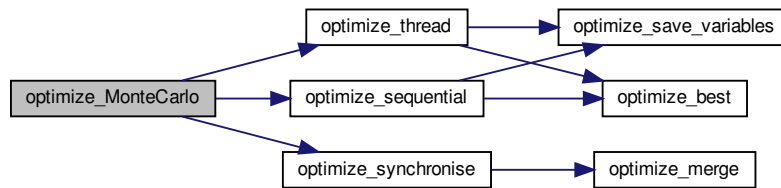
Definition at line 719 of file [optimize.c](#).

```

00720 {
00721     unsigned int i, j;
00722     GThread *thread[nthreads];
00723     ParallelData data[nthreads];
00724 #if DEBUG_OPTIMIZE
00725     fprintf (stderr, "optimize_MonteCarlo: start\n");
00726 #endif
00727     for (i = 0; i < optimize->nsimulations; ++i)
00728         for (j = 0; j < optimize->nvariables; ++j)
00729             optimize->value[i * optimize->nvariables + j]
00730                 = optimize->rangemin[j] + gsl_rng_uniform (optimize->
rng)
00731                     * (optimize->rangemax[j] - optimize->rangemin[j]);
00732     optimize->nsaveds = 0;
00733     if (nthreads <= 1)
00734         optimize_sequential ();
00735     else
00736     {
00737         for (i = 0; i < nthreads; ++i)
00738         {
00739             data[i].thread = i;
00740             thread[i]
00741                 = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00742         }
00743         for (i = 0; i < nthreads; ++i)
00744             g_thread_join (thread[i]);
00745     }
00746 #if HAVE_MPI
00747     // Communicating tasks results
00748     optimize_synchronise ();
00749 #endif
00750 #if DEBUG_OPTIMIZE
00751     fprintf (stderr, "optimize_MonteCarlo: end\n");
00752 #endif
00753 }

```

Here is the call graph for this function:



#### 4.21.2.16 optimize\_norm\_euclidian()

```
double optimize_norm_euclidian (
    unsigned int simulation )
```

Function to calculate the Euclidian error norm.

##### Returns

Euclidian error norm.

##### Parameters

<i>simulation</i>	simulation number.
-------------------	--------------------

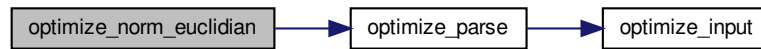
Definition at line 296 of file [optimize.c](#).

```

00297 {
00298     double e, ei;
00299     unsigned int i;
00300     #if DEBUG_OPTIMIZE
00301     fprintf (stderr, "optimize_norm_euclidian: start\n");
00302     #endif
00303     e = 0.;
00304     for (i = 0; i < optimize->nexperiments; ++i)
00305     {
00306         ei = optimize_parse (simulation, i);
00307         e += ei * ei;
00308     }
00309     e = sqrt (e);
00310     #if DEBUG_OPTIMIZE
00311     fprintf (stderr, "optimize_norm_euclidian: error=%lg\n", e);
00312     fprintf (stderr, "optimize_norm_euclidian: end\n");
00313     #endif
00314     return e;
00315 }
```



Here is the call graph for this function:



#### 4.21.2.17 optimize\_norm\_maximum()

```
double optimize_norm_maximum (  
    unsigned int simulation )
```

Function to calculate the maximum error norm.

##### Returns

Maximum error norm.

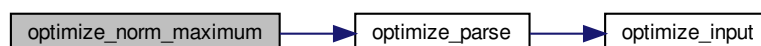
##### Parameters

<i>simulation</i>	simulation number.
-------------------	--------------------

Definition at line 323 of file [optimize.c](#).

```
00324 {  
00325     double e, ei;  
00326     unsigned int i;  
00327     #if DEBUG_OPTIMIZE  
00328     fprintf (stderr, "optimize_norm_maximum: start\n");  
00329     #endif  
00330     e = 0.;  
00331     for (i = 0; i < optimize->nexperiments; ++i)  
00332     {  
00333         ei = fabs (optimize_parse (simulation, i));  
00334         e = fmax (e, ei);  
00335     }  
00336     #if DEBUG_OPTIMIZE  
00337     fprintf (stderr, "optimize_norm_maximum: error=%lg\n", e);  
00338     fprintf (stderr, "optimize_norm_maximum: end\n");  
00339     #endif  
00340     return e;  
00341 }
```

Here is the call graph for this function:



#### 4.21.2.18 optimize\_norm\_p()

```
double optimize_norm_p (
    unsigned int simulation )
```

Function to calculate the P error norm.

##### Returns

P error norm.

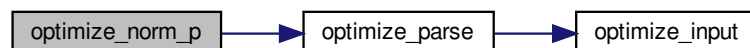
##### Parameters

<i>simulation</i>	simulation number.
-------------------	--------------------

Definition at line 349 of file [optimize.c](#).

```
00350 {
00351     double e, ei;
00352     unsigned int i;
00353     #if DEBUG_OPTIMIZE
00354     fprintf (stderr, "optimize_norm_p: start\n");
00355     #endif
00356     e = 0.;
00357     for (i = 0; i < optimize->nexperiments; ++i)
00358     {
00359         ei = fabs (optimize_parse (simulation, i));
00360         e += pow (ei, optimize->p);
00361     }
00362     e = pow (e, 1. / optimize->p);
00363     #if DEBUG_OPTIMIZE
00364     fprintf (stderr, "optimize_norm_p: error=%lg\n", e);
00365     fprintf (stderr, "optimize_norm_p: end\n");
00366     #endif
00367     return e;
00368 }
```

Here is the call graph for this function:



#### 4.21.2.19 optimize\_norm\_taxicab()

```
double optimize_norm_taxicab (
    unsigned int simulation )
```

Function to calculate the taxicab error norm.

##### Returns

Taxicab error norm.

## Parameters

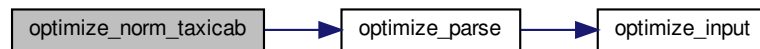
<i>simulation</i>	simulation number.
-------------------	--------------------

Definition at line 376 of file [optimize.c](#).

```

00377 {
00378     double e;
00379     unsigned int i;
00380     #if DEBUG_OPTIMIZE
00381     fprintf (stderr, "optimize_norm_taxicab: start\n");
00382     #endif
00383     e = 0.;
00384     for (i = 0; i < optimize->nexperiments; ++i)
00385         e += fabs (optimize_parse (simulation, i));
00386     #if DEBUG_OPTIMIZE
00387     fprintf (stderr, "optimize_norm_taxicab: error=%lg\n", e);
00388     fprintf (stderr, "optimize_norm_taxicab: end\n");
00389     #endif
00390     return e;
00391 }
```

Here is the call graph for this function:



## 4.21.2.20 optimize\_open()

```
void optimize_open ( )
```

Function to open and perform a optimization.

Definition at line 1420 of file [optimize.c](#).

```

01421 {
01422     GTimeZone *tz;
01423     GDateTime *t0, *t;
01424     unsigned int i, j;
01425
01426     #if DEBUG_OPTIMIZE
01427     char *buffer;
01428     fprintf (stderr, "optimize_open: start\n");
01429     #endif
01430
01431     // Getting initial time
01432     #if DEBUG_OPTIMIZE
01433     fprintf (stderr, "optimize_open: getting initial time\n");
01434     #endif
01435     tz = g_time_zone_new_utc ();
01436     t0 = g_date_time_new_now (tz);
01437
01438     // Obtaining and initing the pseudo-random numbers generator seed
01439     #if DEBUG_OPTIMIZE
01440     fprintf (stderr, "optimize_open: getting initial seed\n");
01441     #endif
01442     if (optimize->seed == DEFAULT_RANDOM_SEED)
```

```

01443     optimize->seed = input->seed;
01444     gsl_rng_set (optimize->rng, optimize->seed);
01445
01446     // Replacing the working directory
01447     #if DEBUG_OPTIMIZE
01448     fprintf (stderr, "optimize_open: replacing the working directory\n");
01449     #endif
01450     g_chdir (input->directory);
01451
01452     // Getting results file names
01453     optimize->result = input->result;
01454     optimize->variables = input->variables;
01455
01456     // Obtaining the simulator file
01457     optimize->simulator = input->simulator;
01458
01459     // Obtaining the evaluator file
01460     optimize->evaluator = input->evaluator;
01461
01462     // Reading the algorithm
01463     optimize->algorithm = input->algorithm;
01464     switch (optimize->algorithm)
01465     {
01466     case ALGORITHM_MONTE_CARLO:
01467         optimize_algorithm = optimize_MonteCarlo;
01468         break;
01469     case ALGORITHM_SWEEP:
01470         optimize_algorithm = optimize_sweep;
01471         break;
01472     case ALGORITHM_ORTHOGONAL:
01473         optimize_algorithm = optimize_orthogonal;
01474         break;
01475     default:
01476         optimize_algorithm = optimize_genetic;
01477         optimize->mutation_ratio = input->
01478         mutation_ratio;
01479         optimize->reproduction_ratio = input->
01480         reproduction_ratio;
01481         optimize->adaptation_ratio = input->
01482         adaptation_ratio;
01483     }
01484     optimize->nvariables = input->nvariables;
01485     optimize->nsimulations = input->nsimulations;
01486     optimize->niterations = input->niterations;
01487     optimize->nbest = input->nbest;
01488     optimize->tolerance = input->tolerance;
01489     optimize->nsteps = input->nsteps;
01490     optimize->nestimates = 0;
01491     optimize->threshold = input->threshold;
01492     optimize->stop = 0;
01493     if (input->nsteps)
01494     {
01495         optimize->relaxation = input->relaxation;
01496         switch (input->climbing)
01497         {
01498         case CLIMBING_METHOD_COORDINATES:
01499             optimize->nestimates = 2 * optimize->
01500             nvariables;
01501             optimize_estimate_climbing =
01502             optimize_estimate_climbing_coordinates;
01503             break;
01504         default:
01505             optimize->nestimates = input->nestimates;
01506             optimize_estimate_climbing =
01507             optimize_estimate_climbing_random;
01508         }
01509     }
01510
01511     #if DEBUG_OPTIMIZE
01512     fprintf (stderr, "optimize_open: nbest=%u\n", optimize->nbest);
01513     #endif
01514     optimize->simulation_best
01515     = (unsigned int *) alloca (optimize->nbest * sizeof (unsigned int));
01516     optimize->error_best = (double *) alloca (optimize->
01517     nbest * sizeof (double));
01518
01519     // Reading the experimental data
01520     #if DEBUG_OPTIMIZE
01521     buffer = g_get_current_dir ();
01522     fprintf (stderr, "optimize_open: current directory=%s\n", buffer);
01523     g_free (buffer);
01524     #endif
01525     optimize->nexperiments = input->nexperiments;
01526     optimize->ninputs = input->experiment->ninputs;
01527     optimize->experiment
01528     = (char **) alloca (input->nexperiments * sizeof (char *));
01529     optimize->weight = (double *) alloca (input->nexperiments * sizeof (double)

```

```

    ));
01523     for (i = 0; i < input->experiment->ninputs; ++i)
01524         optimize->file[i] = (GMappedFile **)
01525             g_malloc (input->nexperiments * sizeof (GMappedFile *));
01526     for (i = 0; i < input->nexperiments; ++i)
01527     {
01528 #if DEBUG_OPTIMIZE
01529         fprintf (stderr, "optimize_open: i=%u\n", i);
01530 #endif
01531         optimize->experiment[i] = input->experiment[i].
01532             name;
01533         optimize->weight[i] = input->experiment[i].
01534             weight;
01535 #if DEBUG_OPTIMIZE
01536         fprintf (stderr, "optimize_open: experiment=%s weight=%lg\n",
01537             optimize->experiment[i], optimize->
01538             weight[i]);
01539 #endif
01540         for (j = 0; j < input->experiment->ninputs; ++j)
01541         {
01542 #if DEBUG_OPTIMIZE
01543             fprintf (stderr, "optimize_open: stencil%u\n", j + 1);
01544 #endif
01545             optimize->file[j][i]
01546                 = g_mapped_file_new (input->experiment[i].stencil[j], 0, NULL);
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].
01568             rangemin;
01569         optimize->rangeminabs[i] = input->variable[i].
01570             rangeminabs;
01571         optimize->rangemax[i] = input->variable[i].
01572             rangemax;
01573         optimize->rangemaxabs[i] = input->variable[i].
01574             rangemaxabs;
01575         optimize->precision[i] = input->variable[i].
01576             precision;
01577         optimize->step[i] = input->variable[i].step;
01578         optimize->nsweeps[i] = input->variable[i].
01579             nsweeps;
01580         optimize->nbits[i] = input->variable[i].nbits;
01581     }
01582     if (input->algorithm == ALGORITHM_SWEEP
01583         || input->algorithm == ALGORITHM_ORTHOGONAL)
01584     {
01585         optimize->nsimulations = 1;
01586         for (i = 0; i < input->nvariables; ++i)
01587         {
01588             optimize->nsimulations *= optimize->
01589                 nsweeps[i];
01590 #if DEBUG_OPTIMIZE
01591             fprintf (stderr, "optimize_open: nsweeps=%u nsimulations=%u\n",
01592                 optimize->nsweeps[i], optimize->
01593                 nsimulations);
01594 #endif
01595         }
01596     }
01597     if (optimize->nsteps)
01598         optimize->climbing
01599             = (double *) alloca (optimize->nvariables * sizeof (double));
01600     // Setting error norm
01601     switch (input->norm)
01602     {
01603     case ERROR_NORM_EUCLIDIAN:
01604         optimize_norm = optimize_norm_euclidian;
01605         break;
01606     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     // Allocating values
01609     #if DEBUG_OPTIMIZE
01610     fprintf (stderr, "optimize_open: allocating variables\n");
01611     fprintf (stderr, "optimize_open: nvariables=%u algorithm=%u\n",
01612             optimize->nvariables, optimize->algorithm);
01613     #endif
01614     optimize->genetic_variable = NULL;
01615     if (optimize->algorithm == ALGORITHM_GENETIC)
01616     {
01617         optimize->genetic_variable = (GeneticVariable *)
01618             g_malloc (optimize->nvariables * sizeof (
01619             GeneticVariable));
01620         for (i = 0; i < optimize->nvariables; ++i)
01621         {
01622             #if DEBUG_OPTIMIZE
01623             fprintf (stderr, "optimize_open: i=%u min=%lg max=%lg nbits=%u\n",
01624                     i, optimize->rangemin[i], optimize->
01625                     rangemax[i], optimize->nbits[i]);
01626             #endif
01627             optimize->genetic_variable[i].minimum =
01628                 optimize->rangemin[i];
01629             optimize->genetic_variable[i].maximum =
01630                 optimize->rangemax[i];
01631             optimize->genetic_variable[i].nbits = optimize->
01632                 nbits[i];
01633         }
01634     }
01635     #if DEBUG_OPTIMIZE
01636     fprintf (stderr, "optimize_open: nvariables=%u nsimulations=%u\n",
01637             optimize->nvariables, optimize->
01638             nsimulations);
01639     #endif
01640     optimize->value = (double *)
01641         g_malloc ((optimize->nsimulations
01642             + optimize->nestimates * optimize->
01643             nsteps)
01644             * optimize->nvariables * sizeof (double));
01645
01646     // Calculating simulations to perform for each task
01647     #if HAVE_MPI
01648     #if DEBUG_OPTIMIZE
01649     fprintf (stderr, "optimize_open: rank=%u ntasks=%u\n",
01650             optimize->mpi_rank, ntasks);
01651     #endif
01652     #endif
01653     optimize->nstart = optimize->mpi_rank * optimize->
01654         nsimulations / ntasks;
01655     optimize->nend = (1 + optimize->mpi_rank) *
01656         optimize->nsimulations / ntasks;
01657     if (optimize->nsteps)
01658     {
01659         optimize->nstart_climbing
01660             = optimize->mpi_rank * optimize->nestimates /
01661             ntasks;
01662         optimize->nend_climbing
01663             = (1 + optimize->mpi_rank) * optimize->
01664             nestimates / ntasks;
01665     }
01666     #else
01667     optimize->nstart = 0;
01668     optimize->nend = optimize->nsimulations;
01669     if (optimize->nsteps)
01670     {
01671         optimize->nstart_climbing = 0;
01672         optimize->nend_climbing = optimize->
01673             nestimates;
01674     }
01675     #endif
01676     #if DEBUG_OPTIMIZE
01677     fprintf (stderr, "optimize_open: nstart=%u nend=%u\n", optimize->
01678         nstart,
01679         optimize->nend);
01680     #endif
01681
01682     // Calculating simulations to perform for each thread
01683     optimize->thread
01684         = (unsigned int *) alloca ((1 + nthreads) * sizeof (unsigned int));

```

Here is the call graph for this function:



## 4.21.2.21 optimize\_orthogonal()

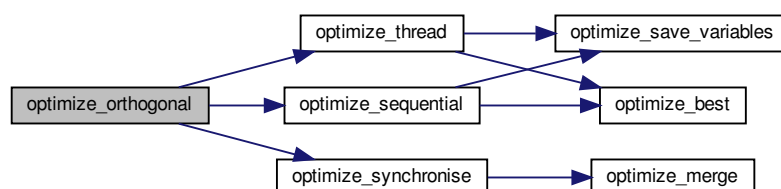
```
void optimize_orthogonal ( )
```

Function to optimize with the orthogonal sampling algorithm.

Definition at line 759 of file [optimize.c](#).

```
00760 {
00761     unsigned int i, j, k, l;
00762     double e;
00763     GThread *thread[nthreads];
00764     ParallelData data[nthreads];
00765     #if DEBUG_OPTIMIZE
00766     fprintf (stderr, "optimize_orthogonal: start\n");
00767     #endif
00768     for (i = 0; i < optimize->nsimulations; ++i)
00769     {
00770         k = i;
00771         for (j = 0; j < optimize->nvariables; ++j)
00772         {
00773             l = k % optimize->nsweeps[j];
00774             k /= optimize->nsweeps[j];
00775             e = optimize->rangemin[j];
00776             if (optimize->nsweeps[j] > 1)
00777                 e += (l + gsl_rng_uniform (optimize->rng))
00778                     * (optimize->rangemax[j] - optimize->
00779                        rangemin[j])
00780                     / optimize->nsweeps[j];
00781             optimize->value[i * optimize->nvariables + j] = e;
00782         }
00783         optimize->nsaveds = 0;
00784         if (nthreads <= 1)
00785             optimize_sequential ();
00786         else
00787         {
00788             for (i = 0; i < nthreads; ++i)
00789             {
00790                 data[i].thread = i;
00791                 thread[i]
00792                     = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00793             }
00794             for (i = 0; i < nthreads; ++i)
00795                 g_thread_join (thread[i]);
00796         }
00797         #if HAVE_MPI
00798         // Communicating tasks results
00799         optimize_synchronise ();
00800         #endif
00801         #if DEBUG_OPTIMIZE
00802         fprintf (stderr, "optimize_orthogonal: end\n");
00803         #endif
00804     }
```

Here is the call graph for this function:





## 4.21.2.22 optimize\_parse()

```
double optimize_parse (
    unsigned int simulation,
    unsigned int experiment )
```

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 182 of file [optimize.c](#).

```
00184 {
00185     unsigned int i;
00186     double e;
00187     char buffer[512], input[MAX_NINPUTS][32], output[32], result[32], *buffer2,
00188         *buffer3, *buffer4;
00189     FILE *file_result;
00190
00191     #if DEBUG_OPTIMIZE
00192         fprintf (stderr, "optimize_parse: start\n");
00193         fprintf (stderr, "optimize_parse: simulation=%u experiment=%u\n",
00194             simulation, experiment);
00195     #endif
00196
00197     // Opening input files
00198     for (i = 0; i < optimize->ninputs; ++i)
00199     {
00200         snprintf (&input[i][0], 32, "input-%u-%u-%u", i, simulation, experiment);
00201     #if DEBUG_OPTIMIZE
00202         fprintf (stderr, "optimize_parse: i=%u input=%s\n", i, &input[i][0]);
00203     #endif
00204         optimize_input (simulation, &input[i][0], optimize->
00205             file[i][experiment]);
00206     }
00207     for (; i < MAX_NINPUTS; ++i)
00208         strcpy (&input[i][0], "");
00209     #if DEBUG_OPTIMIZE
00210         fprintf (stderr, "optimize_parse: parsing end\n");
00211     #endif
00212
00213     // Performing the simulation
00214     snprintf (output, 32, "output-%u-%u", simulation, experiment);
00215     buffer2 = g_path_get_dirname (optimize->simulator);
00216     buffer3 = g_path_get_basename (optimize->simulator);
00217     buffer4 = g_build_filename (buffer2, buffer3, NULL);
00218     snprintf (buffer, 512, "\\\"%s\" %s %s %s %s %s %s %s %s %s",
00219         buffer4, input[0], input[1], input[2], input[3], input[4],
00220         input[5], input[6], input[7], output);
00221     g_free (buffer4);
00222     g_free (buffer3);
00223     g_free (buffer2);
00224     #if DEBUG_OPTIMIZE
00225         fprintf (stderr, "optimize_parse: %s\n", buffer);
00226     #endif
00227     if (system (buffer) == -1)
00228         error_message = buffer;
00229
00230     // Checking the objective value function
00231     if (optimize->evaluator)
00232     {
00233         snprintf (result, 32, "result-%u-%u", simulation, experiment);
00234         buffer2 = g_path_get_dirname (optimize->evaluator);
00235         buffer3 = g_path_get_basename (optimize->evaluator);
00236         buffer4 = g_build_filename (buffer2, buffer3, NULL);
```

```

00236     snprintf (buffer, 512, "\"%s\" %s %s %s",
00237               buffer4, output, optimize->experiment[experiment], result);
00238     g_free (buffer4);
00239     g_free (buffer3);
00240     g_free (buffer2);
00241 #if DEBUG_OPTIMIZE
00242     fprintf (stderr, "optimize_parse: %s\n", buffer);
00243     fprintf (stderr, "optimize_parse: result=%s\n", result);
00244 #endif
00245     if (system (buffer) == -1)
00246         error_message = buffer;
00247     file_result = g_fopen (result, "r");
00248     e = atof (fgets (buffer, 512, file_result));
00249     fclose (file_result);
00250 }
00251 else
00252 {
00253 #if DEBUG_OPTIMIZE
00254     fprintf (stderr, "optimize_parse: output=%s\n", output);
00255 #endif
00256     strcpy (result, "");
00257     file_result = g_fopen (output, "r");
00258     e = atof (fgets (buffer, 512, file_result));
00259     fclose (file_result);
00260 }
00261 // Removing files
00262 #if !DEBUG_OPTIMIZE
00263     for (i = 0; i < optimize->ninputs; ++i)
00264     {
00265         if (optimize->file[i][0])
00266         {
00267             snprintf (buffer, 512, RM " %s", &input[i][0]);
00268             if (system (buffer) == -1)
00269                 error_message = buffer;
00270         }
00271     }
00272     snprintf (buffer, 512, RM " %s %s", output, result);
00273     if (system (buffer) == -1)
00274         error_message = buffer;
00275 #endif
00276 // Processing pending events
00277 if (show_pending)
00278     show_pending ();
00279 #if DEBUG_OPTIMIZE
00280     fprintf (stderr, "optimize_parse: end\n");
00281 #endif
00282 // Returning the objective function
00283 return e * optimize->weight[experiment];
00284 }

```

Here is the call graph for this function:



#### 4.21.2.23 optimize\_print()

```
void optimize_print ( )
```

Function to print the results.

Definition at line 397 of file [optimize.c](#).

```

00398 {
00399     unsigned int i;
00400     char buffer[512];
00401     #if HAVE_MPI
00402     if (optimize->mpi_rank)
00403         return;
00404     #endif
00405     printf ("%s\n", _("Best result"));
00406     fprintf (optimize->file_result, "%s\n", _("Best result"));
00407     printf ("error = %.15le\n", optimize->error_old[0]);
00408     fprintf (optimize->file_result, "error = %.15le\n",
optimize->error_old[0]);
00409     for (i = 0; i < optimize->nvariables; ++i)
00410     {
00411         snprintf (buffer, 512, "%s = %s\n",
optimize->label[i], format[optimize->
precision[i]]);
00413         printf (buffer, optimize->value_old[i]);
00414         fprintf (optimize->file_result, buffer, optimize->
value_old[i]);
00415     }
00416     fflush (optimize->file_result);
00417 }

```

#### 4.21.2.24 optimize\_refine()

```
void optimize_refine ( )
```

Function to refine the search ranges of the variables in iterative algorithms.

Definition at line 1264 of file [optimize.c](#).

```

01265 {
01266     unsigned int i, j;
01267     double d;
01268     #if HAVE_MPI
01269     MPI_Status mpi_stat;
01270     #endif
01271     #if DEBUG_OPTIMIZE
01272     fprintf (stderr, "optimize_refine: start\n");
01273     #endif
01274     #if HAVE_MPI
01275     if (!optimize->mpi_rank)
01276     {
01277     #endif
01278         for (j = 0; j < optimize->nvariables; ++j)
01279         {
01280             optimize->rangemin[j] = optimize->rangemax[j]
= optimize->value_old[j];
01282         }
01283         for (i = 0; ++i < optimize->nbest; )
01284         {
01285             for (j = 0; j < optimize->nvariables; ++j)
01286             {
01287                 optimize->rangemin[j]
= fmin (optimize->rangemin[j],
optimize->value_old[i * optimize->
nvariables + j]);
01290                 optimize->rangemax[j]
= fmax (optimize->rangemax[j],
optimize->value_old[i * optimize->
nvariables + j]);
01293             }
01294         }
01295         for (j = 0; j < optimize->nvariables; ++j)
01296         {
01297             d = optimize->tolerance
* (optimize->rangemax[j] - optimize->
rangemin[j]);
01299             switch (optimize->algorithm)
01300             {
01301             case ALGORITHM_MONTE_CARLO:
01302                 d *= 0.5;
01303                 break;
01304             default:

```

```

01305         if (optimize->nsweeps[j] > 1)
01306             d /= optimize->nsweeps[j] - 1;
01307         else
01308             d = 0.;
01309     }
01310     optimize->rangemin[j] -= d;
01311     optimize->rangemin[j]
01312     = fmax (optimize->rangemin[j], optimize->
rangeminabs[j]);
01313     optimize->rangemax[j] += d;
01314     optimize->rangemax[j]
01315     = fmin (optimize->rangemax[j], optimize->
rangemaxabs[j]);
01316     printf ("%s min=%lg max=%lg\n", optimize->label[j],
optimize->rangemin[j], optimize->
rangemax[j]);
01317     fprintf (optimize->file_result, "%s min=%lg max=%lg\n",
optimize->label[j], optimize->rangemin[j],
optimize->rangemax[j]);
01318 }
01319 #if HAVE_MPI
01320 for (i = 1; (int) i < ntasks; ++i)
01321 {
01322     MPI_Send (optimize->rangemin, optimize->
nvariables, MPI_DOUBLE, i,
01323              1, MPI_COMM_WORLD);
01324     MPI_Send (optimize->rangemax, optimize->
nvariables, MPI_DOUBLE, i,
01325              1, MPI_COMM_WORLD);
01326 }
01327 }
01328 else
01329 {
01330     MPI_Recv (optimize->rangemin, optimize->nvariables, MPI_DOUBLE, 0,
01331              1,
01332              MPI_COMM_WORLD, &mpi_stat);
01333     MPI_Recv (optimize->rangemax, optimize->nvariables, MPI_DOUBLE, 0,
01334              1,
01335              MPI_COMM_WORLD, &mpi_stat);
01336 }
01337 }
01338 #endif
01339 #if DEBUG_OPTIMIZE
01340 fprintf (stderr, "optimize_refine: end\n");
01341 #endif
01342 }

```

#### 4.21.2.25 optimize\_save\_old()

```
void optimize_save_old ( )
```

Function to save the best results on iterative methods.

Definition at line 1184 of file [optimize.c](#).

```

01185 {
01186     unsigned int i, j;
01187     #if DEBUG_OPTIMIZE
01188     fprintf (stderr, "optimize_save_old: start\n");
01189     fprintf (stderr, "optimize_save_old: nsaveds=%u\n", optimize->nsaveds);
01190     #endif
01191     memcpy (optimize->error_old, optimize->error_best,
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,
optimize->nvariables * sizeof (double));
01200     }
01201     #if DEBUG_OPTIMIZE
01202     for (i = 0; i < optimize->nvariables; ++i)
01203     fprintf (stderr, "optimize_save_old: best variable %u=%lg\n",
01204             i, optimize->value_old[i]);
01205     fprintf (stderr, "optimize_save_old: end\n");
01206     #endif
01207 }

```

## 4.21.2.26 optimize\_save\_variables()

```
void optimize_save_variables (
    unsigned int simulation,
    double error )
```

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 423 of file [optimize.c](#).

```
00425 {
00426     unsigned int i;
00427     char buffer[64];
00428     #if DEBUG_OPTIMIZE
00429     fprintf (stderr, "optimize_save_variables: start\n");
00430     #endif
00431     for (i = 0; i < optimize->nvariables; ++i)
00432     {
00433         snprintf (buffer, 64, "%s ", format[optimize->precision[i]]);
00434         fprintf (optimize->file_variables, buffer,
00435                 optimize->value[simulation * optimize->
nvariables + i]);
00436     }
00437     fprintf (optimize->file_variables, "%.14le\n", error);
00438     fflush (optimize->file_variables);
00439     #if DEBUG_OPTIMIZE
00440     fprintf (stderr, "optimize_save_variables: end\n");
00441     #endif
00442 }
```

## 4.21.2.27 optimize\_sequential()

```
void optimize_sequential ( )
```

Function to optimize sequentially.

Definition at line 489 of file [optimize.c](#).

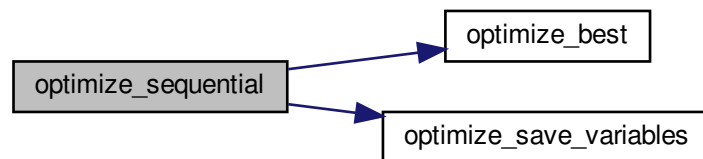
```
00490 {
00491     unsigned int i;
00492     double e;
00493     #if DEBUG_OPTIMIZE
00494     fprintf (stderr, "optimize_sequential: start\n");
00495     fprintf (stderr, "optimize_sequential: nstart=%u nend=%u\n",
00496             optimize->nstart, optimize->nend);
00497     #endif
00498     for (i = optimize->nstart; i < optimize->nend; ++i)
00499     {
00500         e = optimize_norm (i);
00501         optimize_best (i, e);
00502         optimize_save_variables (i, e);
00503         if (e < optimize->threshold)
00504         {
00505             optimize->stop = 1;
```

```

00506         break;
00507     }
00508     #if DEBUG_OPTIMIZE
00509     fprintf (stderr, "optimize_sequential: i=%u e=%lg\n", i, e);
00510     #endif
00511 }
00512 #if DEBUG_OPTIMIZE
00513 fprintf (stderr, "optimize_sequential: end\n");
00514 #endif
00515 }

```

Here is the call graph for this function:



#### 4.21.2.28 optimize\_step()

```
void optimize_step ( )
```

Function to do a step of the iterative algorithm.

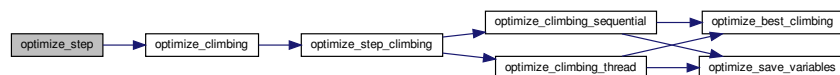
Definition at line 1348 of file `optimize.c`.

```

01349 {
01350     #if DEBUG_OPTIMIZE
01351     fprintf (stderr, "optimize_step: start\n");
01352     #endif
01353     optimize_algorithm ();
01354     if (optimize->nsteps)
01355         optimize_climbing ();
01356     #if DEBUG_OPTIMIZE
01357     fprintf (stderr, "optimize_step: end\n");
01358     #endif
01359 }

```

Here is the call graph for this function:



#### 4.21.2.29 optimize\_step\_climbing()

```
void optimize_step_climbing (
    unsigned int simulation )
```

Function to do a step of the hill climbing method.

## Parameters

<i>simulation</i>	Simulation number.
-------------------	--------------------

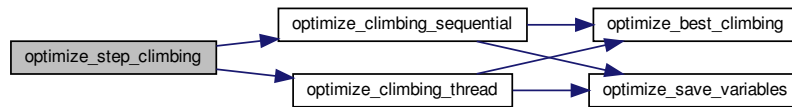
Definition at line 969 of file `optimize.c`.

```

00970 {
00971     GThread *thread[nthreads_climbing];
00972     ParallelData data[nthreads_climbing];
00973     unsigned int i, j, k, b;
00974     #if DEBUG_OPTIMIZE
00975     fprintf (stderr, "optimize_step_climbing: start\n");
00976     #endif
00977     for (i = 0; i < optimize->nestimates; ++i)
00978     {
00979         k = (simulation + i) * optimize->nvariables;
00980         b = optimize->simulation_best[0] * optimize->
nvariables;
00981     #if DEBUG_OPTIMIZE
00982         fprintf (stderr, "optimize_step_climbing: simulation=%u best=%u\n",
00983                 simulation + i, optimize->simulation_best[0]);
00984     #endif
00985         for (j = 0; j < optimize->nvariables; ++j, ++k, ++b)
00986         {
00987             #if DEBUG_OPTIMIZE
00988             fprintf (stderr,
00989                     "optimize_step_climbing: estimate=%u best=%u=%.14le\n",
00990                     i, j, optimize->value[b]);
00991             #endif
00992             optimize->value[k]
00993             = optimize->value[b] + optimize_estimate_climbing (j, i)
;
00994             optimize->value[k] = fmin (fmax (optimize->value[k],
00995                                             optimize->rangeminabs[j]),
00996                                       optimize->rangemaxabs[j]);
00997             #if DEBUG_OPTIMIZE
00998             fprintf (stderr,
00999                     "optimize_step_climbing: estimate=%u variable%u=%.14le\n",
01000                     i, j, optimize->value[k]);
01001             #endif
01002         }
01003     }
01004     if (nthreads_climbing == 1)
01005         optimize_climbing_sequential (simulation);
01006     else
01007     {
01008         for (i = 0; i <= nthreads_climbing; ++i)
01009         {
01010             optimize->thread_climbing[i]
01011             = simulation + optimize->nstart_climbing
01012             + i * (optimize->nend_climbing - optimize->
nstart_climbing)
01013             / nthreads_climbing;
01014             #if DEBUG_OPTIMIZE
01015             fprintf (stderr,
01016                     "optimize_step_climbing: i=%u thread_climbing=%u\n",
01017                     i, optimize->thread_climbing[i]);
01018             #endif
01019         }
01020         for (i = 0; i < nthreads_climbing; ++i)
01021         {
01022             data[i].thread = i;
01023             thread[i] = g_thread_new
01024             (NULL, (GThreadFunc) optimize_climbing_thread, &data[i]);
01025         }
01026         for (i = 0; i < nthreads_climbing; ++i)
01027             g_thread_join (thread[i]);
01028     }
01029     #if DEBUG_OPTIMIZE
01030     fprintf (stderr, "optimize_step_climbing: end\n");
01031     #endif
01032 }

```

Here is the call graph for this function:



#### 4.21.2.30 optimize\_sweep()

```
void optimize_sweep ( )
```

Function to optimize with the sweep algorithm.

Definition at line 669 of file `optimize.c`.

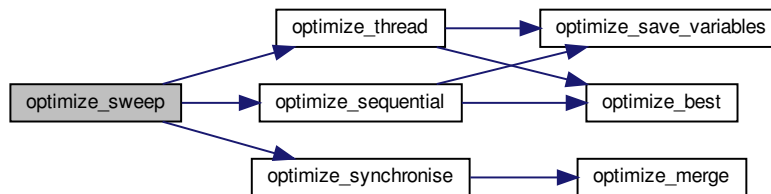
```

00670 {
00671     unsigned int i, j, k, l;
00672     double e;
00673     GThread *thread[nthreads];
00674     ParallelData data[nthreads];
00675     #if DEBUG_OPTIMIZE
00676         fprintf (stderr, "optimize_sweep: start\n");
00677     #endif
00678     for (i = 0; i < optimize->nsimulations; ++i)
00679     {
00680         k = i;
00681         for (j = 0; j < optimize->nvariables; ++j)
00682         {
00683             l = k % optimize->nsweeps[j];
00684             k /= optimize->nsweeps[j];
00685             e = optimize->rangemin[j];
00686             if (optimize->nsweeps[j] > 1)
00687                 e += l * (optimize->rangemax[j] - optimize->
rangemin[j])
00688                     / (optimize->nsweeps[j] - 1);
00689             optimize->value[i * optimize->nvariables + j] = e;
00690         }
00691     }
00692     optimize->nsaveds = 0;
00693     if (nthreads <= 1)
00694         optimize_sequential ();
00695     else
00696     {
00697         for (i = 0; i < nthreads; ++i)
00698         {
00699             data[i].thread = i;
00700             thread[i]
= g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00702         }
00703         for (i = 0; i < nthreads; ++i)
00704             g_thread_join (thread[i]);
00705     }
00706     #if HAVE_MPI
00707         // Communicating tasks results
00708         optimize_synchronise ();
00709     #endif
00710     #if DEBUG_OPTIMIZE
00711         fprintf (stderr, "optimize_sweep: end\n");
00712     #endif
00713 }

```



Here is the call graph for this function:



#### 4.21.2.31 optimize\_synchronise()

```
void optimize_synchronise ( )
```

Function to synchronise the optimization results of MPI tasks.

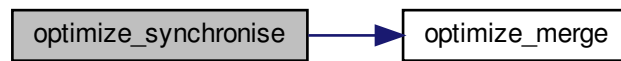
Definition at line 622 of file [optimize.c](#).

```

00623 {
00624     unsigned int i, nsaveds, simulation_best[optimize->nbest], stop;
00625     double error_best[optimize->nbest];
00626     MPI_Status mpi_stat;
00627     #if DEBUG_OPTIMIZE
00628     fprintf (stderr, "optimize_synchronise: start\n");
00629     #endif
00630     if (optimize->mpi_rank == 0)
00631     {
00632         for (i = 1; (int) i < ntasks; ++i)
00633         {
00634             MPI_Recv (&nsaveds, 1, MPI_INT, i, 1, MPI_COMM_WORLD, &mpi_stat);
00635             MPI_Recv (simulation_best, nsaveds, MPI_INT, i, 1,
00636                     MPI_COMM_WORLD, &mpi_stat);
00637             MPI_Recv (error_best, nsaveds, MPI_DOUBLE, i, 1,
00638                     MPI_COMM_WORLD, &mpi_stat);
00639             optimize_merge (nsaveds, simulation_best, error_best);
00640             MPI_Recv (&stop, 1, MPI_UNSIGNED, i, 1, MPI_COMM_WORLD, &mpi_stat);
00641             if (stop)
00642                 optimize->stop = 1;
00643         }
00644         for (i = 1; (int) i < ntasks; ++i)
00645             MPI_Send (&optimize->stop, 1, MPI_UNSIGNED, i, 1, MPI_COMM_WORLD);
00646     }
00647     else
00648     {
00649         MPI_Send (&optimize->nsaveds, 1, MPI_INT, 0, 1, MPI_COMM_WORLD);
00650         MPI_Send (optimize->simulation_best, optimize->
00651                 nsaveds, MPI_INT, 0, 1,
00652                 MPI_COMM_WORLD);
00653         MPI_Send (optimize->error_best, optimize->
00654                 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 }

```

Here is the call graph for this function:



#### 4.21.2.32 optimize\_thread()

```
void* optimize_thread (
    ParallelData * data )
```

Function to optimize on a thread.

##### Returns

NULL.

##### Parameters

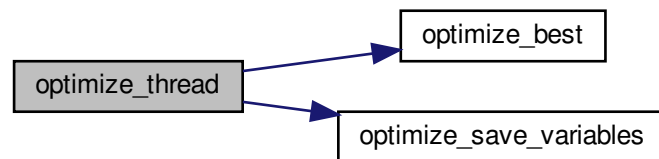
<i>data</i>	Function data.
-------------	----------------

Definition at line 523 of file [optimize.c](#).

```

00524 {
00525     unsigned int i, thread;
00526     double e;
00527     #if DEBUG_OPTIMIZE
00528     fprintf (stderr, "optimize_thread: start\n");
00529     #endif
00530     thread = data->thread;
00531     #if DEBUG_OPTIMIZE
00532     fprintf (stderr, "optimize_thread: thread=%u start=%u end=%u\n", thread,
00533             optimize->thread[thread], optimize->thread[thread + 1]);
00534     #endif
00535     for (i = optimize->thread[thread]; i < optimize->thread[thread + 1]; ++i)
00536     {
00537         e = optimize_norm (i);
00538         g_mutex_lock (mutex);
00539         optimize_best (i, e);
00540         optimize_save_variables (i, e);
00541         if (e < optimize->threshold)
00542             optimize->stop = 1;
00543         g_mutex_unlock (mutex);
00544         if (optimize->stop)
00545             break;
00546     #if DEBUG_OPTIMIZE
00547     fprintf (stderr, "optimize_thread: i=%u e=%lg\n", i, e);
00548     #endif
00549     }
00550     #if DEBUG_OPTIMIZE
00551     fprintf (stderr, "optimize_thread: end\n");
00552     #endif
00553     g_thread_exit (NULL);
00554     return NULL;
00555 }
```

Here is the call graph for this function:



## 4.22 optimize.c

```

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 2012-2018, 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 <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 "genetic/genetic.h"
00054 #include "utils.h"
00055 #include "experiment.h"
00056 #include "variable.h"
00057 #include "input.h"

```

```

00064 #include "optimize.h"
00065
00066 #define DEBUG_OPTIMIZE 0
00067
00068
00072 #ifdef G_OS_WIN32
00073 #define RM "del"
00074 #else
00075 #define RM "rm"
00076 #endif
00077
00078 unsigned int nthreads_climbing;
00080 void (*optimize_algorithm) ();
00082 double (*optimize_estimate_climbing) (unsigned int variable,
00083                                       unsigned int estimate);
00085 double (*optimize_norm) (unsigned int simulation);
00087 Optimize optimize[1];
00088
00092 void
00093 optimize_input (unsigned int simulation,
00094                char *input,
00095                GMappedFile * stencil)
00096 {
00097     char buffer[32], value[32];
00098     GRegex *regex;
00099     FILE *file;
00100     char *buffer2, *buffer3 = NULL, *content;
00101     gsize length;
00102     unsigned int i;
00103
00104     #if DEBUG_OPTIMIZE
00105     fprintf (stderr, "optimize_input: start\n");
00106     #endif
00107
00108     // Checking the file
00109     if (!stencil)
00110         goto optimize_input_end;
00111
00112     // Opening stencil
00113     content = g_mapped_file_get_contents (stencil);
00114     length = g_mapped_file_get_length (stencil);
00115     #if DEBUG_OPTIMIZE
00116     fprintf (stderr, "optimize_input: length=%lu\ncontent:\n%s", length, content);
00117     #endif
00118     file = g_fopen (input, "w");
00119
00120     // Parsing stencil
00121     for (i = 0; i < optimize->nvariables; ++i)
00122     {
00123         #if DEBUG_OPTIMIZE
00124         fprintf (stderr, "optimize_input: variable=%u\n", i);
00125         #endif
00126         snprintf (buffer, 32, "@variable%u@", i + 1);
00127         regex = g_regex_new (buffer, (GRegexCompileFlags) 0, (GRegexMatchFlags) 0,
00128                             NULL);
00129         if (i == 0)
00130         {
00131             buffer2 = g_regex_replace_literal (regex, content, length, 0,
00132                                               optimize->label[i],
00133                                               (GRegexMatchFlags) 0, NULL);
00134             #if DEBUG_OPTIMIZE
00135             fprintf (stderr, "optimize_input: buffer2\n%s", buffer2);
00136             #endif
00137         }
00138         else
00139         {
00140             length = strlen (buffer3);
00141             buffer2 = g_regex_replace_literal (regex, buffer3, length, 0,
00142                                               optimize->label[i],
00143                                               (GRegexMatchFlags) 0, NULL);
00144             g_free (buffer3);
00145         }
00146         g_regex_unref (regex);
00147         length = strlen (buffer2);
00148         snprintf (buffer, 32, "@value%u@", i + 1);
00149         regex = g_regex_new (buffer, (GRegexCompileFlags) 0, (GRegexMatchFlags) 0,
00150                             NULL);
00151         snprintf (value, 32, format[optimize->precision[i]],
00152                 optimize->value[simulation * optimize->nvariables + i]);
00153
00154         #if DEBUG_OPTIMIZE
00155         fprintf (stderr, "optimize_input: value=%s\n", value);
00156         #endif
00157         buffer3 = g_regex_replace_literal (regex, buffer2, length, 0, value,
00158                                           (GRegexMatchFlags) 0, NULL);
00159         g_free (buffer2);
00160         g_regex_unref (regex);

```

```

00161     }
00162
00163     // Saving input file
00164     fwrite (buffer3, strlen (buffer3), sizeof (char), file);
00165     g_free (buffer3);
00166     fclose (file);
00167
00168     optimize_input_end:
00169     #if DEBUG_OPTIMIZE
00170     fprintf (stderr, "optimize_input: end\n");
00171     #endif
00172     return;
00173 }
00174
00181 double
00182 optimize_parse (unsigned int simulation,
00183                 unsigned int experiment)
00184 {
00185     unsigned int i;
00186     double e;
00187     char buffer[512], input[MAX_NINPUTS][32], output[32], result[32], *buffer2,
00188         *buffer3, *buffer4;
00189     FILE *file_result;
00190
00191     #if DEBUG_OPTIMIZE
00192     fprintf (stderr, "optimize_parse: start\n");
00193     fprintf (stderr, "optimize_parse: simulation=%u experiment=%u\n",
00194             simulation, experiment);
00195     #endif
00196
00197     // Opening input files
00198     for (i = 0; i < optimize->ninputs; ++i)
00199     {
00200         snprintf (&input[i][0], 32, "input-%u-%u-%u", i, simulation, experiment);
00201         #if DEBUG_OPTIMIZE
00202         fprintf (stderr, "optimize_parse: i=%u input=%s\n", i, &input[i][0]);
00203         #endif
00204         optimize_input (simulation, &input[i][0], optimize->file[i][experiment]);
00205     }
00206     for (; i < MAX_NINPUTS; ++i)
00207         strcpy (&input[i][0], "");
00208     #if DEBUG_OPTIMIZE
00209     fprintf (stderr, "optimize_parse: parsing end\n");
00210     #endif
00211
00212     // Performing the simulation
00213     snprintf (output, 32, "output-%u-%u", simulation, experiment);
00214     buffer2 = g_path_get_dirname (optimize->simulator);
00215     buffer3 = g_path_get_basename (optimize->simulator);
00216     buffer4 = g_build_filename (buffer2, buffer3, NULL);
00217     snprintf (buffer, 512, "%s\ %s %s %s %s %s %s %s %s %s",
00218             buffer4, input[0], input[1], input[2], input[3], input[4],
00219             input[5], input[6], input[7], output);
00220     g_free (buffer4);
00221     g_free (buffer3);
00222     g_free (buffer2);
00223     #if DEBUG_OPTIMIZE
00224     fprintf (stderr, "optimize_parse: %s\n", buffer);
00225     #endif
00226     if (system (buffer) == -1)
00227         error_message = buffer;
00228
00229     // Checking the objective value function
00230     if (optimize->evaluator)
00231     {
00232         snprintf (result, 32, "result-%u-%u", simulation, experiment);
00233         buffer2 = g_path_get_dirname (optimize->evaluator);
00234         buffer3 = g_path_get_basename (optimize->evaluator);
00235         buffer4 = g_build_filename (buffer2, buffer3, NULL);
00236         snprintf (buffer, 512, "%s\ %s %s %s",
00237                 buffer4, output, optimize->experiment[experiment], result);
00238         g_free (buffer4);
00239         g_free (buffer3);
00240         g_free (buffer2);
00241         #if DEBUG_OPTIMIZE
00242         fprintf (stderr, "optimize_parse: %s\n", buffer);
00243         fprintf (stderr, "optimize_parse: result=%s\n", result);
00244         #endif
00245         if (system (buffer) == -1)
00246             error_message = buffer;
00247         file_result = g_fopen (result, "r");
00248         e = atof (fgets (buffer, 512, file_result));
00249         fclose (file_result);
00250     }
00251     else
00252     {
00253         #if DEBUG_OPTIMIZE

```

```

00254     fprintf (stderr, "optimize_parse: output=%s\n", output);
00255 #endif
00256     strcpy (result, "");
00257     file_result = g_fopen (output, "r");
00258     e = atof (fgets (buffer, 512, file_result));
00259     fclose (file_result);
00260 }
00261
00262 // Removing files
00263 #if !DEBUG_OPTIMIZE
00264     for (i = 0; i < optimize->ninputs; ++i)
00265     {
00266         if (optimize->file[i][0])
00267         {
00268             snprintf (buffer, 512, RM " %s", &input[i][0]);
00269             if (system (buffer) == -1)
00270                 error_message = buffer;
00271         }
00272     }
00273     snprintf (buffer, 512, RM " %s %s", output, result);
00274     if (system (buffer) == -1)
00275         error_message = buffer;
00276 #endif
00277
00278 // Processing pending events
00279 if (show_pending)
00280     show_pending ();
00281
00282 #if DEBUG_OPTIMIZE
00283     fprintf (stderr, "optimize_parse: end\n");
00284 #endif
00285
00286 // Returning the objective function
00287 return e * optimize->weight[experiment];
00288 }
00289
00290 double
00291 optimize_norm_euclidian (unsigned int simulation)
00292 {
00293     double e, ei;
00294     unsigned int i;
00295     #if DEBUG_OPTIMIZE
00296         fprintf (stderr, "optimize_norm_euclidian: start\n");
00297     #endif
00298     e = 0.;
00299     for (i = 0; i < optimize->nexperiments; ++i)
00300     {
00301         ei = optimize_parse (simulation, i);
00302         e += ei * ei;
00303     }
00304     e = sqrt (e);
00305     #if DEBUG_OPTIMIZE
00306         fprintf (stderr, "optimize_norm_euclidian: error=%lg\n", e);
00307         fprintf (stderr, "optimize_norm_euclidian: end\n");
00308     #endif
00309     return e;
00310 }
00311
00312 double
00313 optimize_norm_maximum (unsigned int simulation)
00314 {
00315     double e, ei;
00316     unsigned int i;
00317     #if DEBUG_OPTIMIZE
00318         fprintf (stderr, "optimize_norm_maximum: start\n");
00319     #endif
00320     e = 0.;
00321     for (i = 0; i < optimize->nexperiments; ++i)
00322     {
00323         ei = fabs (optimize_parse (simulation, i));
00324         e = fmax (e, ei);
00325     }
00326     #if DEBUG_OPTIMIZE
00327         fprintf (stderr, "optimize_norm_maximum: error=%lg\n", e);
00328         fprintf (stderr, "optimize_norm_maximum: end\n");
00329     #endif
00330     return e;
00331 }
00332
00333 double
00334 optimize_norm_p (unsigned int simulation)
00335 {
00336     double e, ei;
00337     unsigned int i;
00338     #if DEBUG_OPTIMIZE
00339         fprintf (stderr, "optimize_norm_p: start\n");
00340     #endif

```

```

00356     e = 0.;
00357     for (i = 0; i < optimize->nexperiments; ++i)
00358     {
00359         ei = fabs (optimize_parse (simulation, i));
00360         e += pow (ei, optimize->p);
00361     }
00362     e = pow (e, 1. / optimize->p);
00363     #if DEBUG_OPTIMIZE
00364     fprintf (stderr, "optimize_norm_p: error=%lg\n", e);
00365     fprintf (stderr, "optimize_norm_p: end\n");
00366     #endif
00367     return e;
00368 }
00369
00375 double
00376 optimize_norm_taxicab (unsigned int simulation)
00377 {
00378     double e;
00379     unsigned int i;
00380     #if DEBUG_OPTIMIZE
00381     fprintf (stderr, "optimize_norm_taxicab: start\n");
00382     #endif
00383     e = 0.;
00384     for (i = 0; i < optimize->nexperiments; ++i)
00385         e += fabs (optimize_parse (simulation, i));
00386     #if DEBUG_OPTIMIZE
00387     fprintf (stderr, "optimize_norm_taxicab: error=%lg\n", e);
00388     fprintf (stderr, "optimize_norm_taxicab: end\n");
00389     #endif
00390     return e;
00391 }
00392
00396 void
00397 optimize_print ()
00398 {
00399     unsigned int i;
00400     char buffer[512];
00401     #if HAVE_MPI
00402     if (optimize->mpi_rank)
00403         return;
00404     #endif
00405     printf ("%s\n", _("Best result"));
00406     fprintf (optimize->file_result, "%s\n", _("Best result"));
00407     printf ("error = %.15le\n", optimize->error_old[0]);
00408     fprintf (optimize->file_result, "error = %.15le\n", optimize->
error_old[0]);
00409     for (i = 0; i < optimize->nvariables; ++i)
00410     {
00411         snprintf (buffer, 512, "%s = %s\n",
00412                 optimize->label[i], format[optimize->precision[i]]);
00413         printf (buffer, optimize->value_old[i]);
00414         fprintf (optimize->file_result, buffer, optimize->value_old[i]);
00415     }
00416     fflush (optimize->file_result);
00417 }
00418
00422 void
00423 optimize_save_variables (unsigned int simulation,
00424                         double error)
00425 {
00426     unsigned int i;
00427     char buffer[64];
00428     #if DEBUG_OPTIMIZE
00429     fprintf (stderr, "optimize_save_variables: start\n");
00430     #endif
00431     for (i = 0; i < optimize->nvariables; ++i)
00432     {
00433         snprintf (buffer, 64, "%s ", format[optimize->precision[i]]);
00434         fprintf (optimize->file_variables, buffer,
00435                 optimize->value[simulation * optimize->nvariables + i]);
00436     }
00437     fprintf (optimize->file_variables, "%.14le\n", error);
00438     fflush (optimize->file_variables);
00439     #if DEBUG_OPTIMIZE
00440     fprintf (stderr, "optimize_save_variables: end\n");
00441     #endif
00442 }
00443
00447 void
00448 optimize_best (unsigned int simulation,
00449               double value)
00450 {
00451     unsigned int i, j;
00452     double e;
00453     #if DEBUG_OPTIMIZE
00454     fprintf (stderr, "optimize_best: start\n");
00455     fprintf (stderr, "optimize_best: nsaveds=%u nbest=%u\n",

```

```

00456         optimize->nsaveds, optimize->nbest);
00457 #endif
00458     if (optimize->nsaveds < optimize->nbest
00459         || value < optimize->error_best[optimize->nsaveds - 1])
00460     {
00461         if (optimize->nsaveds < optimize->nbest)
00462             ++optimize->nsaveds;
00463         optimize->error_best[optimize->nsaveds - 1] = value;
00464         optimize->simulation_best[optimize->nsaveds - 1] = simulation;
00465         for (i = optimize->nsaveds; --i;)
00466         {
00467             if (optimize->error_best[i] < optimize->error_best[i - 1])
00468             {
00469                 j = optimize->simulation_best[i];
00470                 e = optimize->error_best[i];
00471                 optimize->simulation_best[i] = optimize->
simulation_best[i - 1];
00472                 optimize->error_best[i] = optimize->error_best[i - 1];
00473                 optimize->simulation_best[i - 1] = j;
00474                 optimize->error_best[i - 1] = e;
00475             }
00476             else
00477                 break;
00478         }
00479     }
00480 #if DEBUG_OPTIMIZE
00481     fprintf (stderr, "optimize_best: end\n");
00482 #endif
00483 }
00484
00488 void
00489 optimize_sequential ()
00490 {
00491     unsigned int i;
00492     double e;
00493 #if DEBUG_OPTIMIZE
00494     fprintf (stderr, "optimize_sequential: start\n");
00495     fprintf (stderr, "optimize_sequential: nstart=%u nend=%u\n",
00496             optimize->nstart, optimize->nend);
00497 #endif
00498     for (i = optimize->nstart; i < optimize->nend; ++i)
00499     {
00500         e = optimize_norm (i);
00501         optimize_best (i, e);
00502         optimize_save_variables (i, e);
00503         if (e < optimize->threshold)
00504         {
00505             optimize->stop = 1;
00506             break;
00507         }
00508 #if DEBUG_OPTIMIZE
00509         fprintf (stderr, "optimize_sequential: i=%u e=%lg\n", i, e);
00510 #endif
00511     }
00512 #if DEBUG_OPTIMIZE
00513     fprintf (stderr, "optimize_sequential: end\n");
00514 #endif
00515 }
00516
00522 void *
00523 optimize_thread (ParallelData * data)
00524 {
00525     unsigned int i, thread;
00526     double e;
00527 #if DEBUG_OPTIMIZE
00528     fprintf (stderr, "optimize_thread: start\n");
00529 #endif
00530     thread = data->thread;
00531 #if DEBUG_OPTIMIZE
00532     fprintf (stderr, "optimize_thread: thread=%u start=%u end=%u\n", thread,
00533             optimize->thread[thread], optimize->thread[thread + 1]);
00534 #endif
00535     for (i = optimize->thread[thread]; i < optimize->thread[thread + 1]; ++i)
00536     {
00537         e = optimize_norm (i);
00538         g_mutex_lock (mutex);
00539         optimize_best (i, e);
00540         optimize_save_variables (i, e);
00541         if (e < optimize->threshold)
00542             optimize->stop = 1;
00543         g_mutex_unlock (mutex);
00544         if (optimize->stop)
00545             break;
00546 #if DEBUG_OPTIMIZE
00547         fprintf (stderr, "optimize_thread: i=%u e=%lg\n", i, e);
00548 #endif
00549     }

```



```

00550 #if DEBUG_OPTIMIZE
00551     fprintf (stderr, "optimize_thread: end\n");
00552 #endif
00553     g_thread_exit (NULL);
00554     return NULL;
00555 }
00556
00560 void
00561 optimize_merge (unsigned int nsaveds,
00562                 unsigned int *simulation_best,
00563                 double *error_best)
00564 {
00565     unsigned int i, j, k, s[optimize->nbest];
00566     double e[optimize->nbest];
00567     #if DEBUG_OPTIMIZE
00568     fprintf (stderr, "optimize_merge: start\n");
00569     #endif
00570     i = j = k = 0;
00571     do
00572     {
00573         if (i == optimize->nsaveds)
00574         {
00575             s[k] = simulation_best[j];
00576             e[k] = error_best[j];
00577             ++j;
00578             ++k;
00579             if (j == nsaveds)
00580                 break;
00581         }
00582         else if (j == nsaveds)
00583         {
00584             s[k] = optimize->simulation_best[i];
00585             e[k] = optimize->error_best[i];
00586             ++i;
00587             ++k;
00588             if (i == optimize->nsaveds)
00589                 break;
00590         }
00591         else if (optimize->error_best[i] > error_best[j])
00592         {
00593             s[k] = simulation_best[j];
00594             e[k] = error_best[j];
00595             ++j;
00596             ++k;
00597         }
00598         else
00599         {
00600             s[k] = optimize->simulation_best[i];
00601             e[k] = optimize->error_best[i];
00602             ++i;
00603             ++k;
00604         }
00605     }
00606     while (k < optimize->nbest);
00607     optimize->nsaveds = k;
00608     memcpy (optimize->simulation_best, s, k * sizeof (unsigned int));
00609     memcpy (optimize->error_best, e, k * sizeof (double));
00610     #if DEBUG_OPTIMIZE
00611     fprintf (stderr, "optimize_merge: end\n");
00612     #endif
00613 }
00614
00616 #if HAVE_MPI
00620 void
00621 optimize_synchronise ()
00622 {
00623     unsigned int i, nsaveds, simulation_best[optimize->nbest], stop;
00624     double error_best[optimize->nbest];
00625     MPI_Status mpi_stat;
00626     #if DEBUG_OPTIMIZE
00627     fprintf (stderr, "optimize_synchronise: start\n");
00628     #endif
00629     if (optimize->mpi_rank == 0)
00630     {
00631         for (i = 1; (int) i < ntasks; ++i)
00632         {
00633             MPI_Recv (&nsaveds, 1, MPI_INT, i, 1, MPI_COMM_WORLD, &mpi_stat);
00634             MPI_Recv (simulation_best, nsaveds, MPI_INT, i, 1,
00635                      MPI_COMM_WORLD, &mpi_stat);
00636             MPI_Recv (error_best, nsaveds, MPI_DOUBLE, i, 1,
00637                      MPI_COMM_WORLD, &mpi_stat);
00638             optimize_merge (nsaveds, simulation_best, error_best);
00639             MPI_Recv (&stop, 1, MPI_UNSIGNED, i, 1, MPI_COMM_WORLD, &mpi_stat);
00640             if (stop)
00641                 optimize->stop = 1;
00642         }
00643     }
00644     for (i = 1; (int) i < ntasks; ++i)

```

```

00645     MPI_Send (&optimize->stop, 1, MPI_UNSIGNED, i, 1, MPI_COMM_WORLD);
00646 }
00647 else
00648 {
00649     MPI_Send (&optimize->nsaveds, 1, MPI_INT, 0, 1, MPI_COMM_WORLD);
00650     MPI_Send (optimize->simulation_best, optimize->nsaveds, MPI_INT, 0, 1,
00651             MPI_COMM_WORLD);
00652     MPI_Send (optimize->error_best, optimize->nsaveds, MPI_DOUBLE, 0, 1,
00653             MPI_COMM_WORLD);
00654     MPI_Send (&optimize->stop, 1, MPI_UNSIGNED, 0, 1, MPI_COMM_WORLD);
00655     MPI_Recv (&stop, 1, MPI_UNSIGNED, 0, 1, MPI_COMM_WORLD, &mpi_stat);
00656     if (stop)
00657         optimize->stop = 1;
00658 }
00659 #if DEBUG_OPTIMIZE
00660 fprintf (stderr, "optimize_synchronise: end\n");
00661 #endif
00662 }
00663 #endif
00664
00665 void
00666 optimize_sweep ()
00667 {
00671     unsigned int i, j, k, l;
00672     double e;
00673     GThread *thread[nthreads];
00674     ParallelData data[nthreads];
00675 #if DEBUG_OPTIMIZE
00676     fprintf (stderr, "optimize_sweep: start\n");
00677 #endif
00678     for (i = 0; i < optimize->nsimulations; ++i)
00679     {
00680         k = i;
00681         for (j = 0; j < optimize->nvariables; ++j)
00682         {
00683             l = k % optimize->nsweeps[j];
00684             k /= optimize->nsweeps[j];
00685             e = optimize->rangemin[j];
00686             if (optimize->nsweeps[j] > 1)
00687                 e += l * (optimize->rangemax[j] - optimize->rangemin[j])
00688                     / (optimize->nsweeps[j] - 1);
00689             optimize->value[i * optimize->nvariables + j] = e;
00690         }
00691     }
00692     optimize->nsaveds = 0;
00693     if (nthreads <= 1)
00694         optimize_sequential ();
00695     else
00696     {
00697         for (i = 0; i < nthreads; ++i)
00698         {
00699             data[i].thread = i;
00700             thread[i]
00701                 = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00702         }
00703         for (i = 0; i < nthreads; ++i)
00704             g_thread_join (thread[i]);
00705     }
00706 #if HAVE_MPI
00707     // Communicating tasks results
00708     optimize_synchronise ();
00709 #endif
00710 #if DEBUG_OPTIMIZE
00711     fprintf (stderr, "optimize_sweep: end\n");
00712 #endif
00713 }
00714
00715 void
00716 optimize_MonteCarlo ()
00717 {
00721     unsigned int i, j;
00722     GThread *thread[nthreads];
00723     ParallelData data[nthreads];
00724 #if DEBUG_OPTIMIZE
00725     fprintf (stderr, "optimize_MonteCarlo: start\n");
00726 #endif
00727     for (i = 0; i < optimize->nsimulations; ++i)
00728     {
00729         for (j = 0; j < optimize->nvariables; ++j)
00730             optimize->value[i * optimize->nvariables + j]
00731                 = optimize->rangemin[j] + gsl_rng_uniform (optimize->rng)
00732                     * (optimize->rangemax[j] - optimize->rangemin[j]);
00733         optimize->nsaveds = 0;
00734         if (nthreads <= 1)
00735             optimize_sequential ();
00736         else
00737         {
00738             for (i = 0; i < nthreads; ++i)

```

```

00738     {
00739         data[i].thread = i;
00740         thread[i]
00741             = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00742     }
00743     for (i = 0; i < nthreads; ++i)
00744         g_thread_join (thread[i]);
00745 }
00746 #if HAVE_MPI
00747 // Communicating tasks results
00748 optimize_synchronise ();
00749 #endif
00750 #if DEBUG_OPTIMIZE
00751 fprintf (stderr, "optimize_MonteCarlo: end\n");
00752 #endif
00753 }
00754
00755 void
00756 optimize_orthogonal ()
00757 {
00758     unsigned int i, j, k, l;
00759     double e;
00760     GThread *thread[nthreads];
00761     ParallelData data[nthreads];
00762 #if DEBUG_OPTIMIZE
00763 fprintf (stderr, "optimize_orthogonal: start\n");
00764 #endif
00765 for (i = 0; i < optimize->nsimulations; ++i)
00766 {
00767     k = i;
00768     for (j = 0; j < optimize->nvariables; ++j)
00769     {
00770         l = k % optimize->nsweeps[j];
00771         k /= optimize->nsweeps[j];
00772         e = optimize->rangemin[j];
00773         if (optimize->nsweeps[j] > 1)
00774             e += (l + gsl_rng_uniform (optimize->rng))
00775                 * (optimize->rangemax[j] - optimize->rangemin[j])
00776                 / optimize->nsweeps[j];
00777         optimize->value[i * optimize->nvariables + j] = e;
00778     }
00779 }
00780 optimize->nsaveds = 0;
00781 if (nthreads <= 1)
00782     optimize_sequential ();
00783 else
00784 {
00785     for (i = 0; i < nthreads; ++i)
00786     {
00787         data[i].thread = i;
00788         thread[i]
00789             = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00790     }
00791     for (i = 0; i < nthreads; ++i)
00792         g_thread_join (thread[i]);
00793 }
00794 #if HAVE_MPI
00795 // Communicating tasks results
00796 optimize_synchronise ();
00797 #endif
00798 #if DEBUG_OPTIMIZE
00799 fprintf (stderr, "optimize_orthogonal: end\n");
00800 #endif
00801 }
00802
00803 void
00804 optimize_best_climbing (unsigned int simulation,
00805                        double value)
00806 {
00807     #if DEBUG_OPTIMIZE
00808     fprintf (stderr, "optimize_best_climbing: start\n");
00809     fprintf (stderr,
00810             "optimize_best_climbing: simulation=%u value=%.14le best=%.14le\n",
00811             simulation, value, optimize->error_best[0]);
00812     #endif
00813     if (value < optimize->error_best[0])
00814     {
00815         optimize->error_best[0] = value;
00816         optimize->simulation_best[0] = simulation;
00817     #if DEBUG_OPTIMIZE
00818     fprintf (stderr,
00819             "optimize_best_climbing: BEST simulation=%u value=%.14le\n",
00820             simulation, value);
00821     #endif
00822     }
00823     #if DEBUG_OPTIMIZE
00824     fprintf (stderr, "optimize_best_climbing: end\n");
00825     #endif
00826 }

```

```

00831 #endif
00832 }
00833
00837 void
00838 optimize_climbing_sequential (unsigned int simulation)
00839 {
00840     double e;
00841     unsigned int i, j;
00842     #if DEBUG_OPTIMIZE
00843         fprintf (stderr, "optimize_climbing_sequential: start\n");
00844         fprintf (stderr, "optimize_climbing_sequential: nstart_climbing=%u "
00845                 "nend_climbing=%u\n",
00846                 optimize->nstart_climbing, optimize->nend_climbing);
00847     #endif
00848     for (i = optimize->nstart_climbing; i < optimize->nend_climbing; ++i)
00849     {
00850         j = simulation + i;
00851         e = optimize_norm (j);
00852         optimize_best_climbing (j, e);
00853         optimize_save_variables (j, e);
00854         if (e < optimize->threshold)
00855         {
00856             optimize->stop = 1;
00857             break;
00858         }
00859     #if DEBUG_OPTIMIZE
00860         fprintf (stderr, "optimize_climbing_sequential: i=%u e=%lg\n", i, e);
00861     #endif
00862     }
00863     #if DEBUG_OPTIMIZE
00864         fprintf (stderr, "optimize_climbing_sequential: end\n");
00865     #endif
00866 }
00867
00873 void *
00874 optimize_climbing_thread (ParallelData * data)
00875 {
00876     unsigned int i, thread;
00877     double e;
00878     #if DEBUG_OPTIMIZE
00879         fprintf (stderr, "optimize_climbing_thread: start\n");
00880     #endif
00881     thread = data->thread;
00882     #if DEBUG_OPTIMIZE
00883         fprintf (stderr, "optimize_climbing_thread: thread=%u start=%u end=%u\n",
00884                 thread,
00885                 optimize->thread_climbing[thread],
00886                 optimize->thread_climbing[thread + 1]);
00887     #endif
00888     for (i = optimize->thread_climbing[thread];
00889          i < optimize->thread_climbing[thread + 1]; ++i)
00890     {
00891         e = optimize_norm (i);
00892         g_mutex_lock (mutex);
00893         optimize_best_climbing (i, e);
00894         optimize_save_variables (i, e);
00895         if (e < optimize->threshold)
00896             optimize->stop = 1;
00897         g_mutex_unlock (mutex);
00898         if (optimize->stop)
00899             break;
00900     #if DEBUG_OPTIMIZE
00901         fprintf (stderr, "optimize_climbing_thread: i=%u e=%lg\n", i, e);
00902     #endif
00903     }
00904     #if DEBUG_OPTIMIZE
00905         fprintf (stderr, "optimize_climbing_thread: end\n");
00906     #endif
00907     g_thread_exit (NULL);
00908     return NULL;
00909 }
00910
00914 double
00915 optimize_estimate_climbing_random (unsigned int variable,
00916                                   unsigned int estimate
00917                                   __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
00938 double
00939 optimize_estimate_climbing_coordinates (unsigned int variable,
00940                                         unsigned int estimate)
00941 {
00942     double x;
00943     #if DEBUG_OPTIMIZE
00944     fprintf (stderr, "optimize_estimate_climbing_coordinates: start\n");
00945     #endif
00946     x = optimize->climbing[variable];
00947     if (estimate >= (2 * variable) && estimate < (2 * variable + 2))
00948     {
00949         if (estimate & 1)
00950             x += optimize->step[variable];
00951         else
00952             x -= optimize->step[variable];
00953     }
00954     #if DEBUG_OPTIMIZE
00955     fprintf (stderr,
00956             "optimize_estimate_climbing_coordinates: climbing=%u=%lg\n",
00957             variable, x);
00958     fprintf (stderr, "optimize_estimate_climbing_coordinates: end\n");
00959     #endif
00960     return x;
00961 }
00962
00963 void
00964 optimize_step_climbing (unsigned int simulation)
00965 {
00966     GThread *thread[nthreads_climbing];
00967     ParallelData data[nthreads_climbing];
00968     unsigned int i, j, k, b;
00969     #if DEBUG_OPTIMIZE
00970     fprintf (stderr, "optimize_step_climbing: start\n");
00971     #endif
00972     for (i = 0; i < optimize->nvariables; ++i)
00973     {
00974         k = (simulation + i) * optimize->nvariables;
00975         b = optimize->simulation_best[0] * optimize->nvariables;
00976         #if DEBUG_OPTIMIZE
00977         fprintf (stderr, "optimize_step_climbing: simulation=%u best=%u\n",
00978                 simulation + i, optimize->simulation_best[0]);
00979         #endif
00980         for (j = 0; j < optimize->nvariables; ++j, ++k, ++b)
00981         {
00982             #if DEBUG_OPTIMIZE
00983             fprintf (stderr,
00984                     "optimize_step_climbing: estimate=%u best=%u=%.14le\n",
00985                     i, j, optimize->value[b]);
00986             #endif
00987             optimize->value[k]
00988                 = optimize->value[b] + optimize_estimate_climbing (j, i);
00989             optimize->value[k] = fmin (fmax (optimize->value[k],
00990                                             optimize->rangeminabs[j]),
00991                                     optimize->rangemaxabs[j]);
00992             #if DEBUG_OPTIMIZE
00993             fprintf (stderr,
00994                     "optimize_step_climbing: estimate=%u variable=%u=%.14le\n",
00995                     i, j, optimize->value[k]);
00996             #endif
00997         }
00998     }
00999     if (nthreads_climbing == 1)
01000         optimize_climbing_sequential (simulation);
01001     else
01002     {
01003         for (i = 0; i <= nthreads_climbing; ++i)
01004         {
01005             optimize->thread_climbing[i]
01006                 = simulation + optimize->nstart_climbing
01007                   + i * (optimize->wend_climbing - optimize->
01008                        nstart_climbing)
01009                   / nthreads_climbing;
01010             #if DEBUG_OPTIMIZE
01011             fprintf (stderr,
01012                     "optimize_step_climbing: i=%u thread_climbing=%u\n",
01013                     i, optimize->thread_climbing[i]);
01014             #endif
01015         }
01016         for (i = 0; i < nthreads_climbing; ++i)
01017         {
01018             data[i].thread = i;
01019             thread[i] = g_thread_new
01020                 (NULL, (GThreadFunc) optimize_climbing_thread, &data[i]);
01021         }
01022     }

```

```

01025     }
01026     for (i = 0; i < nthreads_climbing; ++i)
01027         g_thread_join (thread[i]);
01028 }
01029 #if DEBUG_OPTIMIZE
01030 fprintf (stderr, "optimize_step_climbing: end\n");
01031 #endif
01032 }
01033
01037 void
01038 optimize_climbing ()
01039 {
01040     unsigned int i, j, k, b, s, adjust;
01041     #if DEBUG_OPTIMIZE
01042     fprintf (stderr, "optimize_climbing: start\n");
01043     #endif
01044     for (i = 0; i < optimize->nvariables; ++i)
01045         optimize->climbing[i] = 0.;
01046     b = optimize->simulation_best[0] * optimize->nvariables;
01047     s = optimize->nsimulations;
01048     adjust = 1;
01049     for (i = 0; i < optimize->nsteps; ++i, s += optimize->nestimates, b = k)
01050     {
01051         #if DEBUG_OPTIMIZE
01052         fprintf (stderr, "optimize_climbing: step=%u old_best=%u\n",
01053                 i, optimize->simulation_best[0]);
01054         #endif
01055         optimize_step_climbing (s);
01056         k = optimize->simulation_best[0] * optimize->nvariables;
01057         #if DEBUG_OPTIMIZE
01058         fprintf (stderr, "optimize_climbing: step=%u best=%u\n",
01059                 i, optimize->simulation_best[0]);
01060         #endif
01061         if (k == b)
01062         {
01063             if (adjust)
01064                 for (j = 0; j < optimize->nvariables; ++j)
01065                     optimize->step[j] *= 0.5;
01066             for (j = 0; j < optimize->nvariables; ++j)
01067                 optimize->climbing[j] = 0.;
01068             adjust = 1;
01069         }
01070         else
01071         {
01072             for (j = 0; j < optimize->nvariables; ++j)
01073             {
01074                 #if DEBUG_OPTIMIZE
01075                 fprintf (stderr,
01076                         "optimize_climbing: best%u=%%.14le old%u=%%.14le\n",
01077                         j, optimize->value[k + j], j, optimize->value[b + j]);
01078                 #endif
01079                 optimize->climbing[j]
01080                     = (1. - optimize->relaxation) * optimize->climbing[j]
01081                     + optimize->relaxation
01082                     * (optimize->value[k + j] - optimize->value[b + j]);
01083                 #if DEBUG_OPTIMIZE
01084                 fprintf (stderr, "optimize_climbing: climbing%u=%%.14le\n",
01085                         j, optimize->climbing[j]);
01086                 #endif
01087             }
01088             adjust = 0;
01089         }
01090     }
01091     #if DEBUG_OPTIMIZE
01092     fprintf (stderr, "optimize_climbing: end\n");
01093     #endif
01094 }
01095
01101 double
01102 optimize_genetic_objective (Entity * entity)
01103 {
01104     unsigned int j;
01105     double objective;
01106     char buffer[64];
01107     #if DEBUG_OPTIMIZE
01108     fprintf (stderr, "optimize_genetic_objective: start\n");
01109     #endif
01110     for (j = 0; j < optimize->nvariables; ++j)
01111     {
01112         optimize->value[entity->id * optimize->nvariables + j]
01113             = genetic_get_variable (entity, optimize->genetic_variable + j);
01114     }
01115     objective = optimize_norm (entity->id);
01116     g_mutex_lock (mutex);
01117     for (j = 0; j < optimize->nvariables; ++j)
01118     {
01119         snprintf (buffer, 64, "%s ", format[optimize->precision[j]]);

```

```

01120     fprintf (optimize->file_variables, buffer,
01121              genetic_get_variable (entity, optimize->genetic_variable + j));
01122     }
01123     fprintf (optimize->file_variables, "%.14le\n", objective);
01124     g_mutex_unlock (mutex);
01125     #if DEBUG_OPTIMIZE
01126     fprintf (stderr, "optimize_genetic_objective: end\n");
01127     #endif
01128     return objective;
01129 }
01130
01131 void
01132 optimize_genetic ()
01133 {
01134     double *best_variable = NULL;
01135     char *best_genome = NULL;
01136     double best_objective = 0.;
01137     #if DEBUG_OPTIMIZE
01138     fprintf (stderr, "optimize_genetic: start\n");
01139     fprintf (stderr, "optimize_genetic: ntasks=%u nthreads=%u\n", ntasks,
01140              nthreads);
01141     fprintf (stderr,
01142              "optimize_genetic: nvariables=%u population=%u generations=%u\n",
01143              optimize->nvariables, optimize->nsimulations, optimize->
01144              niterations);
01145     fprintf (stderr,
01146              "optimize_genetic: mutation=%lg reproduction=%lg adaptation=%lg\n",
01147              optimize->mutation_ratio, optimize->reproduction_ratio,
01148              optimize->adaptation_ratio);
01149     #endif
01150     genetic_algorithm_default (optimize->nvariables,
01151                               optimize->genetic_variable,
01152                               optimize->nsimulations,
01153                               optimize->niterations,
01154                               optimize->mutation_ratio,
01155                               optimize->reproduction_ratio,
01156                               optimize->adaptation_ratio,
01157                               optimize->seed,
01158                               optimize->threshold,
01159                               &optimize_genetic_objective,
01160                               &best_genome, &best_variable, &best_objective);
01161     #if DEBUG_OPTIMIZE
01162     fprintf (stderr, "optimize_genetic: the best\n");
01163     #endif
01164     optimize->error_old = (double *) g_malloc (sizeof (double));
01165     optimize->value_old
01166     = (double *) g_malloc (optimize->nvariables * sizeof (double));
01167     optimize->error_old[0] = best_objective;
01168     memcpy (optimize->value_old, best_variable,
01169            optimize->nvariables * sizeof (double));
01170     g_free (best_genome);
01171     g_free (best_variable);
01172     optimize_print ();
01173     #if DEBUG_OPTIMIZE
01174     fprintf (stderr, "optimize_genetic: end\n");
01175     #endif
01176 }
01177
01178 void
01179 optimize_save_old ()
01180 {
01181     unsigned int i, j;
01182     #if DEBUG_OPTIMIZE
01183     fprintf (stderr, "optimize_save_old: start\n");
01184     fprintf (stderr, "optimize_save_old: nsaveds=%u\n", optimize->nsaveds);
01185     #endif
01186     memcpy (optimize->error_old, optimize->error_best,
01187            optimize->nbest * sizeof (double));
01188     for (i = 0; i < optimize->nbest; ++i)
01189     {
01190         j = optimize->simulation_best[i];
01191         #if DEBUG_OPTIMIZE
01192         fprintf (stderr, "optimize_save_old: i=%u j=%u\n", i, j);
01193         #endif
01194         memcpy (optimize->value_old + i * optimize->nvariables,
01195                optimize->value + j * optimize->nvariables,
01196                optimize->nvariables * sizeof (double));
01197     }
01198     #if DEBUG_OPTIMIZE
01199     for (i = 0; i < optimize->nvariables; ++i)
01200         fprintf (stderr, "optimize_save_old: best variable %u=%lg\n",
01201                  i, optimize->value_old[i]);
01202     fprintf (stderr, "optimize_save_old: end\n");
01203     #endif
01204 }
01205
01206 void
01207 
```

```

01216 optimize_merge_old ()
01217 {
01218     unsigned int i, j, k;
01219     double v[optimize->nbest * optimize->nvariables], e[optimize->
nbest],
01220         *enew, *eold;
01221     #if DEBUG_OPTIMIZE
01222     fprintf (stderr, "optimize_merge_old: start\n");
01223     #endif
01224     anew = optimize->error_best;
01225     eold = optimize->error_old;
01226     i = j = k = 0;
01227     do
01228     {
01229         if (*enew < *eold)
01230         {
01231             memcpy (v + k * optimize->nvariables,
01232                 optimize->value
01233                 + optimize->simulation_best[i] * optimize->
nvariables,
01234                 optimize->nvariables * sizeof (double));
01235             e[k] = *enew;
01236             ++k;
01237             ++enew;
01238             ++i;
01239         }
01240         else
01241         {
01242             memcpy (v + k * optimize->nvariables,
01243                 optimize->value_old + j * optimize->nvariables,
01244                 optimize->nvariables * sizeof (double));
01245             e[k] = *eold;
01246             ++k;
01247             ++eold;
01248             ++j;
01249         }
01250     }
01251     while (k < optimize->nbest);
01252     memcpy (optimize->value_old, v, k * optimize->nvariables * sizeof (double));
01253     memcpy (optimize->error_old, e, k * sizeof (double));
01254     #if DEBUG_OPTIMIZE
01255     fprintf (stderr, "optimize_merge_old: end\n");
01256     #endif
01257 }
01258
01263 void
01264 optimize_refine ()
01265 {
01266     unsigned int i, j;
01267     double d;
01268     #if HAVE_MPI
01269     MPI_Status mpi_stat;
01270     #endif
01271     #if DEBUG_OPTIMIZE
01272     fprintf (stderr, "optimize_refine: start\n");
01273     #endif
01274     #if HAVE_MPI
01275     if (!optimize->mpi_rank)
01276     {
01277     #endif
01278         for (j = 0; j < optimize->nvariables; ++j)
01279         {
01280             optimize->rangemin[j] = optimize->rangemax[j]
= optimize->value_old[j];
01281         }
01282         for (i = 0; ++i < optimize->nbest; )
01283         {
01284             for (j = 0; j < optimize->nvariables; ++j)
01285             {
01286                 optimize->rangemin[j]
= fmin (optimize->rangemin[j],
optimize->value_old[i * optimize->nvariables + j]);
01287                 optimize->rangemax[j]
= fmax (optimize->rangemax[j],
optimize->value_old[i * optimize->nvariables + j]);
01288             }
01289         }
01290         for (j = 0; j < optimize->nvariables; ++j)
01291         {
01292             d = optimize->tolerance
* (optimize->rangemax[j] - optimize->rangemin[j]);
01293             switch (optimize->algorithm)
01294             {
01295             case ALGORITHM_MONTE_CARLO:
01296                 d *= 0.5;
01297                 break;
01298             default:
01299                 ;
01300             }
01301         }
01302     }
01303     #if HAVE_MPI
01304     MPI_Send (&mpi_stat, 1, MPI_STATUS_SIZE, 0, 0, MPI_COMM_WORLD);
01305     MPI_Recv (&mpi_stat, 1, MPI_STATUS_SIZE, 0, 0, MPI_COMM_WORLD);
01306     #endif
01307 }

```



```

01305         if (optimize->nsweeps[j] > 1)
01306             d /= optimize->nsweeps[j] - 1;
01307         else
01308             d = 0.;
01309     }
01310     optimize->rangemin[j] -= d;
01311     optimize->rangemin[j]
01312     = fmax (optimize->rangemin[j], optimize->rangeminabs[j]);
01313     optimize->rangemax[j] += d;
01314     optimize->rangemax[j]
01315     = fmin (optimize->rangemax[j], optimize->rangemaxabs[j]);
01316     printf ("%s min=%lg max=%lg\n", optimize->label[j],
01317            optimize->rangemin[j], optimize->rangemax[j]);
01318     fprintf (optimize->file_result, "%s min=%lg max=%lg\n",
01319            optimize->label[j], optimize->rangemin[j],
01320            optimize->rangemax[j]);
01321     }
01322 #if HAVE_MPI
01323     for (i = 1; (int) i < ntasks; ++i)
01324     {
01325         MPI_Send (optimize->rangemin, optimize->nvariables, MPI_DOUBLE, i,
01326                 1, MPI_COMM_WORLD);
01327         MPI_Send (optimize->rangemax, optimize->nvariables, MPI_DOUBLE, i,
01328                 1, MPI_COMM_WORLD);
01329     }
01330 }
01331 else
01332 {
01333     MPI_Recv (optimize->rangemin, optimize->nvariables, MPI_DOUBLE, 0, 1,
01334             MPI_COMM_WORLD, &mpi_stat);
01335     MPI_Recv (optimize->rangemax, optimize->nvariables, MPI_DOUBLE, 0, 1,
01336             MPI_COMM_WORLD, &mpi_stat);
01337 }
01338 #endif
01339 #if DEBUG_OPTIMIZE
01340     fprintf (stderr, "optimize_refine: end\n");
01341 #endif
01342 }
01343
01344 void
01345 optimize_step ()
01346 {
01347 #if DEBUG_OPTIMIZE
01348     fprintf (stderr, "optimize_step: start\n");
01349 #endif
01350     optimize_algorithm ();
01351     if (optimize->nsteps)
01352         optimize_climbing ();
01353 #if DEBUG_OPTIMIZE
01354     fprintf (stderr, "optimize_step: end\n");
01355 #endif
01356 }
01357
01358 void
01359 optimize_iterate ()
01360 {
01361     unsigned int i;
01362 #if DEBUG_OPTIMIZE
01363     fprintf (stderr, "optimize_iterate: start\n");
01364 #endif
01365     optimize->error_old = (double *) g_malloc (optimize->nbest * sizeof (double));
01366     optimize->value_old =
01367         (double *) g_malloc (optimize->nbest * optimize->nvariables *
01368                             sizeof (double));
01369     optimize_step ();
01370     optimize_save_old ();
01371     optimize_refine ();
01372     optimize_print ();
01373     for (i = 1; i < optimize->niterations && !optimize->stop; ++i)
01374     {
01375         optimize_step ();
01376         optimize_merge_old ();
01377         optimize_refine ();
01378         optimize_print ();
01379     }
01380 #if DEBUG_OPTIMIZE
01381     fprintf (stderr, "optimize_iterate: end\n");
01382 #endif
01383 }
01384
01385 void
01386 optimize_free ()
01387 {
01388     unsigned int i, j;
01389 #if DEBUG_OPTIMIZE
01390     fprintf (stderr, "optimize_free: start\n");
01391 #endif
01392 }

```

```

01401     for (j = 0; j < optimize->ninputs; ++j)
01402     {
01403         for (i = 0; i < optimize->nexperiments; ++i)
01404             g_mapped_file_unref (optimize->file[j][i]);
01405         g_free (optimize->file[j]);
01406     }
01407     g_free (optimize->error_old);
01408     g_free (optimize->value_old);
01409     g_free (optimize->value);
01410     g_free (optimize->genetic_variable);
01411     #if DEBUG_OPTIMIZE
01412     fprintf (stderr, "optimize_free: end\n");
01413     #endif
01414 }
01415
01419 void
01420 optimize_open ()
01421 {
01422     GTimeZone *tz;
01423     GDateTime *t0, *t;
01424     unsigned int i, j;
01425
01426     #if DEBUG_OPTIMIZE
01427     char *buffer;
01428     fprintf (stderr, "optimize_open: start\n");
01429     #endif
01430
01431     // Getting initial time
01432     #if DEBUG_OPTIMIZE
01433     fprintf (stderr, "optimize_open: getting initial time\n");
01434     #endif
01435     tz = g_time_zone_new_utc ();
01436     t0 = g_date_time_new_now (tz);
01437
01438     // Obtaining and initing the pseudo-random numbers generator seed
01439     #if DEBUG_OPTIMIZE
01440     fprintf (stderr, "optimize_open: getting initial seed\n");
01441     #endif
01442     if (optimize->seed == DEFAULT_RANDOM_SEED)
01443         optimize->seed = input->seed;
01444     gsl_rng_set (optimize->rng, optimize->seed);
01445
01446     // Replacing the working directory
01447     #if DEBUG_OPTIMIZE
01448     fprintf (stderr, "optimize_open: replacing the working directory\n");
01449     #endif
01450     g_chdir (input->directory);
01451
01452     // Getting results file names
01453     optimize->result = input->result;
01454     optimize->variables = input->variables;
01455
01456     // Obtaining the simulator file
01457     optimize->simulator = input->simulator;
01458
01459     // Obtaining the evaluator file
01460     optimize->evaluator = input->evaluator;
01461
01462     // Reading the algorithm
01463     optimize->algorithm = input->algorithm;
01464     switch (optimize->algorithm)
01465     {
01466         case ALGORITHM_MONTE_CARLO:
01467             optimize_algorithm = optimize_MonteCarlo;
01468             break;
01469         case ALGORITHM_SWEEP:
01470             optimize_algorithm = optimize_sweep;
01471             break;
01472         case ALGORITHM_ORTHOGONAL:
01473             optimize_algorithm = optimize_orthogonal;
01474             break;
01475         default:
01476             optimize_algorithm = optimize_genetic;
01477             optimize->mutation_ratio = input->mutation_ratio;
01478             optimize->reproduction_ratio = input->
reproduction_ratio;
01479             optimize->adaptation_ratio = input->adaptation_ratio;
01480     }
01481     optimize->nvariables = input->nvariables;
01482     optimize->nsimulations = input->nsimulations;
01483     optimize->niterations = input->niterations;
01484     optimize->nbest = input->nbest;
01485     optimize->tolerance = input->tolerance;
01486     optimize->nsteps = input->nsteps;
01487     optimize->nestimates = 0;
01488     optimize->threshold = input->threshold;
01489     optimize->stop = 0;

```

```

01490     if (input->nsteps)
01491     {
01492         optimize->relaxation = input->relaxation;
01493         switch (input->climbing)
01494         {
01495             case CLIMBING_METHOD_COORDINATES:
01496                 optimize->nestimates = 2 * optimize->nvariables;
01497                 optimize_estimate_climbing =
01498                     optimize_estimate_climbing_coordinates;
01499                 break;
01500             default:
01501                 optimize->nestimates = input->nestimates;
01502                 optimize_estimate_climbing =
01503                     optimize_estimate_climbing_random;
01504         }
01505     }
01506     #if DEBUG_OPTIMIZE
01507     fprintf (stderr, "optimize_open: nbest=%u\n", optimize->nbest);
01508     #endif
01509     optimize->simulation_best
01510     = (unsigned int *) alloca (optimize->nbest * sizeof (unsigned int));
01511     optimize->error_best = (double *) alloca (optimize->nbest * sizeof (double));
01512     // Reading the experimental data
01513     #if DEBUG_OPTIMIZE
01514     buffer = g_get_current_dir ();
01515     fprintf (stderr, "optimize_open: current directory=%s\n", buffer);
01516     g_free (buffer);
01517     #endif
01518     optimize->nexperiments = input->nexperiments;
01519     optimize->ninputs = input->experiment->ninputs;
01520     optimize->experiment
01521     = (char **) alloca (input->nexperiments * sizeof (char *));
01522     optimize->weight = (double *) alloca (input->nexperiments * sizeof (double));
01523     for (i = 0; i < input->experiment->ninputs; ++i)
01524         optimize->file[i] = (GMappedFile **)
01525             g_malloc (input->nexperiments * sizeof (GMappedFile *));
01526     for (i = 0; i < input->nexperiments; ++i)
01527     {
01528         #if DEBUG_OPTIMIZE
01529         fprintf (stderr, "optimize_open: i=%u\n", i);
01530         #endif
01531         optimize->experiment[i] = input->experiment[i].
01532             name;
01533         optimize->weight[i] = input->experiment[i].weight;
01534         #if DEBUG_OPTIMIZE
01535         fprintf (stderr, "optimize_open: experiment=%s weight=%lg\n",
01536             optimize->experiment[i], optimize->weight[i]);
01537         #endif
01538         for (j = 0; j < input->experiment->ninputs; ++j)
01539         {
01540             #if DEBUG_OPTIMIZE
01541             fprintf (stderr, "optimize_open: stencil%u\n", j + 1);
01542             #endif
01543             optimize->file[j][i]
01544             = g_mapped_file_new (input->experiment[i].stencil[j], 0, NULL);
01545         }
01546     }
01547     // Reading the variables data
01548     #if DEBUG_OPTIMIZE
01549     fprintf (stderr, "optimize_open: reading variables\n");
01550     #endif
01551     optimize->label = (char **) alloca (input->nvariables * sizeof (char *));
01552     j = input->nvariables * sizeof (double);
01553     optimize->rangemin = (double *) alloca (j);
01554     optimize->rangeminabs = (double *) alloca (j);
01555     optimize->rangemax = (double *) alloca (j);
01556     optimize->rangemaxabs = (double *) alloca (j);
01557     optimize->step = (double *) alloca (j);
01558     j = input->nvariables * sizeof (unsigned int);
01559     optimize->precision = (unsigned int *) alloca (j);
01560     optimize->nsweeps = (unsigned int *) alloca (j);
01561     optimize->nbits = (unsigned int *) alloca (j);
01562     for (i = 0; i < input->nvariables; ++i)
01563     {
01564         optimize->label[i] = input->variable[i].name;
01565         optimize->rangemin[i] = input->variable[i].rangemin;
01566         optimize->rangeminabs[i] = input->variable[i].
01567             rangeminabs;
01568         optimize->rangemax[i] = input->variable[i].rangemax;
01569         optimize->rangemaxabs[i] = input->variable[i].
01570             rangemaxabs;
01571         optimize->precision[i] = input->variable[i].
01572             precision;
01573         optimize->step[i] = input->variable[i].step;
01574     }

```

```

01571     optimize->nsweeps[i] = input->variable[i].nsweeps;
01572     optimize->nbits[i] = input->variable[i].nbits;
01573 }
01574 if (input->algorithm == ALGORITHM_SWEEP
01575 || input->algorithm == ALGORITHM_ORTHOGONAL)
01576 {
01577     optimize->nsimulations = 1;
01578     for (i = 0; i < input->nvariables; ++i)
01579     {
01580         optimize->nsimulations *= optimize->nsweeps[i];
01581 #if DEBUG_OPTIMIZE
01582         fprintf (stderr, "optimize_open: nsweeps=%u nsimulations=%u\n",
01583             optimize->nsweeps[i], optimize->nsimulations);
01584 #endif
01585     }
01586 }
01587 if (optimize->nsteps)
01588     optimize->climbing
01589     = (double *) alloca (optimize->nvariables * sizeof (double));
01590
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 // Allocating values
01609 #if DEBUG_OPTIMIZE
01610 fprintf (stderr, "optimize_open: allocating variables\n");
01611 fprintf (stderr, "optimize_open: nvariables=%u algorithm=%u\n",
01612     optimize->nvariables, optimize->algorithm);
01613 #endif
01614 optimize->genetic_variable = NULL;
01615 if (optimize->algorithm == ALGORITHM_GENETIC)
01616 {
01617     optimize->genetic_variable = (GeneticVariable *)
01618         g_malloc (optimize->nvariables * sizeof (GeneticVariable));
01619     for (i = 0; i < optimize->nvariables; ++i)
01620     {
01621 #if DEBUG_OPTIMIZE
01622         fprintf (stderr, "optimize_open: i=%u min=%lg max=%lg nbits=%u\n",
01623             i, optimize->rangemin[i], optimize->rangemax[i],
01624             optimize->nbits[i]);
01625 #endif
01626         optimize->genetic_variable[i].minimum = optimize->
01627             rangemin[i];
01628         optimize->genetic_variable[i].maximum = optimize->
01629             rangemax[i];
01630         optimize->genetic_variable[i].nbits = optimize->nbits[i];
01631     }
01632 #if DEBUG_OPTIMIZE
01633     fprintf (stderr, "optimize_open: nvariables=%u nsimulations=%u\n",
01634         optimize->nvariables, optimize->nsimulations);
01635 #endif
01636     optimize->value = (double *)
01637         g_malloc ((optimize->nsimulations
01638             + optimize->nestimates * optimize->nsteps)
01639             * optimize->nvariables * sizeof (double));
01640
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     optimize->nstart = optimize->mpi_rank * optimize->nsimulations /
01648         ntasks;
01649     optimize->nend = (1 + optimize->mpi_rank) * optimize->nsimulations /
01650         ntasks;
01651     if (optimize->nsteps)
01652     {
01653         optimize->nstart_climbing
01654             = optimize->mpi_rank * optimize->nestimates / ntasks;
01655         optimize->nend_climbing
01656             = (1 + optimize->mpi_rank) * optimize->nestimates /

```

```

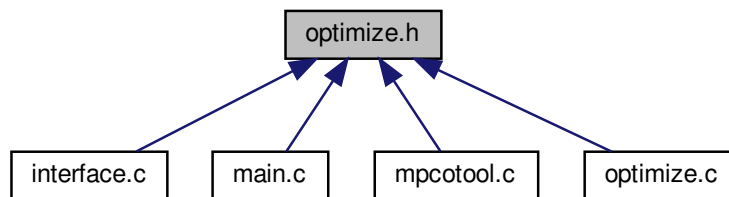
    ntasks;
01654 }
01655 #else
01656     optimize->nstart = 0;
01657     optimize->nend = optimize->nsimulations;
01658     if (optimize->nsteps)
01659     {
01660         optimize->nstart_climbing = 0;
01661         optimize->nend_climbing = optimize->nestimates;
01662     }
01663 #endif
01664 #if DEBUG_OPTIMIZE
01665     fprintf (stderr, "optimize_open: nstart=%u nend=%u\n", optimize->nstart,
01666             optimize->nend);
01667 #endif
01668 // Calculating simulations to perform for each thread
01669 optimize->thread
01670 = (unsigned int *) alloca ((1 + nthreads) * sizeof (unsigned int));
01671 for (i = 0; i <= nthreads; ++i)
01672 {
01673     optimize->thread[i] = optimize->nstart
01674         + i * (optimize->nend - optimize->nstart) / nthreads;
01675 #if DEBUG_OPTIMIZE
01676     fprintf (stderr, "optimize_open: i=%u thread=%u\n", i,
01677             optimize->thread[i]);
01678 #endif
01679 }
01680 if (optimize->nsteps)
01681     optimize->thread_climbing = (unsigned int *)
01682         alloca ((1 + nthreads_climbing) * sizeof (unsigned int));
01683 // Opening result files
01684 optimize->file_result = g_fopen (optimize->result, "w");
01685 optimize->file_variables = g_fopen (optimize->variables, "w");
01686 // Performing the algorithm
01687 switch (optimize->algorithm)
01688 {
01689     // Genetic algorithm
01690     case ALGORITHM_GENETIC:
01691         optimize_genetic ();
01692         break;
01693     // Iterative algorithm
01694     default:
01695         optimize_iterate ();
01696 }
01697 // Getting calculation time
01698 t = g_date_time_new_now (tz);
01699 optimize->calculation_time = 0.000001 * g_date_time_difference (t, t0);
01700 g_date_time_unref (t);
01701 g_date_time_unref (t0);
01702 g_time_zone_unref (tz);
01703 printf ("%s = %.6lg s\n", _("Calculation time"), optimize->calculation_time);
01704 fprintf (optimize->file_result, "%s = %.6lg s\n",
01705         _("Calculation time"), optimize->calculation_time);
01706 // Closing result files
01707 fclose (optimize->file_variables);
01708 fclose (optimize->file_result);
01709 #if DEBUG_OPTIMIZE
01710     fprintf (stderr, "optimize_open: end\n");
01711 #endif
01712 }

```

## 4.23 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\\_input](#) (unsigned int simulation, char \*[input](#), GMappedFile \*[stencil](#))
- double [optimize\\_parse](#) (unsigned int simulation, unsigned int experiment)
- double [optimize\\_norm\\_euclidian](#) (unsigned int simulation)
- double [optimize\\_norm\\_maximum](#) (unsigned int simulation)
- double [optimize\\_norm\\_p](#) (unsigned int simulation)
- double [optimize\\_norm\\_taxicab](#) (unsigned int simulation)
- void [optimize\\_print](#) ()
- void [optimize\\_save\\_variables](#) (unsigned int simulation, double error)
- void [optimize\\_best](#) (unsigned int simulation, double value)
- void [optimize\\_sequential](#) ()
- void \* [optimize\\_thread](#) ([ParallelData](#) \*data)
- void [optimize\\_merge](#) (unsigned int nsaveds, unsigned int \*simulation\_best, double \*error\_best)
- void [optimize\\_synchronise](#) ()
- void [optimize\\_sweep](#) ()
- void [optimize\\_MonteCarlo](#) ()
- void [optimize\\_orthogonal](#) ()
- void [optimize\\_best\\_climbing](#) (unsigned int simulation, double value)
- void [optimize\\_climbing\\_sequential](#) (unsigned int simulation)
- void \* [optimize\\_climbing\\_thread](#) ([ParallelData](#) \*data)
- double [optimize\\_estimate\\_climbing\\_random](#) (unsigned int variable, unsigned int estimate)
- double [optimize\\_estimate\\_climbing\\_coordinates](#) (unsigned int variable, unsigned int estimate)
- void [optimize\\_step\\_climbing](#) (unsigned int simulation)
- void [optimize\\_climbing](#) ()
- double [optimize\\_genetic\\_objective](#) ( **Entity** \*entity)
- void [optimize\\_genetic](#) ()
- void [optimize\\_save\\_old](#) ()
- void [optimize\\_merge\\_old](#) ()
- void [optimize\\_refine](#) ()
- void [optimize\\_step](#) ()
- void [optimize\\_iterate](#) ()
- void [optimize\\_free](#) ()
- void [optimize\\_open](#) ()

## Variables

- int [ntasks](#)  
*Tasks number.*
- unsigned int [nthreads](#)  
*Threads number.*
- unsigned int [nthreads\\_climbing](#)  
*Number of threads for the hill climbing method.*
- GMutex [mutex](#) [1]  
*GMutex struct.*
- void(\* [optimize\\_algorithm](#) )()  
*Pointer to the function to perform a optimization algorithm step.*
- double(\* [optimize\\_estimate\\_climbing](#) )(unsigned int variable, unsigned int estimate)  
*Pointer to the function to estimate the climbing.*
- double(\* [optimize\\_norm](#) )(unsigned int simulation)  
*Pointer to the error norm function.*
- [Optimize optimize](#) [1]  
*Optimization data.*

### 4.23.1 Detailed Description

Header file to define the optimization functions.

#### Authors

Javier Burguete.

#### Copyright

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

### 4.23.2 Function Documentation

#### 4.23.2.1 optimize\_best()

```
void optimize_best (
    unsigned int simulation,
    double value )
```

Function to save the best simulations.

#### Parameters

<i>simulation</i>	Simulation number.
<i>value</i>	Objective function value.

Definition at line 448 of file `optimize.c`.

```

00450 {
00451     unsigned int i, j;
00452     double e;
00453     #if DEBUG_OPTIMIZE
00454         fprintf (stderr, "optimize_best: start\n");
00455         fprintf (stderr, "optimize_best: nsaveds=%u nbest=%u\n",
00456                 optimize->nsaveds, optimize->nbest);
00457     #endif
00458     if (optimize->nsaveds < optimize->nbest
00459         || value < optimize->error_best[optimize->nsaveds - 1])
00460     {
00461         if (optimize->nsaveds < optimize->nbest)
00462             ++optimize->nsaveds;
00463         optimize->error_best[optimize->nsaveds - 1] = value;
00464         optimize->simulation_best[optimize->nsaveds - 1] = simulation;
00465         for (i = optimize->nsaveds; --i;)
00466         {
00467             if (optimize->error_best[i] < optimize->
00468                 error_best[i - 1])
00469             {
00470                 j = optimize->simulation_best[i];
00471                 e = optimize->error_best[i];
00472                 optimize->simulation_best[i] = optimize->
00473                     simulation_best[i - 1];
00474                 optimize->error_best[i] = optimize->
00475                     error_best[i - 1];
00476                 optimize->simulation_best[i - 1] = j;
00477                 optimize->error_best[i - 1] = e;
00478             }
00479             else
00480                 break;
00481         }
00482     }
00483     #if DEBUG_OPTIMIZE
00484         fprintf (stderr, "optimize_best: end\n");
00485     #endif
00486 }

```

#### 4.23.2.2 `optimize_best_climbing()`

```

void optimize_best_climbing (
    unsigned int simulation,
    double value )

```

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 810 of file `optimize.c`.

```

00812 {
00813     #if DEBUG_OPTIMIZE
00814         fprintf (stderr, "optimize_best_climbing: start\n");
00815         fprintf (stderr,
00816                 "optimize_best_climbing: simulation=%u value=%.14le best=%.14le\n",
00817                 simulation, value, optimize->error_best[0]);
00818     #endif
00819     if (value < optimize->error_best[0])
00820     {
00821         optimize->error_best[0] = value;
00822         optimize->simulation_best[0] = simulation;
00823     }
00824     #if DEBUG_OPTIMIZE
00825         fprintf (stderr, "optimize_best_climbing: end\n");
00826     #endif
00827 }

```



```

00824     fprintf (stderr,
00825              "optimize_best_climbing: BEST simulation=%u value=%.14le\n",
00826              simulation, value);
00827 #endif
00828 }
00829 #if DEBUG_OPTIMIZE
00830 fprintf (stderr, "optimize_best_climbing: end\n");
00831 #endif
00832 }

```

#### 4.23.2.3 optimize\_climbing()

```
void optimize_climbing ( )
```

Function to optimize with a hill climbing method.

Definition at line 1038 of file [optimize.c](#).

```

01039 {
01040     unsigned int i, j, k, b, s, adjust;
01041     #if DEBUG_OPTIMIZE
01042     fprintf (stderr, "optimize_climbing: start\n");
01043     #endif
01044     for (i = 0; i < optimize->nvariables; ++i)
01045         optimize->climbing[i] = 0.;
01046     b = optimize->simulation_best[0] * optimize->
nvariables;
01047     s = optimize->nsimulations;
01048     adjust = 1;
01049     for (i = 0; i < optimize->nsteps; ++i, s += optimize->
nestimates, b = k)
01050     {
01051     #if DEBUG_OPTIMIZE
01052         fprintf (stderr, "optimize_climbing: step=%u old_best=%u\n",
01053                 i, optimize->simulation_best[0]);
01054     #endif
01055         optimize_step_climbing (s);
01056         k = optimize->simulation_best[0] * optimize->
nvariables;
01057     #if DEBUG_OPTIMIZE
01058         fprintf (stderr, "optimize_climbing: step=%u best=%u\n",
01059                 i, optimize->simulation_best[0]);
01060     #endif
01061         if (k == b)
01062         {
01063             if (adjust)
01064                 for (j = 0; j < optimize->nvariables; ++j)
01065                     optimize->step[j] *= 0.5;
01066             for (j = 0; j < optimize->nvariables; ++j)
01067                 optimize->climbing[j] = 0.;
01068             adjust = 1;
01069         }
01070         else
01071         {
01072             for (j = 0; j < optimize->nvariables; ++j)
01073             {
01074             #if DEBUG_OPTIMIZE
01075                 fprintf (stderr,
01076                         "optimize_climbing: best%u=%.14le old%u=%.14le\n",
01077                         j, optimize->value[k + j], j, optimize->
value[b + j]);
01078             #endif
01079                 optimize->climbing[j]
01080                     = (1. - optimize->relaxation) * optimize->
climbing[j]
01081                     + optimize->relaxation
01082                     * (optimize->value[k + j] - optimize->value[b + j]);
01083             #if DEBUG_OPTIMIZE
01084                 fprintf (stderr, "optimize_climbing: climbing%u=%.14le\n",
01085                         j, optimize->climbing[j]);
01086             #endif
01087             }
01088             adjust = 0;
01089         }
01090     }
01091     #if DEBUG_OPTIMIZE
01092     fprintf (stderr, "optimize_climbing: end\n");
01093     #endif
01094 }

```

Here is the call graph for this function:



#### 4.23.2.4 optimize\_climbing\_sequential()

```
void optimize_climbing_sequential (
    unsigned int simulation )
```

Function to estimate the hill climbing sequentially.

##### Parameters

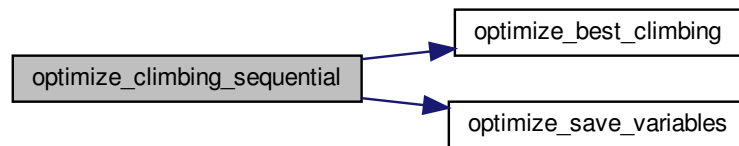
<i>simulation</i>	Simulation number.
-------------------	--------------------

Definition at line 838 of file [optimize.c](#).

```

00839 {
00840     double e;
00841     unsigned int i, j;
00842     #if DEBUG_OPTIMIZE
00843         fprintf (stderr, "optimize_climbing_sequential: start\n");
00844         fprintf (stderr, "optimize_climbing_sequential: nstart_climbing=%u "
00845                 "nend_climbing=%u\n",
00846                 optimize->nstart_climbing, optimize->
nend_climbing);
00847     #endif
00848     for (i = optimize->nstart_climbing; i < optimize->nend_climbing; ++i)
00849     {
00850         j = simulation + i;
00851         e = optimize_norm (j);
00852         optimize_best_climbing (j, e);
00853         optimize_save_variables (j, e);
00854         if (e < optimize->threshold)
00855         {
00856             optimize->stop = 1;
00857             break;
00858         }
00859     }
00860     #if DEBUG_OPTIMIZE
00861         fprintf (stderr, "optimize_climbing_sequential: i=%u e=%lg\n", i, e);
00862     #endif
00863     #if DEBUG_OPTIMIZE
00864         fprintf (stderr, "optimize_climbing_sequential: end\n");
00865     #endif
00866 }
```

Here is the call graph for this function:



#### 4.23.2.5 optimize\_climbing\_thread()

```
void* optimize_climbing_thread (
    ParallelData * data )
```

Function to estimate the hill climbing on a thread.

##### Returns

NULL

##### Parameters

<i>data</i>	Function data.
-------------	----------------

Definition at line 874 of file [optimize.c](#).

```

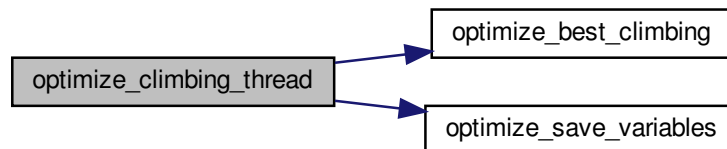
00875 {
00876     unsigned int i, thread;
00877     double e;
00878     #if DEBUG_OPTIMIZE
00879     fprintf (stderr, "optimize_climbing_thread: start\n");
00880     #endif
00881     thread = data->thread;
00882     #if DEBUG_OPTIMIZE
00883     fprintf (stderr, "optimize_climbing_thread: thread=%u start=%u end=%u\n",
00884             thread,
00885             optimize->thread_climbing[thread],
00886             optimize->thread_climbing[thread + 1]);
00887     #endif
00888     for (i = optimize->thread_climbing[thread];
00889          i < optimize->thread_climbing[thread + 1]; ++i)
00890     {
00891         e = optimize_norm (i);
00892         g_mutex_lock (mutex);
00893         optimize_best_climbing (i, e);
00894         optimize_save_variables (i, e);
00895         if (e < optimize->threshold)
00896             optimize->stop = 1;
00897         g_mutex_unlock (mutex);
00898         if (optimize->stop)
00899             break;
00900     #if DEBUG_OPTIMIZE
00901     fprintf (stderr, "optimize_climbing_thread: i=%u e=%lg\n", i, e);
00902     #endif
  
```

```

00903     }
00904     #if DEBUG_OPTIMIZE
00905     fprintf (stderr, "optimize_climbing_thread: end\n");
00906     #endif
00907     g_thread_exit (NULL);
00908     return NULL;
00909 }

```

Here is the call graph for this function:



#### 4.23.2.6 optimize\_estimate\_climbing\_coordinates()

```

double optimize_estimate_climbing_coordinates (
    unsigned int variable,
    unsigned int estimate )

```

Function to estimate a component of the hill climbing vector.

##### Parameters

<i>variable</i>	Variable number.
<i>estimate</i>	Estimate number.

Definition at line 939 of file [optimize.c](#).

```

00943 {
00944     double x;
00945     #if DEBUG_OPTIMIZE
00946     fprintf (stderr, "optimize_estimate_climbing_coordinates: start\n");
00947     #endif
00948     x = optimize->climbing[variable];
00949     if (estimate >= (2 * variable) && estimate < (2 * variable + 2))
00950     {
00951         if (estimate & 1)
00952             x += optimize->step[variable];
00953         else
00954             x -= optimize->step[variable];
00955     }
00956     #if DEBUG_OPTIMIZE
00957     fprintf (stderr,
00958             "optimize_estimate_climbing_coordinates: climbing%u=%lg\n",
00959             variable, x);
00960     fprintf (stderr, "optimize_estimate_climbing_coordinates: end\n");
00961     #endif
00962     return x;
00963 }

```

## 4.23.2.7 optimize\_estimate\_climbing\_random()

```
double optimize_estimate_climbing_random (
    unsigned int variable,
    unsigned int estimate )
```

Function to estimate a component of the hill climbing vector.

## Parameters

<i>variable</i>	Variable number.
<i>estimate</i>	Estimate number.

Definition at line 915 of file [optimize.c](#).

```
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->
00927         step[variable];
00928     #if DEBUG_OPTIMIZE
00929     fprintf (stderr, "optimize_estimate_climbing_random: climbing%u=%lg\n",
00930             variable, x);
00931     fprintf (stderr, "optimize_estimate_climbing_random: end\n");
00932     #endif
00933     return x;
00934 }
```

## 4.23.2.8 optimize\_free()

```
void optimize_free ( )
```

Function to free the memory used by the [Optimize](#) struct.

Definition at line 1395 of file [optimize.c](#).

```
01396 {
01397     unsigned int i, j;
01398     #if DEBUG_OPTIMIZE
01399     fprintf (stderr, "optimize_free: start\n");
01400     #endif
01401     for (j = 0; j < optimize->ninputs; ++j)
01402     {
01403         for (i = 0; i < optimize->nexperiments; ++i)
01404             g_mapped_file_unref (optimize->file[j][i]);
01405         g_free (optimize->file[j]);
01406     }
01407     g_free (optimize->error_old);
01408     g_free (optimize->value_old);
01409     g_free (optimize->value);
01410     g_free (optimize->genetic_variable);
01411     #if DEBUG_OPTIMIZE
01412     fprintf (stderr, "optimize_free: end\n");
01413     #endif
01414 }
```

#### 4.23.2.9 optimize\_genetic()

```
void optimize_genetic ( )
```

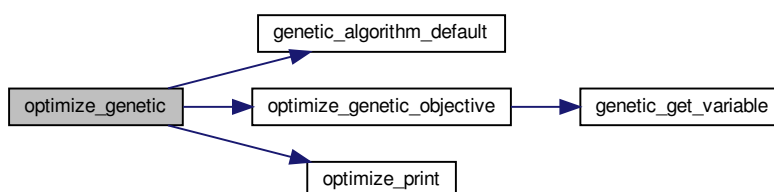
Function to optimize with the genetic algorithm.

Definition at line 1135 of file [optimize.c](#).

```

01136 {
01137     double *best_variable = NULL;
01138     char *best_genome = NULL;
01139     double best_objective = 0.;
01140     #if DEBUG_OPTIMIZE
01141     fprintf (stderr, "optimize_genetic: start\n");
01142     fprintf (stderr, "optimize_genetic: ntasks=%u nthreads=%u\n", ntasks,
01143             nthreads);
01144     fprintf (stderr,
01145             "optimize_genetic: nvariables=%u population=%u generations=%u\n",
01146             optimize->nvariables, optimize->
01147             nsimulations, optimize->niterations);
01148     fprintf (stderr,
01149             "optimize_genetic: mutation=%lg reproduction=%lg adaptation=%lg\n",
01150             optimize->mutation_ratio, optimize->
01151             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 }
```

Here is the call graph for this function:



## 4.23.2.10 optimize\_genetic\_objective()

```
double optimize_genetic_objective (
    Entity * entity )
```

Function to calculate the objective function of an entity.

## Returns

objective function value.

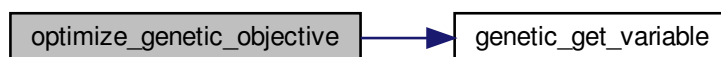
## Parameters

<i>entity</i>	entity data.
---------------	--------------

Definition at line 1102 of file [optimize.c](#).

```
01103 {
01104     unsigned int j;
01105     double objective;
01106     char buffer[64];
01107     #if DEBUG_OPTIMIZE
01108     fprintf (stderr, "optimize_genetic_objective: start\n");
01109     #endif
01110     for (j = 0; j < optimize->nvariables; ++j)
01111     {
01112         optimize->value[entity->id * optimize->nvariables + j]
01113         = genetic_get_variable (entity, optimize->genetic_variable + j);
01114     }
01115     objective = optimize_norm (entity->id);
01116     g_mutex_lock (mutex);
01117     for (j = 0; j < optimize->nvariables; ++j)
01118     {
01119         snprintf (buffer, 64, "%s ", format[optimize->precision[j]]);
01120         fprintf (optimize->file_variables, buffer,
01121                 genetic_get_variable (entity, optimize->genetic_variable + j));
01122     }
01123     fprintf (optimize->file_variables, "%.14le\n", objective);
01124     g_mutex_unlock (mutex);
01125     #if DEBUG_OPTIMIZE
01126     fprintf (stderr, "optimize_genetic_objective: end\n");
01127     #endif
01128     return objective;
01129 }
```

Here is the call graph for this function:



## 4.23.2.11 optimize\_input()

```
void optimize_input (
    unsigned int simulation,
    char * input,
    GMappedFile * stencil )
```

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 93 of file [optimize.c](#).

```
00096 {
00097     char buffer[32], value[32];
00098     GRegex *regex;
00099     FILE *file;
00100     char *buffer2, *buffer3 = NULL, *content;
00101     gsize length;
00102     unsigned int i;
00103
00104     #if DEBUG_OPTIMIZE
00105     fprintf (stderr, "optimize_input: start\n");
00106     #endif
00107
00108     // Checking the file
00109     if (!stencil)
00110         goto optimize_input_end;
00111
00112     // Opening stencil
00113     content = g_mapped_file_get_contents (stencil);
00114     length = g_mapped_file_get_length (stencil);
00115     #if DEBUG_OPTIMIZE
00116     fprintf (stderr, "optimize_input: length=%lu\ncontent:\n%s", length, content);
00117     #endif
00118     file = g_fopen (input, "w");
00119
00120     // Parsing stencil
00121     for (i = 0; i < optimize->nvariables; ++i)
00122     {
00123         #if DEBUG_OPTIMIZE
00124         fprintf (stderr, "optimize_input: variable=%u\n", i);
00125         #endif
00126         snprintf (buffer, 32, "@variable%u@", i + 1);
00127         regex = g_regex_new (buffer, (GRegexCompileFlags) 0, (GRegexMatchFlags) 0,
00128                             NULL);
00129         if (i == 0)
00130         {
00131             buffer2 = g_regex_replace_literal (regex, content, length, 0,
00132                                               optimize->label[i],
00133                                               (GRegexMatchFlags) 0, NULL);
00134             #if DEBUG_OPTIMIZE
00135             fprintf (stderr, "optimize_input: buffer2\n%s", buffer2);
00136             #endif
00137         }
00138         else
00139         {
00140             length = strlen (buffer3);
00141             buffer2 = g_regex_replace_literal (regex, buffer3, length, 0,
00142                                               optimize->label[i],
00143                                               (GRegexMatchFlags) 0, NULL);
00144             g_free (buffer3);
00145         }
00146         g_regex_unref (regex);
00147         length = strlen (buffer2);
00148         snprintf (buffer, 32, "@value%u@", i + 1);
00149         regex = g_regex_new (buffer, (GRegexCompileFlags) 0, (GRegexMatchFlags) 0,
00150                             NULL);
00151         snprintf (value, 32, format[optimize->precision[i]],
00152                 optimize->value[simulation * optimize->
00153                             nvariables + i]);
```



```

00153
00154 #if DEBUG_OPTIMIZE
00155     fprintf (stderr, "optimize_input: value=%s\n", value);
00156 #endif
00157     buffer3 = g_regex_replace_literal (regex, buffer2, length, 0, value,
00158                                     (GRegexMatchFlags) 0, NULL);
00159     g_free (buffer2);
00160     g_regex_unref (regex);
00161 }
00162
00163 // Saving input file
00164 fwrite (buffer3, strlen (buffer3), sizeof (char), file);
00165 g_free (buffer3);
00166 fclose (file);
00167
00168 optimize_input_end:
00169 #if DEBUG_OPTIMIZE
00170     fprintf (stderr, "optimize_input: end\n");
00171 #endif
00172     return;
00173 }

```

#### 4.23.2.12 optimize\_iterate()

```
void optimize_iterate ( )
```

Function to iterate the algorithm.

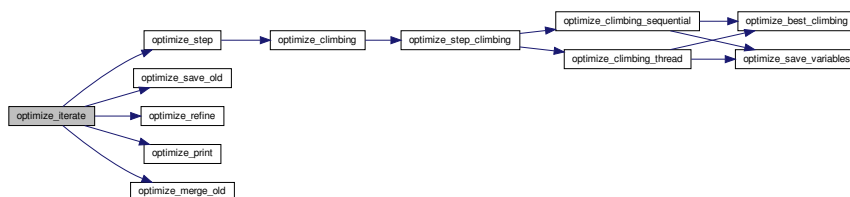
Definition at line 1365 of file [optimize.c](#).

```

01366 {
01367     unsigned int i;
01368     #if DEBUG_OPTIMIZE
01369         fprintf (stderr, "optimize_iterate: start\n");
01370     #endif
01371     optimize->error_old = (double *) g_malloc (optimize->
nbest * sizeof (double));
01372     optimize->value_old =
01373         (double *) g_malloc (optimize->nbest * optimize->
nvariables *
01374                             sizeof (double));
01375     optimize_step ();
01376     optimize_save_old ();
01377     optimize_refine ();
01378     optimize_print ();
01379     for (i = 1; i < optimize->niterations && !optimize->
stop; ++i)
01380     {
01381         optimize_step ();
01382         optimize_merge_old ();
01383         optimize_refine ();
01384         optimize_print ();
01385     }
01386     #if DEBUG_OPTIMIZE
01387         fprintf (stderr, "optimize_iterate: end\n");
01388     #endif
01389 }

```

Here is the call graph for this function:



## 4.23.2.13 optimize\_merge()

```
void optimize_merge (
    unsigned int nsaveds,
    unsigned int * simulation_best,
    double * error_best )
```

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 561 of file [optimize.c](#).

```
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     i = j = k = 0;
00573     do
00574     {
00575         if (i == optimize->nsaveds)
00576         {
00577             s[k] = simulation_best[j];
00578             e[k] = error_best[j];
00579             ++j;
00580             ++k;
00581             if (j == nsaveds)
00582                 break;
00583         }
00584         else if (j == nsaveds)
00585         {
00586             s[k] = optimize->simulation_best[i];
00587             e[k] = optimize->error_best[i];
00588             ++i;
00589             ++k;
00590             if (i == optimize->nsaveds)
00591                 break;
00592         }
00593         else if (optimize->error_best[i] > error_best[j])
00594         {
00595             s[k] = simulation_best[j];
00596             e[k] = error_best[j];
00597             ++j;
00598             ++k;
00599         }
00600         else
00601         {
00602             s[k] = optimize->simulation_best[i];
00603             e[k] = optimize->error_best[i];
00604             ++i;
00605             ++k;
00606         }
00607     }
00608     while (k < optimize->nbest);
00609     optimize->nsaveds = k;
00610     memcpy (optimize->simulation_best, s, k * sizeof (unsigned int));
00611     memcpy (optimize->error_best, e, k * sizeof (double));
00612     #if DEBUG_OPTIMIZE
00613     fprintf (stderr, "optimize_merge: end\n");
00614     #endif
00615 }
```

## 4.23.2.14 optimize\_merge\_old()

```
void optimize_merge_old ( )
```

Function to merge the best results with the previous step best results on iterative methods.

Definition at line 1216 of file [optimize.c](#).

```
01217 {
01218     unsigned int i, j, k;
01219     double v[optimize->nbest * optimize->nvariables], e[
optimize->nbest],
01220         *enew, *eold;
01221     #if DEBUG_OPTIMIZE
01222     fprintf (stderr, "optimize_merge_old: start\n");
01223     #endif
01224     anew = optimize->error_best;
01225     eold = optimize->error_old;
01226     i = j = k = 0;
01227     do
01228     {
01229         if (*enew < *eold)
01230         {
01231             memcpy (v + k * optimize->nvariables,
optimize->value
01232                 + optimize->simulation_best[i] *
optimize->nvariables,
01233                     optimize->nvariables * sizeof (double));
01234             e[k] = *enew;
01235             ++k;
01236             ++enew;
01237             ++i;
01238         }
01239     }
01240     else
01241     {
01242         memcpy (v + k * optimize->nvariables,
optimize->value_old + j * optimize->
01243             nvariables,
optimize->nvariables * sizeof (double));
01244             e[k] = *eold;
01245             ++k;
01246             ++eold;
01247             ++j;
01248         }
01249     }
01250 }
01251 while (k < optimize->nbest);
01252 memcpy (optimize->value_old, v, k * optimize->
nvariables * sizeof (double));
01253 memcpy (optimize->error_old, e, k * sizeof (double));
01254 #if DEBUG_OPTIMIZE
01255     fprintf (stderr, "optimize_merge_old: end\n");
01256 #endif
01257 }
```

## 4.23.2.15 optimize\_MonteCarlo()

```
void optimize_MonteCarlo ( )
```

Function to optimize with the Monte-Carlo algorithm.

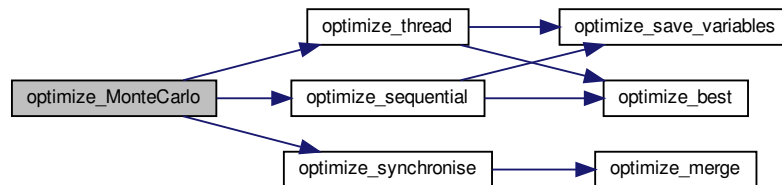
Definition at line 719 of file [optimize.c](#).

```

00720 {
00721     unsigned int i, j;
00722     GThread *thread[nthreads];
00723     ParallelData data[nthreads];
00724     #if DEBUG_OPTIMIZE
00725     fprintf (stderr, "optimize_MonteCarlo: start\n");
00726     #endif
00727     for (i = 0; i < optimize->nsimulations; ++i)
00728         for (j = 0; j < optimize->nvariables; ++j)
00729             optimize->value[i * optimize->nvariables + j]
00730                 = optimize->rangemin[j] + gsl_rng_uniform (optimize->
rng)
00731                     * (optimize->rangemax[j] - optimize->rangemin[j]);
00732     optimize->nsaveds = 0;
00733     if (nthreads <= 1)
00734         optimize_sequential ();
00735     else
00736     {
00737         for (i = 0; i < nthreads; ++i)
00738         {
00739             data[i].thread = i;
00740             thread[i]
00741                 = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00742         }
00743         for (i = 0; i < nthreads; ++i)
00744             g_thread_join (thread[i]);
00745     }
00746     #if HAVE_MPI
00747     // Communicating tasks results
00748     optimize_synchronise ();
00749     #endif
00750     #if DEBUG_OPTIMIZE
00751     fprintf (stderr, "optimize_MonteCarlo: end\n");
00752     #endif
00753 }

```

Here is the call graph for this function:



#### 4.23.2.16 optimize\_norm\_euclidian()

```

double optimize_norm_euclidian (
    unsigned int simulation )

```

Function to calculate the Euclidian error norm.

#### Returns

Euclidian error norm.

## Parameters

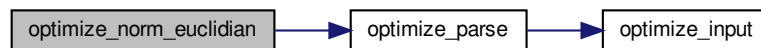
<i>simulation</i>	simulation number.
-------------------	--------------------

Definition at line 296 of file [optimize.c](#).

```

00297 {
00298     double e, ei;
00299     unsigned int i;
00300     #if DEBUG_OPTIMIZE
00301     fprintf (stderr, "optimize_norm_euclidian: start\n");
00302     #endif
00303     e = 0.;
00304     for (i = 0; i < optimize->nexperiments; ++i)
00305     {
00306         ei = optimize_parse (simulation, i);
00307         e += ei * ei;
00308     }
00309     e = sqrt (e);
00310     #if DEBUG_OPTIMIZE
00311     fprintf (stderr, "optimize_norm_euclidian: error=%lg\n", e);
00312     fprintf (stderr, "optimize_norm_euclidian: end\n");
00313     #endif
00314     return e;
00315 }
```

Here is the call graph for this function:



## 4.23.2.17 optimize\_norm\_maximum()

```
double optimize_norm_maximum (
    unsigned int simulation )
```

Function to calculate the maximum error norm.

## Returns

Maximum error norm.

## Parameters

<i>simulation</i>	simulation number.
-------------------	--------------------

Definition at line 323 of file [optimize.c](#).

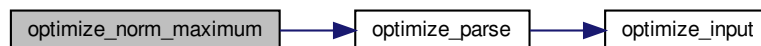
```
00324 {
```

```

00325     double e, ei;
00326     unsigned int i;
00327     #if DEBUG_OPTIMIZE
00328     fprintf (stderr, "optimize_norm_maximum: start\n");
00329     #endif
00330     e = 0.;
00331     for (i = 0; i < optimize->nexperiments; ++i)
00332     {
00333         ei = fabs (optimize_parse (simulation, i));
00334         e = fmax (e, ei);
00335     }
00336     #if DEBUG_OPTIMIZE
00337     fprintf (stderr, "optimize_norm_maximum: error=%lg\n", e);
00338     fprintf (stderr, "optimize_norm_maximum: end\n");
00339     #endif
00340     return e;
00341 }

```

Here is the call graph for this function:



#### 4.23.2.18 optimize\_norm\_p()

```

double optimize_norm_p (
    unsigned int simulation )

```

Function to calculate the P error norm.

##### Returns

P error norm.

##### Parameters

<i>simulation</i>	simulation number.
-------------------	--------------------

Definition at line 349 of file [optimize.c](#).

```

00350 {
00351     double e, ei;
00352     unsigned int i;
00353     #if DEBUG_OPTIMIZE
00354     fprintf (stderr, "optimize_norm_p: start\n");
00355     #endif
00356     e = 0.;
00357     for (i = 0; i < optimize->nexperiments; ++i)
00358     {
00359         ei = fabs (optimize_parse (simulation, i));
00360         e += pow (ei, optimize->p);
00361     }
00362     e = pow (e, 1. / optimize->p);
00363     #if DEBUG_OPTIMIZE

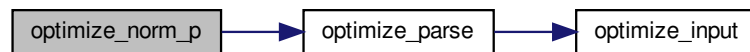
```

```

00364     fprintf (stderr, "optimize_norm_p: error=%lg\n", e);
00365     fprintf (stderr, "optimize_norm_p: end\n");
00366 #endif
00367     return e;
00368 }

```

Here is the call graph for this function:



#### 4.23.2.19 optimize\_norm\_taxicab()

```

double optimize_norm_taxicab (
    unsigned int simulation )

```

Function to calculate the taxicab error norm.

##### Returns

Taxicab error norm.

##### Parameters

<i>simulation</i>	simulation number.
-------------------	--------------------

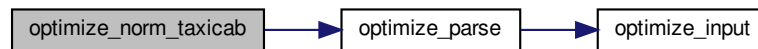
Definition at line 376 of file [optimize.c](#).

```

00377 {
00378     double e;
00379     unsigned int i;
00380     #if DEBUG_OPTIMIZE
00381     fprintf (stderr, "optimize_norm_taxicab: start\n");
00382     #endif
00383     e = 0.;
00384     for (i = 0; i < optimize->nexperiments; ++i)
00385         e += fabs (optimize_parse (simulation, i));
00386     #if DEBUG_OPTIMIZE
00387     fprintf (stderr, "optimize_norm_taxicab: error=%lg\n", e);
00388     fprintf (stderr, "optimize_norm_taxicab: end\n");
00389     #endif
00390     return e;
00391 }

```

Here is the call graph for this function:



#### 4.23.2.20 optimize\_open()

```
void optimize_open ( )
```

Function to open and perform a optimization.

Definition at line 1420 of file [optimize.c](#).

```

01421 {
01422     GTimeZone *tz;
01423     GDateTime *t0, *t;
01424     unsigned int i, j;
01425
01426     #if DEBUG_OPTIMIZE
01427     char *buffer;
01428     fprintf (stderr, "optimize_open: start\n");
01429     #endif
01430
01431     // Getting initial time
01432     #if DEBUG_OPTIMIZE
01433     fprintf (stderr, "optimize_open: getting initial time\n");
01434     #endif
01435     tz = g_time_zone_new_utc ();
01436     t0 = g_date_time_new_now (tz);
01437
01438     // Obtaining and initing the pseudo-random numbers generator seed
01439     #if DEBUG_OPTIMIZE
01440     fprintf (stderr, "optimize_open: getting initial seed\n");
01441     #endif
01442     if (optimize->seed == DEFAULT_RANDOM_SEED)
01443         optimize->seed = input->seed;
01444     gsl_rng_set (optimize->rng, optimize->seed);
01445
01446     // Replacing the working directory
01447     #if DEBUG_OPTIMIZE
01448     fprintf (stderr, "optimize_open: replacing the working directory\n");
01449     #endif
01450     g_chdir (input->directory);
01451
01452     // Getting results file names
01453     optimize->result = input->result;
01454     optimize->variables = input->variables;
01455
01456     // Obtaining the simulator file
01457     optimize->simulator = input->simulator;
01458
01459     // Obtaining the evaluator file
01460     optimize->evaluator = input->evaluator;
01461
01462     // Reading the algorithm
01463     optimize->algorithm = input->algorithm;
01464     switch (optimize->algorithm)
01465     {
01466     case ALGORITHM_MONTE_CARLO:
01467         optimize_algorithm = optimize_MonteCarlo;
01468         break;
01469     case ALGORITHM_SWEEP:
01470         optimize_algorithm = optimize_sweep;
01471         break;
  
```



```

01472     case ALGORITHM_ORTHOGONAL:
01473         optimize_algorithm = optimize_orthogonal;
01474         break;
01475     default:
01476         optimize_algorithm = optimize_genetic;
01477         optimize->mutation_ratio = input->
mutation_ratio;
01478         optimize->reproduction_ratio = input->
reproduction_ratio;
01479         optimize->adaptation_ratio = input->
adaptation_ratio;
01480     }
01481     optimize->nvariables = input->nvariables;
01482     optimize->nsimulations = input->nsimulations;
01483     optimize->niterations = input->niterations;
01484     optimize->nbest = input->nbest;
01485     optimize->tolerance = input->tolerance;
01486     optimize->nsteps = input->nsteps;
01487     optimize->nestimates = 0;
01488     optimize->threshold = input->threshold;
01489     optimize->stop = 0;
01490     if (input->nsteps)
01491     {
01492         optimize->relaxation = input->relaxation;
01493         switch (input->climbing)
01494         {
01495             case CLIMBING_METHOD_COORDINATES:
01496                 optimize->nestimates = 2 * optimize->
nvariables;
01497                 optimize_estimate_climbing =
optimize_estimate_climbing_coordinates;
01498                 break;
01499             default:
01500                 optimize->nestimates = input->nestimates;
01501                 optimize_estimate_climbing =
optimize_estimate_climbing_random;
01502         }
01503     }
01504
01505 #if DEBUG_OPTIMIZE
01506     fprintf (stderr, "optimize_open: nbest=%u\n", optimize->nbest);
01507 #endif
01508     optimize->simulation_best
01509     = (unsigned int *) alloca (optimize->nbest * sizeof (unsigned int));
01510     optimize->error_best = (double *) alloca (optimize->
nbest * sizeof (double));
01511
01512     // Reading the experimental data
01513 #if DEBUG_OPTIMIZE
01514     buffer = g_get_current_dir ();
01515     fprintf (stderr, "optimize_open: current directory=%s\n", buffer);
01516     g_free (buffer);
01517 #endif
01518     optimize->nexperiments = input->nexperiments;
01519     optimize->ninputs = input->experiment->ninputs;
01520     optimize->experiment
01521     = (char **) alloca (input->nexperiments * sizeof (char *));
01522     optimize->weight = (double *) alloca (input->nexperiments * sizeof (double
));
01523     for (i = 0; i < input->experiment->ninputs; ++i)
01524         optimize->file[i] = (GMappedFile **)
01525         g_malloc (input->nexperiments * sizeof (GMappedFile *));
01526     for (i = 0; i < input->nexperiments; ++i)
01527     {
01528 #if DEBUG_OPTIMIZE
01529         fprintf (stderr, "optimize_open: i=%u\n", i);
01530 #endif
01531         optimize->experiment[i] = input->experiment[i].
name;
01532         optimize->weight[i] = input->experiment[i].
weight;
01533 #if DEBUG_OPTIMIZE
01534         fprintf (stderr, "optimize_open: experiment=%s weight=%lg\n",
01535                 optimize->experiment[i], optimize->
weight[i]);
01536 #endif
01537         for (j = 0; j < input->experiment->ninputs; ++j)
01538         {
01539 #if DEBUG_OPTIMIZE
01540             fprintf (stderr, "optimize_open: stencil%u\n", j + 1);
01541 #endif
01542             optimize->file[j][i]
01543             = g_mapped_file_new (input->experiment[i].stencil[j], 0, NULL);
01544         }
01545     }
01546
01547     // Reading the variables data

```

```

01548 #if DEBUG_OPTIMIZE
01549     fprintf (stderr, "optimize_open: reading variables\n");
01550 #endif
01551     optimize->label = (char **) alloca (input->nvariables * sizeof (char *));
01552     j = input->nvariables * sizeof (double);
01553     optimize->rangemin = (double *) alloca (j);
01554     optimize->rangeminabs = (double *) alloca (j);
01555     optimize->rangemax = (double *) alloca (j);
01556     optimize->rangemaxabs = (double *) alloca (j);
01557     optimize->step = (double *) alloca (j);
01558     j = input->nvariables * sizeof (unsigned int);
01559     optimize->precision = (unsigned int *) alloca (j);
01560     optimize->nsweeps = (unsigned int *) alloca (j);
01561     optimize->nbits = (unsigned int *) alloca (j);
01562     for (i = 0; i < input->nvariables; ++i)
01563     {
01564         optimize->label[i] = input->variable[i].name;
01565         optimize->rangemin[i] = input->variable[i].
rangemin;
01566         optimize->rangeminabs[i] = input->variable[i].
rangeminabs;
01567         optimize->rangemax[i] = input->variable[i].
rangemax;
01568         optimize->rangemaxabs[i] = input->variable[i].
rangemaxabs;
01569         optimize->precision[i] = input->variable[i].
precision;
01570         optimize->step[i] = input->variable[i].step;
01571         optimize->nsweeps[i] = input->variable[i].
nsweeps;
01572         optimize->nbits[i] = input->variable[i].nbits;
01573     }
01574     if (input->algorithm == ALGORITHM_SWEEP
01575         || input->algorithm == ALGORITHM_ORTHOGONAL)
01576     {
01577         optimize->nsimulations = 1;
01578         for (i = 0; i < input->nvariables; ++i)
01579         {
01580             optimize->nsimulations *= optimize->
nsweeps[i];
01581 #if DEBUG_OPTIMIZE
01582             fprintf (stderr, "optimize_open: nsweeps=%u nsimulations=%u\n",
01583                     optimize->nsweeps[i], optimize->
nsimulations);
01584 #endif
01585         }
01586     }
01587     if (optimize->nsteps)
01588         optimize->climbing
01589             = (double *) alloca (optimize->nvariables * sizeof (double));
01590
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     // Allocating values
01609 #if DEBUG_OPTIMIZE
01610     fprintf (stderr, "optimize_open: allocating variables\n");
01611     fprintf (stderr, "optimize_open: nvariables=%u algorithm=%u\n",
01612             optimize->nvariables, optimize->algorithm);
01613 #endif
01614     optimize->genetic_variable = NULL;
01615     if (optimize->algorithm == ALGORITHM_GENETIC)
01616     {
01617         optimize->genetic_variable = (GeneticVariable *)
g_malloc (optimize->nvariables * sizeof (
GeneticVariable));
01619         for (i = 0; i < optimize->nvariables; ++i)
01620         {
01621 #if DEBUG_OPTIMIZE
01622             fprintf (stderr, "optimize_open: i=%u min=%lg max=%lg nbits=%u\n",
01623                     i, optimize->rangemin[i], optimize->
rangemax[i],
01624                     optimize->nbits[i]);

```

```

01625 #endif
01626     optimize->genetic_variable[i].minimum =
01627         optimize->rangemin[i];
01627     optimize->genetic_variable[i].maximum =
01628         optimize->rangemax[i];
01628     optimize->genetic_variable[i].nbits = optimize->
01629         nbits[i];
01629 }
01630 }
01631 #if DEBUG_OPTIMIZE
01632     fprintf (stderr, "optimize_open: nvariables=%u nsimulations=%u\n",
01633         optimize->nvariables, optimize->
01634         nsimulations);
01634 #endif
01635     optimize->value = (double *)
01636         g_malloc ((optimize->nsimulations
01637             + optimize->nestimates * optimize->
01638             nsteps)
01639             * optimize->nvariables * sizeof (double));
01639
01640     // Calculating simulations to perform for each task
01641     #if HAVE_MPI
01642     #if DEBUG_OPTIMIZE
01643         fprintf (stderr, "optimize_open: rank=%u ntasks=%u\n",
01644             optimize->mpi_rank, ntasks);
01645     #endif
01646     optimize->nstart = optimize->mpi_rank * optimize->
01647         nsimulations / ntasks;
01647     optimize->nend = (1 + optimize->mpi_rank) *
01648         optimize->nsimulations / ntasks;
01648     if (optimize->nsteps)
01649     {
01650         optimize->nstart_climbing
01651             = optimize->mpi_rank * optimize->nestimates /
01652             ntasks;
01652         optimize->nend_climbing
01653             = (1 + optimize->mpi_rank) * optimize->
01654             nestimates / ntasks;
01654     }
01655     #else
01656     optimize->nstart = 0;
01657     optimize->nend = optimize->nsimulations;
01658     if (optimize->nsteps)
01659     {
01660         optimize->nstart_climbing = 0;
01661         optimize->nend_climbing = optimize->
01662             nestimates;
01662     }
01663     #endif
01664     #if DEBUG_OPTIMIZE
01665     fprintf (stderr, "optimize_open: nstart=%u nend=%u\n", optimize->
01666         nstart,
01667         optimize->nend);
01667     #endif
01668
01669     // Calculating simulations to perform for each thread
01670     optimize->thread
01671         = (unsigned int *) alloca ((1 + nthreads) * sizeof (unsigned int));
01672     for (i = 0; i <= nthreads; ++i)
01673     {
01674         optimize->thread[i] = optimize->nstart
01675             + i * (optimize->nend - optimize->nstart) /
01676             nthreads;
01677     #if DEBUG_OPTIMIZE
01677         fprintf (stderr, "optimize_open: i=%u thread=%u\n", i,
01678             optimize->thread[i]);
01679     #endif
01680     }
01681     if (optimize->nsteps)
01682         optimize->thread_climbing = (unsigned int *)
01683             alloca ((1 + nthreads_climbing) * sizeof (unsigned int));
01684
01685     // Opening result files
01686     optimize->file_result = g_fopen (optimize->result, "w");
01687     optimize->file_variables = g_fopen (optimize->
01688         variables, "w");
01688
01689     // Performing the algorithm
01690     switch (optimize->algorithm)
01691     {
01692         // Genetic algorithm
01693         case ALGORITHM_GENETIC:
01694             optimize_genetic ();
01695             break;
01696
01697         // Iterative algorithm
01698         default:

```

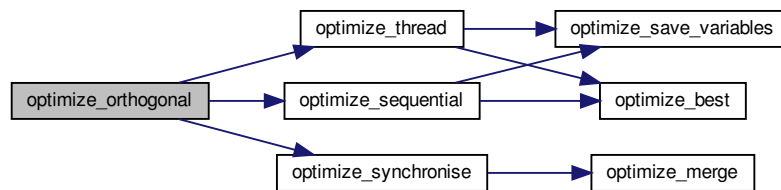


```

00775         e = optimize->rangemin[j];
00776         if (optimize->nsweeps[j] > 1)
00777             e += (1 + gsl_rng_uniform (optimize->rng))
00778                 * (optimize->rangemax[j] - optimize->
rangemin[j])
00779             / optimize->nsweeps[j];
00780         optimize->value[i * optimize->nvariables + j] = e;
00781     }
00782 }
00783 optimize->nsaveds = 0;
00784 if (nthreads <= 1)
00785     optimize_sequential ();
00786 else
00787 {
00788     for (i = 0; i < nthreads; ++i)
00789     {
00790         data[i].thread = i;
00791         thread[i]
            = g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00792     }
00793     for (i = 0; i < nthreads; ++i)
00794         g_thread_join (thread[i]);
00795 }
00796 #if HAVE_MPI
00797 // Communicating tasks results
00798 optimize_synchronise ();
00799 #endif
00800 #if DEBUG_OPTIMIZE
00801 fprintf (stderr, "optimize_orthogonal: end\n");
00802 #endif
00803 }
00804 }

```

Here is the call graph for this function:



#### 4.23.2.22 optimize\_parse()

```

double optimize_parse (
    unsigned int simulation,
    unsigned int experiment )

```

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 182 of file `optimize.c`.

```

00184 {
00185     unsigned int i;
00186     double e;
00187     char buffer[512], input[MAX_NINPUTS][32], output[32], result[32], *buffer2,
00188         *buffer3, *buffer4;
00189     FILE *file_result;
00190
00191     #if DEBUG_OPTIMIZE
00192         fprintf (stderr, "optimize_parse: start\n");
00193         fprintf (stderr, "optimize_parse: simulation=%u experiment=%u\n",
00194             simulation, experiment);
00195     #endif
00196
00197     // Opening input files
00198     for (i = 0; i < optimize->ninputs; ++i)
00199     {
00200         snprintf (&input[i][0], 32, "input-%u-%u-%u", i, simulation, experiment);
00201     #if DEBUG_OPTIMIZE
00202         fprintf (stderr, "optimize_parse: i=%u input=%s\n", i, &input[i][0]);
00203     #endif
00204         optimize_input (simulation, &input[i][0], optimize->
00205             file[i][experiment]);
00206     }
00207     for (; i < MAX_NINPUTS; ++i)
00208         strcpy (&input[i][0], "");
00209     #if DEBUG_OPTIMIZE
00210         fprintf (stderr, "optimize_parse: parsing end\n");
00211     #endif
00212
00213     // Performing the simulation
00214     snprintf (output, 32, "output-%u-%u", simulation, experiment);
00215     buffer2 = g_path_get_dirname (optimize->simulator);
00216     buffer3 = g_path_get_basename (optimize->simulator);
00217     buffer4 = g_build_filename (buffer2, buffer3, NULL);
00218     snprintf (buffer, 512, "\"%s\" %s %s %s %s %s %s %s %s %s",
00219         buffer4, input[0], input[1], input[2], input[3], input[4],
00220         input[5], input[6], input[7], output);
00221     g_free (buffer4);
00222     g_free (buffer3);
00223     g_free (buffer2);
00224     #if DEBUG_OPTIMIZE
00225         fprintf (stderr, "optimize_parse: %s\n", buffer);
00226     #endif
00227     if (system (buffer) == -1)
00228         error_message = buffer;
00229
00230     // Checking the objective value function
00231     if (optimize->evaluator)
00232     {
00233         snprintf (result, 32, "result-%u-%u", simulation, experiment);
00234         buffer2 = g_path_get_dirname (optimize->evaluator);
00235         buffer3 = g_path_get_basename (optimize->evaluator);
00236         buffer4 = g_build_filename (buffer2, buffer3, NULL);
00237         snprintf (buffer, 512, "\"%s\" %s %s %s",
00238             buffer4, output, optimize->experiment[experiment], result);
00239         g_free (buffer4);
00240         g_free (buffer3);
00241         g_free (buffer2);
00242     #if DEBUG_OPTIMIZE
00243         fprintf (stderr, "optimize_parse: %s\n", buffer);
00244     #endif
00245         if (system (buffer) == -1)
00246             error_message = buffer;
00247         file_result = g_fopen (result, "r");
00248         e = atof (fgets (buffer, 512, file_result));
00249         fclose (file_result);
00250     }
00251     else
00252     {
00253     #if DEBUG_OPTIMIZE
00254         fprintf (stderr, "optimize_parse: output=%s\n", output);
00255     #endif
00256         strcpy (result, "");
00257         file_result = g_fopen (output, "r");
00258         e = atof (fgets (buffer, 512, file_result));
00259         fclose (file_result);
00260     }
00261
00262     // Removing files
00263     #if !DEBUG_OPTIMIZE
00264     for (i = 0; i < optimize->ninputs; ++i)
00265     {
00266         if (optimize->file[i][0])

```

```

00267     {
00268         snprintf (buffer, 512, RM " %s", &input[i][0]);
00269         if (system (buffer) == -1)
00270             error_message = buffer;
00271     }
00272 }
00273 snprintf (buffer, 512, RM " %s %s", output, result);
00274 if (system (buffer) == -1)
00275     error_message = buffer;
00276 #endif
00277
00278 // Processing pending events
00279 if (show_pending)
00280     show_pending ();
00281
00282 #if DEBUG_OPTIMIZE
00283 fprintf (stderr, "optimize_parse: end\n");
00284 #endif
00285
00286 // Returning the objective function
00287 return e * optimize->weight[experiment];
00288 }

```

Here is the call graph for this function:



#### 4.23.2.23 optimize\_print()

```
void optimize_print ( )
```

Function to print the results.

Definition at line 397 of file [optimize.c](#).

```

00398 {
00399     unsigned int i;
00400     char buffer[512];
00401     #if HAVE_MPI
00402     if (optimize->mpi_rank)
00403         return;
00404     #endif
00405     printf ("%s\n", _("Best result"));
00406     fprintf (optimize->file_result, "%s\n", _("Best result"));
00407     printf ("error = %.15le\n", optimize->error_old[0]);
00408     fprintf (optimize->file_result, "error = %.15le\n",
00409             optimize->error_old[0]);
00409     for (i = 0; i < optimize->nvariables; ++i)
00410     {
00411         snprintf (buffer, 512, "%s = %s\n",
00412                 optimize->label[i], format[optimize->
00413                 precision[i]]);
00414         printf (buffer, optimize->value_old[i]);
00415         fprintf (optimize->file_result, buffer, optimize->
00416                 value_old[i]);
00417     }
00418     fflush (optimize->file_result);
00419 }

```

#### 4.23.2.24 optimize\_refine()

```
void optimize_refine ( )
```

Function to refine the search ranges of the variables in iterative algorithms.

Definition at line 1264 of file [optimize.c](#).

```
01265 {
01266     unsigned int i, j;
01267     double d;
01268     #if HAVE_MPI
01269     MPI_Status mpi_stat;
01270     #endif
01271     #if DEBUG_OPTIMIZE
01272     fprintf (stderr, "optimize_refine: start\n");
01273     #endif
01274     #if HAVE_MPI
01275     if (!optimize->mpi_rank)
01276     {
01277     #endif
01278         for (j = 0; j < optimize->nvariables; ++j)
01279         {
01280             optimize->rangemin[j] = optimize->rangemax[j]
01281             = optimize->value_old[j];
01282         }
01283         for (i = 0; ++i < optimize->nbest;)
01284         {
01285             for (j = 0; j < optimize->nvariables; ++j)
01286             {
01287                 optimize->rangemin[j]
01288                 = fmin (optimize->rangemin[j],
01289                     optimize->value_old[i * optimize->
01290                     nvariables + j]);
01291                 optimize->rangemax[j]
01292                 = fmax (optimize->rangemax[j],
01293                     optimize->value_old[i * optimize->
01294                     nvariables + j]);
01295             }
01296             for (j = 0; j < optimize->nvariables; ++j)
01297             {
01298                 d = optimize->tolerance
01299                 * (optimize->rangemax[j] - optimize->
01300                 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->
01315                 rangeminabs[j]);
01316                 optimize->rangemax[j] += d;
01317                 optimize->rangemax[j]
01318                 = fmin (optimize->rangemax[j], optimize->
01319                 rangemaxabs[j]);
01320                 printf ("%s min=%lg max=%lg\n", optimize->label[j],
01321                     optimize->rangemin[j], optimize->
01322                     rangemax[j]);
01323                 fprintf (optimize->file_result, "%s min=%lg max=%lg\n",
01324                     optimize->label[j], optimize->rangemin[j],
01325                     optimize->rangemax[j]);
01326             }
01327             #if HAVE_MPI
01328             for (i = 1; (int) i < ntasks; ++i)
01329             {
01330                 MPI_Send (optimize->rangemin, optimize->
01331                     nvariables, MPI_DOUBLE, i,
01332                     1, MPI_COMM_WORLD);
01333                 MPI_Send (optimize->rangemax, optimize->
01334                     nvariables, MPI_DOUBLE, i,
01335                     1, MPI_COMM_WORLD);
01336             }
01337             #endif
01338         }
01339     }
```



```

01331     else
01332     {
01333         MPI_Recv (optimize->rangemin, optimize->nvariables, MPI_DOUBLE, 0,
01334                 1,
01335                 MPI_COMM_WORLD, &mpi_stat);
01336         MPI_Recv (optimize->rangemax, optimize->nvariables, MPI_DOUBLE, 0,
01337                 1,
01338                 MPI_COMM_WORLD, &mpi_stat);
01339     }
01340 #endif
01341 #if DEBUG_OPTIMIZE
01342     fprintf (stderr, "optimize_refine: end\n");
01343 #endif
01344 }

```

#### 4.23.2.25 optimize\_save\_old()

```
void optimize_save_old ( )
```

Function to save the best results on iterative methods.

Definition at line 1184 of file [optimize.c](#).

```

01185 {
01186     unsigned int i, j;
01187     #if DEBUG_OPTIMIZE
01188         fprintf (stderr, "optimize_save_old: start\n");
01189         fprintf (stderr, "optimize_save_old: nsaveds=%u\n", optimize->nsaveds);
01190     #endif
01191     memcpy (optimize->error_old, optimize->error_best,
01192            optimize->nbest * sizeof (double));
01193     for (i = 0; i < optimize->nbest; ++i)
01194     {
01195         j = optimize->simulation_best[i];
01196         #if DEBUG_OPTIMIZE
01197             fprintf (stderr, "optimize_save_old: i=%u j=%u\n", i, j);
01198         #endif
01199         memcpy (optimize->value_old + i * optimize->
01200                nvariables,
01201                optimize->value + j * optimize->nvariables,
01202                optimize->nvariables * sizeof (double));
01203     }
01204     #if DEBUG_OPTIMIZE
01205         for (i = 0; i < optimize->nvariables; ++i)
01206             fprintf (stderr, "optimize_save_old: best variable %u=%lg\n",
01207                     i, optimize->value_old[i]);
01208     #endif
01209 }

```

#### 4.23.2.26 optimize\_save\_variables()

```
void optimize_save_variables (
    unsigned int simulation,
    double error )
```

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 423 of file `optimize.c`.

```

00425 {
00426     unsigned int i;
00427     char buffer[64];
00428     #if DEBUG_OPTIMIZE
00429     fprintf (stderr, "optimize_save_variables: start\n");
00430     #endif
00431     for (i = 0; i < optimize->nvariables; ++i)
00432     {
00433         snprintf (buffer, 64, "%s ", format[optimize->precision[i]]);
00434         fprintf (optimize->file_variables, buffer,
00435                 optimize->value[simulation * optimize->
nvariables + i]);
00436     }
00437     fprintf (optimize->file_variables, "%.14le\n", error);
00438     fflush (optimize->file_variables);
00439     #if DEBUG_OPTIMIZE
00440     fprintf (stderr, "optimize_save_variables: end\n");
00441     #endif
00442 }

```

#### 4.23.2.27 optimize\_sequential()

```
void optimize_sequential ( )
```

Function to optimize sequentially.

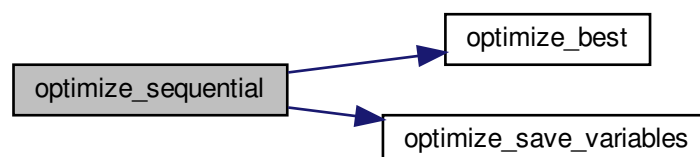
Definition at line 489 of file `optimize.c`.

```

00490 {
00491     unsigned int i;
00492     double e;
00493     #if DEBUG_OPTIMIZE
00494     fprintf (stderr, "optimize_sequential: start\n");
00495     fprintf (stderr, "optimize_sequential: nstart=%u nend=%u\n",
00496             optimize->nstart, optimize->nend);
00497     #endif
00498     for (i = optimize->nstart; i < optimize->nend; ++i)
00499     {
00500         e = optimize_norm (i);
00501         optimize_best (i, e);
00502         optimize_save_variables (i, e);
00503         if (e < optimize->threshold)
00504         {
00505             optimize->stop = 1;
00506             break;
00507         }
00508     #if DEBUG_OPTIMIZE
00509     fprintf (stderr, "optimize_sequential: i=%u e=%lg\n", i, e);
00510     #endif
00511     }
00512     #if DEBUG_OPTIMIZE
00513     fprintf (stderr, "optimize_sequential: end\n");
00514     #endif
00515 }

```

Here is the call graph for this function:



## 4.23.2.28 optimize\_step()

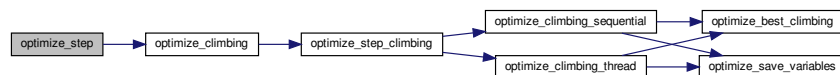
```
void optimize_step ( )
```

Function to do a step of the iterative algorithm.

Definition at line 1348 of file [optimize.c](#).

```
01349 {
01350     #if DEBUG_OPTIMIZE
01351         fprintf (stderr, "optimize_step: start\n");
01352     #endif
01353     optimize_algorithm ();
01354     if (optimize->nsteps)
01355         optimize_climbing ();
01356     #if DEBUG_OPTIMIZE
01357         fprintf (stderr, "optimize_step: end\n");
01358     #endif
01359 }
```

Here is the call graph for this function:



## 4.23.2.29 optimize\_step\_climbing()

```
void optimize_step_climbing (
    unsigned int simulation )
```

Function to do a step of the hill climbing method.

## Parameters

<i>simulation</i>	Simulation number.
-------------------	--------------------

Definition at line 969 of file [optimize.c](#).

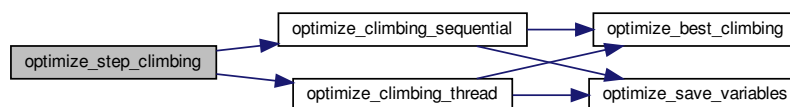
```
00970 {
00971     GThread *thread[nthreads_climbing];
00972     ParallelData data[nthreads_climbing];
00973     unsigned int i, j, k, b;
00974     #if DEBUG_OPTIMIZE
00975         fprintf (stderr, "optimize_step_climbing: start\n");
00976     #endif
00977     for (i = 0; i < optimize->nestimates; ++i)
00978     {
00979         k = (simulation + i) * optimize->nvariables;
```

```

00980     b = optimize->simulation_best[0] * optimize->
nvariables;
00981 #if DEBUG_OPTIMIZE
00982     fprintf (stderr, "optimize_step_climbing: simulation=%u best=%u\n",
00983             simulation + i, optimize->simulation_best[0]);
00984 #endif
00985     for (j = 0; j < optimize->nvariables; ++j, ++k, ++b)
00986     {
00987 #if DEBUG_OPTIMIZE
00988         fprintf (stderr,
00989                 "optimize_step_climbing: estimate=%u best=%u=%.14le\n",
00990                 i, j, optimize->value[b]);
00991 #endif
00992         optimize->value[k]
00993             = optimize->value[b] + optimize_estimate_climbing (j, i)
;
00994         optimize->value[k] = fmin (fmax (optimize->value[k],
00995                                         optimize->rangeminabs[j]),
00996                                   optimize->rangemaxabs[j]);
00997 #if DEBUG_OPTIMIZE
00998         fprintf (stderr,
00999                 "optimize_step_climbing: estimate=%u variable%u=%.14le\n",
01000                 i, j, optimize->value[k]);
01001 #endif
01002     }
01003 }
01004 if (nthreads_climbing == 1)
01005     optimize_climbing_sequential (simulation);
01006 else
01007 {
01008     for (i = 0; i <= nthreads_climbing; ++i)
01009     {
01010         optimize->thread_climbing[i]
01011             = simulation + optimize->nstart_climbing
01012             + i * (optimize->nend_climbing - optimize->
nstart_climbing)
01013             / nthreads_climbing;
01014 #if DEBUG_OPTIMIZE
01015         fprintf (stderr,
01016                 "optimize_step_climbing: i=%u thread_climbing=%u\n",
01017                 i, optimize->thread_climbing[i]);
01018 #endif
01019     }
01020     for (i = 0; i < nthreads_climbing; ++i)
01021     {
01022         data[i].thread = i;
01023         thread[i] = g_thread_new
01024             (NULL, (GThreadFunc) optimize_climbing_thread, &data[i]);
01025     }
01026     for (i = 0; i < nthreads_climbing; ++i)
01027         g_thread_join (thread[i]);
01028 }
01029 #if DEBUG_OPTIMIZE
01030     fprintf (stderr, "optimize_step_climbing: end\n");
01031 #endif
01032 }

```

Here is the call graph for this function:



#### 4.23.2.30 optimize\_sweep()

```
void optimize_sweep ( )
```

Function to optimize with the sweep algorithm.

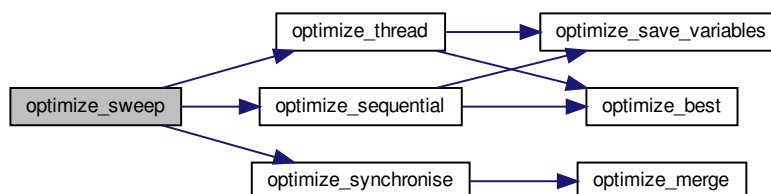
Definition at line 669 of file [optimize.c](#).

```

00670 {
00671     unsigned int i, j, k, l;
00672     double e;
00673     GThread *thread[nthreads];
00674     ParallelData data[nthreads];
00675     #if DEBUG_OPTIMIZE
00676     fprintf (stderr, "optimize_sweep: start\n");
00677     #endif
00678     for (i = 0; i < optimize->nsimulations; ++i)
00679     {
00680         k = i;
00681         for (j = 0; j < optimize->nvariables; ++j)
00682         {
00683             l = k % optimize->nsweeps[j];
00684             k /= optimize->nsweeps[j];
00685             e = optimize->rangemin[j];
00686             if (optimize->nsweeps[j] > 1)
00687                 e += 1 * (optimize->rangemax[j] - optimize->
rangemin[j])
/ (optimize->nsweeps[j] - 1);
00688             optimize->value[i * optimize->nvariables + j] = e;
00689         }
00690     }
00691     optimize->nsaveds = 0;
00692     if (nthreads <= 1)
00693         optimize_sequential ();
00694     else
00695     {
00696         for (i = 0; i < nthreads; ++i)
00697         {
00698             data[i].thread = i;
00699             thread[i]
= g_thread_new (NULL, (GThreadFunc) optimize_thread, &data[i]);
00700         }
00701         for (i = 0; i < nthreads; ++i)
00702             g_thread_join (thread[i]);
00703     }
00704     #if HAVE_MPI
00705     // Communicating tasks results
00706     optimize_synchronise ();
00707     #endif
00708     #if DEBUG_OPTIMIZE
00709     fprintf (stderr, "optimize_sweep: end\n");
00710     #endif
00711 }
00712
00713

```

Here is the call graph for this function:



## 4.23.2.31 optimize\_synchronise()

```
void optimize_synchronise ( )
```

Function to synchronise the optimization results of MPI tasks.

Definition at line 622 of file [optimize.c](#).

```
00623 {
00624     unsigned int i, nsaveds, simulation_best[optimize->nbest], stop;
00625     double error_best[optimize->nbest];
00626     MPI_Status mpi_stat;
00627     #if DEBUG_OPTIMIZE
00628     fprintf (stderr, "optimize_synchronise: start\n");
00629     #endif
00630     if (optimize->mpi_rank == 0)
00631     {
00632         for (i = 1; (int) i < ntasks; ++i)
00633         {
00634             MPI_Recv (&nsaveds, 1, MPI_INT, i, 1, MPI_COMM_WORLD, &mpi_stat);
00635             MPI_Recv (simulation_best, nsaveds, MPI_INT, i, 1,
00636                     MPI_COMM_WORLD, &mpi_stat);
00637             MPI_Recv (error_best, nsaveds, MPI_DOUBLE, i, 1,
00638                     MPI_COMM_WORLD, &mpi_stat);
00639             optimize_merge (nsaveds, simulation_best, error_best);
00640             MPI_Recv (&stop, 1, MPI_UNSIGNED, i, 1, MPI_COMM_WORLD, &mpi_stat);
00641             if (stop)
00642                 optimize->stop = 1;
00643         }
00644         for (i = 1; (int) i < ntasks; ++i)
00645             MPI_Send (&optimize->stop, 1, MPI_UNSIGNED, i, 1, MPI_COMM_WORLD);
00646     }
00647     else
00648     {
00649         MPI_Send (&optimize->nsaveds, 1, MPI_INT, 0, 1, MPI_COMM_WORLD);
00650         MPI_Send (optimize->simulation_best, optimize->
00651                 nsaveds, MPI_INT, 0, 1,
00652                 MPI_COMM_WORLD);
00653         MPI_Send (optimize->error_best, optimize->
00654                 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 }
```

Here is the call graph for this function:



## 4.23.2.32 optimize\_thread()

```
void* optimize_thread (
    ParallelData * data )
```

Function to optimize on a thread.

## Returns

NULL.

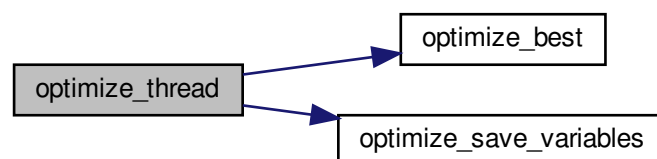
## Parameters

<i>data</i>	Function data.
-------------	----------------

Definition at line 523 of file [optimize.c](#).

```
00524 {
00525     unsigned int i, thread;
00526     double e;
00527     #if DEBUG_OPTIMIZE
00528     fprintf (stderr, "optimize_thread: start\n");
00529     #endif
00530     thread = data->thread;
00531     #if DEBUG_OPTIMIZE
00532     fprintf (stderr, "optimize_thread: thread=%u start=%u end=%u\n", thread,
00533             optimize->thread[thread], optimize->thread[thread + 1]);
00534     #endif
00535     for (i = optimize->thread[thread]; i < optimize->thread[thread + 1]; ++i)
00536     {
00537         e = optimize_norm (i);
00538         g_mutex_lock (mutex);
00539         optimize_best (i, e);
00540         optimize_save_variables (i, e);
00541         if (e < optimize->threshold)
00542             optimize->stop = 1;
00543         g_mutex_unlock (mutex);
00544         if (optimize->stop)
00545             break;
00546     #if DEBUG_OPTIMIZE
00547     fprintf (stderr, "optimize_thread: i=%u e=%lg\n", i, e);
00548     #endif
00549     }
00550     #if DEBUG_OPTIMIZE
00551     fprintf (stderr, "optimize_thread: end\n");
00552     #endif
00553     g_thread_exit (NULL);
00554     return NULL;
00555 }
```

Here is the call graph for this function:



## 4.24 optimize.h

```

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 2012-2018, 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 #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     GeneticVariable *genetic_variable;
00042     FILE *file_result;
00043     FILE *file_variables;
00044     char *result;
00045     char *variables;
00046     char *simulator;
00047     char *evaluator;
00048     double *value;
00049     double *rangemin;
00050     double *rangemax;
00051     double *rangeminabs;
00052     double *rangemaxabs;
00053     double *error_best;
00054     double *weight;
00055     double *step;
00056     double *climbing;
00057     double *value_old;
00058     double *error_old;
00059     unsigned int *precision;
00060     unsigned int *nsweeps;
00061     unsigned int *nbits;
00062     unsigned int *thread;
00063     unsigned int *thread_climbing;
00064     unsigned int *simulation_best;
00065     double tolerance;
00066     double mutation_ratio;
00067     double reproduction_ratio;
00068     double adaptation_ratio;
00069     double relaxation;
00070     double calculation_time;
00071     double p;
00072     double threshold;
00073     unsigned long int seed;
00074     unsigned int nvariables;
00075     unsigned int nexperiments;
00076     unsigned int ninputs;
00077     unsigned int nsimulations;
00078     unsigned int nsteps;
00079     unsigned int nestimates;
00080     unsigned int algorithm;
00081     unsigned int nstart;
00082     unsigned int nend;
00083     unsigned int nstart_climbing;
00084     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 void (*optimize_algorithm) ();
00132 extern double (*optimize_estimate_climbing) (unsigned int variable,
00133 unsigned int estimate);
00134 extern double (*optimize_norm) (unsigned int simulation);
00135 extern Optimize optimize[1];
00136
00137 // Public functions
00138 void optimize_input (unsigned int simulation, char *input,
00139 GMappedFile * stencil);
00140 double optimize_parse (unsigned int simulation, unsigned int experiment);
00141 double optimize_norm_euclidian (unsigned int simulation);
00142 double optimize_norm_maximum (unsigned int simulation);
00143 double optimize_norm_p (unsigned int simulation);
00144 double optimize_norm_taxicab (unsigned int simulation);
00145 void optimize_print ();
00146 void optimize_save_variables (unsigned int simulation, double error);
00147 void optimize_best (unsigned int simulation, double value);
00148 void optimize_sequential ();
00149 void *optimize_thread (ParallelData * data);
00150 void optimize_merge (unsigned int nsaveds, unsigned int *simulation_best,
00151 double *error_best);
00152 #if HAVE_MPI
00153 void optimize_synchronise ();
00154 #endif
00155 void optimize_sweep ();
00156 void optimize_MonteCarlo ();
00157 void optimize_orthogonal ();
00158 void optimize_best_climbing (unsigned int simulation, double value);
00159 void optimize_climbing_sequential (unsigned int simulation);
00160 void *optimize_climbing_thread (ParallelData * data);
00161 double optimize_estimate_climbing_random (unsigned int variable,
00162 unsigned int estimate);
00163 double optimize_estimate_climbing_coordinates (unsigned int variable,
00164 unsigned int estimate);
00165 void optimize_step_climbing (unsigned int simulation);
00166 void optimize_climbing ();
00167 double optimize_genetic_objective (Entity * entity);
00168 void optimize_genetic ();
00169 void optimize_save_old ();
00170 void optimize_merge_old ();
00171 void optimize_refine ();
00172 void optimize_step ();
00173 void optimize_iterate ();
00174 void optimize_free ();
00175 void optimize_open ();
00176
00177 #endif

```

## 4.25 utils.c File Reference

Source file to define some useful functions.

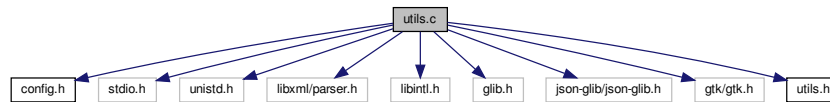
```

#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 "utils.h"
```

Include dependency graph for utils.c:



## Functions

- void [show\\_message](#) (char \*title, char \*msg, int type)
- void [show\\_error](#) (char \*msg)
- int [xml\\_node\\_get\\_int](#) (xmlNode \*node, const xmlChar \*prop, int \*error\_code)
- unsigned int [xml\\_node\\_get\\_uint](#) (xmlNode \*node, const xmlChar \*prop, int \*error\_code)
- unsigned int [xml\\_node\\_get\\_uint\\_with\\_default](#) (xmlNode \*node, const xmlChar \*prop, unsigned int default\_value, int \*error\_code)
- double [xml\\_node\\_get\\_float](#) (xmlNode \*node, const xmlChar \*prop, int \*error\_code)
- double [xml\\_node\\_get\\_float\\_with\\_default](#) (xmlNode \*node, const xmlChar \*prop, double default\_value, int \*error\_code)
- void [xml\\_node\\_set\\_int](#) (xmlNode \*node, const xmlChar \*prop, int value)
- void [xml\\_node\\_set\\_uint](#) (xmlNode \*node, const xmlChar \*prop, unsigned int value)
- void [xml\\_node\\_set\\_float](#) (xmlNode \*node, const xmlChar \*prop, double value)
- int [json\\_object\\_get\\_int](#) (JsonObject \*object, const char \*prop, int \*error\_code)
- unsigned int [json\\_object\\_get\\_uint](#) (JsonObject \*object, const char \*prop, int \*error\_code)
- unsigned int [json\\_object\\_get\\_uint\\_with\\_default](#) (JsonObject \*object, const char \*prop, unsigned int default\_value, int \*error\_code)
- double [json\\_object\\_get\\_float](#) (JsonObject \*object, const char \*prop, int \*error\_code)
- double [json\\_object\\_get\\_float\\_with\\_default](#) (JsonObject \*object, const char \*prop, double default\_value, int \*error\_code)
- void [json\\_object\\_set\\_int](#) (JsonObject \*object, const char \*prop, int value)
- void [json\\_object\\_set\\_uint](#) (JsonObject \*object, const char \*prop, unsigned int value)
- void [json\\_object\\_set\\_float](#) (JsonObject \*object, const char \*prop, double value)
- int [cores\\_number](#) ()
- 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.*

### 4.25.1 Detailed Description

Source file to define some useful functions.

#### Authors

Javier Burguete and Borja Latorre.

#### Copyright

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

### 4.25.2 Function Documentation

#### 4.25.2.1 `cores_number()`

```
int cores_number ( )
```

Function to obtain the cores number.

#### Returns

Cores number.

Definition at line [440](#) of file [utils.c](#).

```
00441 {  
00442     #ifdef G_OS_WIN32  
00443         SYSTEM_INFO sysinfo;  
00444         GetSystemInfo (&sysinfo);  
00445         return sysinfo.dwNumberOfProcessors;  
00446     #else  
00447         return (int) sysconf ( _SC_NPROCESSORS_ONLN );  
00448     #endif  
00449 }
```

#### 4.25.2.2 `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 469 of file [utils.c](#).

```
00471 {
00472     unsigned int i;
00473     for (i = 0; i < n; ++i)
00474         if (gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (array[i])))
00475             break;
00476     return i;
00477 }
```

**4.25.2.3 json\_object\_get\_float()**

```
double json_object_get_float (
    JsonObject * object,
    const char * prop,
    int * error_code )
```

Function to get a floating point number of a JSON object property.

**Returns**

Floating point number value.

**Parameters**

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>error_code</i>	Error code.

Definition at line 350 of file [utils.c](#).

```
00353 {
00354     const char *buffer;
00355     double x = 0.;
00356     buffer = json_object_get_string_member (object, prop);
00357     if (!buffer)
00358         *error_code = 1;
00359     else
00360     {
00361         if (sscanf (buffer, "%lf", &x) != 1)
00362             *error_code = 2;
00363         else
00364             *error_code = 0;
00365     }
00366     return x;
00367 }
```

#### 4.25.2.4 json\_object\_get\_float\_with\_default()

```
double json_object_get_float_with_default (
    JsonObject * object,
    const char * prop,
    double default_value,
    int * error_code )
```

Function to get a floating point number of a JSON object property with a default value.

##### Returns

Floating point number value.

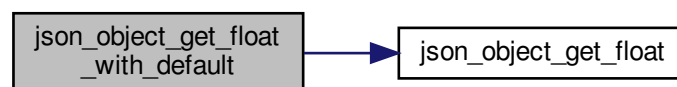
##### Parameters

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>default_value</i>	default value.
<i>error_code</i>	Error code.

Definition at line 376 of file [utils.c](#).

```
00382 {
00383     double x;
00384     if (json_object_get_member (object, prop))
00385         x = json_object_get_float (object, prop, error_code);
00386     else
00387     {
00388         x = default_value;
00389         *error_code = 0;
00390     }
00391     return x;
00392 }
```

Here is the call graph for this function:



#### 4.25.2.5 json\_object\_get\_int()

```
int json_object_get_int (
    JsonObject * object,
    const char * prop,
    int * error_code )
```

Function to get an integer number of a JSON object property.

**Returns**

Integer number value.

**Parameters**

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>error_code</i>	Error code.

Definition at line 276 of file [utils.c](#).

```
00279 {
00280     const char *buffer;
00281     int i = 0;
00282     buffer = json_object_get_string_member (object, prop);
00283     if (!buffer)
00284         *error_code = 1;
00285     else
00286     {
00287         if (sscanf (buffer, "%d", &i) != 1)
00288             *error_code = 2;
00289         else
00290             *error_code = 0;
00291     }
00292     return i;
00293 }
```

**4.25.2.6 json\_object\_get\_uint()**

```
unsigned int json_object_get_uint (
    JsonObject * object,
    const char * prop,
    int * error_code )
```

Function to get an unsigned integer number of a JSON object property.

**Returns**

Unsigned integer number value.

**Parameters**

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>error_code</i>	Error code.

Definition at line 301 of file [utils.c](#).

```
00304 {
00305     const char *buffer;
00306     unsigned int i = 0;
00307     buffer = json_object_get_string_member (object, prop);
00308     if (!buffer)
```

```

00309     *error_code = 1;
00310     else
00311     {
00312         if (sscanf (buffer, "%u", &i) != 1)
00313             *error_code = 2;
00314         else
00315             *error_code = 0;
00316     }
00317     return i;
00318 }

```

#### 4.25.2.7 json\_object\_get\_uint\_with\_default()

```

unsigned int json_object_get_uint_with_default (
    JsonObject * object,
    const char * prop,
    unsigned int default_value,
    int * error_code )

```

Function to get an unsigned integer number of a JSON object property with a default value.

##### Returns

Unsigned integer number value.

##### Parameters

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>default_value</i>	default value.
<i>error_code</i>	Error code.

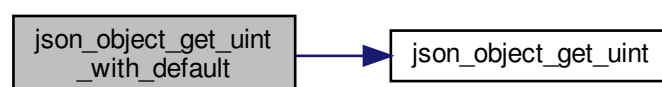
Definition at line 327 of file [utils.c](#).

```

00332 {
00333     unsigned int i;
00334     if (json_object_get_member (object, prop))
00335         i = json_object_get_uint (object, prop, error_code);
00336     else
00337     {
00338         i = default_value;
00339         *error_code = 0;
00340     }
00341     return i;
00342 }

```

Here is the call graph for this function:



#### 4.25.2.8 json\_object\_set\_float()

```
void json_object_set_float (
    JsonObject * object,
    const char * prop,
    double value )
```

Function to set a floating point number in a JSON object property.

##### Parameters

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>value</i>	Floating point number value.

Definition at line 425 of file [utils.c](#).

```
00428 {
00429     char buffer[64];
00430     snprintf (buffer, 64, "%.14lg", value);
00431     json_object_set_string_member (object, prop, buffer);
00432 }
```

#### 4.25.2.9 json\_object\_set\_int()

```
void json_object_set_int (
    JsonObject * object,
    const char * prop,
    int value )
```

Function to set an integer number in a JSON object property.

##### Parameters

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>value</i>	Integer number value.

Definition at line 398 of file [utils.c](#).

```
00401 {
00402     char buffer[64];
00403     snprintf (buffer, 64, "%d", value);
00404     json_object_set_string_member (object, prop, buffer);
00405 }
```



#### 4.25.2.10 json\_object\_set\_uint()

```
void json_object_set_uint (
    JsonObject * object,
    const char * prop,
    unsigned int value )
```

Function to set an unsigned integer number in a JSON object property.

##### Parameters

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>value</i>	Unsigned integer number value.

Definition at line [411](#) of file [utils.c](#).

```
00415 {
00416     char buffer[64];
00417     snprintf (buffer, 64, "%u", value);
00418     json_object_set_string_member (object, prop, buffer);
00419 }
```

#### 4.25.2.11 process\_pending()

```
void process_pending ( )
```

Function to process events on long computation.

Definition at line [457](#) of file [utils.c](#).

```
00458 {
00459     while (gtk_events_pending ())
00460         gtk_main_iteration ();
00461 }
```

#### 4.25.2.12 show\_error()

```
void show_error (
    char * msg )
```

Function to show a dialog with an error message.

##### Parameters

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

Definition at line 101 of file [utils.c](#).

```
00102 {
00103     show_message (_("ERROR!"), msg, ERROR_TYPE);
00104 }
```

Here is the call graph for this function:



#### 4.25.2.13 show\_message()

```
void show_message (
    char * title,
    char * msg,
    int type )
```

Function to show a dialog with a message.

##### Parameters

<i>title</i>	Title.
<i>msg</i>	Message.
<i>type</i>	Message type.

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

```
00074 {
00075     #if HAVE_GTK
00076     GtkMessageDialog *dlg;
00077
00078     // Creating the dialog
00079     dlg = (GtkMessageDialog *)
00080         gtk_message_dialog_new (main_window, GTK_DIALOG_MODAL,
00081                                (GtkMessageType) type, GTK_BUTTONS_OK, "%s", msg);
00082
00083     // Setting the dialog title
00084     gtk_window_set_title (GTK_WINDOW (dlg), title);
00085
00086     // Showing the dialog and waiting response
00087     gtk_dialog_run (GTK_DIALOG (dlg));
00088
00089     // Closing and freeing memory
00090     gtk_widget_destroy (GTK_WIDGET (dlg));
00091
00092 #else
00093     printf ("%s: %s\n", title, msg);
00094 #endif
00095 }
```

#### 4.25.2.14 xml\_node\_get\_float()

```
double xml_node_get_float (
    xmlNode * node,
    const xmlChar * prop,
    int * error_code )
```

Function to get a floating point number of a XML node property.

##### Returns

Floating point number value.

##### Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>error_code</i>	Error code.

Definition at line 188 of file [utils.c](#).

```
00191 {
00192     double x = 0.;
00193     xmlChar *buffer;
00194     buffer = xmlGetProp (node, prop);
00195     if (!buffer)
00196         *error_code = 1;
00197     else
00198     {
00199         if (sscanf ((char *) buffer, "%lf", &x) != 1)
00200             *error_code = 2;
00201         else
00202             *error_code = 0;
00203         xmlFree (buffer);
00204     }
00205     return x;
00206 }
```

#### 4.25.2.15 xml\_node\_get\_float\_with\_default()

```
double xml_node_get_float_with_default (
    xmlNode * node,
    const xmlChar * prop,
    double default_value,
    int * error_code )
```

Function to get a floating point number of a XML node property with a default value.

##### Returns

Floating point number value.

**Parameters**

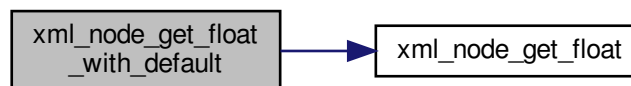
<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>default_value</i>	default value.
<i>error_code</i>	Error code.

Definition at line 215 of file [utils.c](#).

```

00219 {
00220     double x;
00221     if (xmlHasProp (node, prop))
00222         x = xml_node_get_float (node, prop, error_code);
00223     else
00224     {
00225         x = default_value;
00226         *error_code = 0;
00227     }
00228     return x;
00229 }
```

Here is the call graph for this function:

**4.25.2.16 xml\_node\_get\_int()**

```

int xml_node_get_int (
    xmlNode * node,
    const xmlChar * prop,
    int * error_code )
```

Function to get an integer number of a XML node property.

**Returns**

Integer number value.

**Parameters**

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>error_code</i>	Error code.

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

```

00115 {
00116     int i = 0;
00117     xmlChar *buffer;
00118     buffer = xmlGetProp (node, prop);
00119     if (!buffer)
00120         *error_code = 1;
00121     else
00122     {
00123         if (sscanf ((char *) buffer, "%d", &i) != 1)
00124             *error_code = 2;
00125         else
00126             *error_code = 0;
00127         xmlFree (buffer);
00128     }
00129     return i;
00130 }
```

#### 4.25.2.17 xml\_node\_get\_uint()

```

unsigned int xml_node_get_uint (
    xmlNode * node,
    const xmlChar * prop,
    int * error_code )
```

Function to get an unsigned integer number of a XML node property.

#### Returns

Unsigned integer number value.

#### Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>error_code</i>	Error code.

Definition at line 138 of file [utils.c](#).

```

00141 {
00142     unsigned int i = 0;
00143     xmlChar *buffer;
00144     buffer = xmlGetProp (node, prop);
00145     if (!buffer)
00146         *error_code = 1;
00147     else
00148     {
00149         if (sscanf ((char *) buffer, "%u", &i) != 1)
00150             *error_code = 2;
00151         else
00152             *error_code = 0;
00153         xmlFree (buffer);
00154     }
00155     return i;
00156 }
```

#### 4.25.2.18 xml\_node\_get\_uint\_with\_default()

```
unsigned int xml_node_get_uint_with_default (  
    xmlNode * node,  
    const xmlChar * prop,  
    unsigned int default_value,  
    int * error_code )
```

Function to get an unsigned integer number of a XML node property with a default value.

##### Returns

Unsigned integer number value.

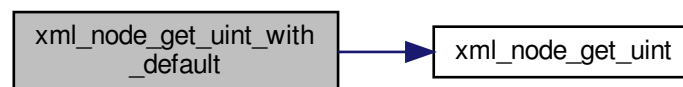
##### Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>default_value</i>	default value.
<i>error_code</i>	Error code.

Definition at line 165 of file [utils.c](#).

```
00170 {  
00171     unsigned int i;  
00172     if (xmlHasProp (node, prop))  
00173         i = xml_node_get_uint (node, prop, error_code);  
00174     else  
00175     {  
00176         i = default_value;  
00177         *error_code = 0;  
00178     }  
00179     return i;  
00180 }
```

Here is the call graph for this function:



#### 4.25.2.19 xml\_node\_set\_float()

```
void xml_node_set_float (  
    xmlNode * node,  
    const xmlChar * prop,  
    double value )
```

Function to set a floating point number in a XML node property.

## Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>value</i>	Floating point number value.

Definition at line 261 of file [utils.c](#).

```
00264 {
00265     xmlChar buffer[64];
00266     snprintf ((char *) buffer, 64, "%.14lg", value);
00267     xmlSetProp (node, prop, buffer);
00268 }
```

#### 4.25.2.20 xml\_node\_set\_int()

```
void xml_node_set_int (
    xmlNode * node,
    const xmlChar * prop,
    int value )
```

Function to set an integer number in a XML node property.

## Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>value</i>	Integer number value.

Definition at line 235 of file [utils.c](#).

```
00238 {
00239     xmlChar buffer[64];
00240     snprintf ((char *) buffer, 64, "%d", value);
00241     xmlSetProp (node, prop, buffer);
00242 }
```

#### 4.25.2.21 xml\_node\_set\_uint()

```
void xml_node_set_uint (
    xmlNode * node,
    const xmlChar * prop,
    unsigned int value )
```

Function to set an unsigned integer number in a XML node property.

## Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>value</i>	Unsigned integer number value.

Definition at line 248 of file [utils.c](#).

```
00251 {
00252     xmlChar buffer[64];
00253     snprintf ((char *) buffer, 64, "%u", value);
00254     xmlSetProp (node, prop, buffer);
00255 }
```

## 4.26 utils.c

```
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 2012-2018, 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 <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 "utils.h"
00047
00048 #if HAVE_GTK
00049 GtkWidget *main_window;
00050 #endif
00051
00052 char *error_message;
00053 void (*show_pending) () = NULL;
00054
00055 void
00056 show_message (char *title,
00057              char *msg,
00058              int type
00059 #if !HAVE_GTK
```



```

00070         __attribute__ ((unused))
00071 #endif
00072     )
00073 {
00074     #if HAVE_GTK
00075     GtkWidgetDialog *dlg;
00076     // Creating the dialog
00077     dlg = (GtkMessageDialog *)
00078         gtk_message_dialog_new (main_window, GTK_DIALOG_MODAL,
00079                                (GtkMessageType) type, GTK_BUTTONS_OK, "%s", msg);
00080     // Setting the dialog title
00081     gtk_window_set_title (GTK_WINDOW (dlg), title);
00082     // Showing the dialog and waiting response
00083     gtk_dialog_run (GTK_DIALOG (dlg));
00084     // Closing and freeing memory
00085     gtk_widget_destroy (GTK_WIDGET (dlg));
00086 #else
00087     printf ("%s: %s\n", title, msg);
00088 #endif
00089 }
00090 void
00091 show_error (char *msg)
00092 {
00093     show_message (_("ERROR!"), msg, ERROR_TYPE);
00094 }
00095 int
00096 xml_node_get_int (xmlNode * node,
00097                  const xmlChar * prop,
00098                  int *error_code)
00099 {
00100     int i = 0;
00101     xmlChar *buffer;
00102     buffer = xmlGetProp (node, prop);
00103     if (!buffer)
00104         *error_code = 1;
00105     else
00106     {
00107         if (sscanf ((char *) buffer, "%d", &i) != 1)
00108             *error_code = 2;
00109         else
00110             *error_code = 0;
00111         xmlFree (buffer);
00112     }
00113     return i;
00114 }
00115 unsigned int
00116 xml_node_get_uint (xmlNode * node,
00117                   const xmlChar * prop,
00118                   int *error_code)
00119 {
00120     unsigned int i = 0;
00121     xmlChar *buffer;
00122     buffer = xmlGetProp (node, prop);
00123     if (!buffer)
00124         *error_code = 1;
00125     else
00126     {
00127         if (sscanf ((char *) buffer, "%u", &i) != 1)
00128             *error_code = 2;
00129         else
00130             *error_code = 0;
00131         xmlFree (buffer);
00132     }
00133     return i;
00134 }
00135 unsigned int
00136 xml_node_get_uint_with_default (xmlNode * node,
00137                                const xmlChar * prop,
00138                                unsigned int default_value,
00139                                int *error_code)
00140 {
00141     unsigned int i;
00142     if (xmlHasProp (node, prop))
00143         i = xml_node_get_uint (node, prop, error_code);
00144     else
00145     {
00146         i = default_value;
00147         *error_code = 0;
00148     }
00149 }

```

```

00178     }
00179     return i;
00180 }
00181
00182 double
00183 xml_node_get_float (xmlNode * node,
00184                     const xmlChar * prop,
00185                     int *error_code)
00186 {
00187     double x = 0.;
00188     xmlChar *buffer;
00189     buffer = xmlGetProp (node, prop);
00190     if (!buffer)
00191         *error_code = 1;
00192     else
00193     {
00194         if (sscanf ((char *) buffer, "%lf", &x) != 1)
00195             *error_code = 2;
00196         else
00197             *error_code = 0;
00198         xmlFree (buffer);
00199     }
00200     return x;
00201 }
00202
00203 double
00204 xml_node_get_float_with_default (xmlNode * node,
00205                                 const xmlChar * prop,
00206                                 double default_value,
00207                                 int *error_code)
00208 {
00209     double x;
00210     if (xmlHasProp (node, prop))
00211         x = xml_node_get_float (node, prop, error_code);
00212     else
00213     {
00214         x = default_value;
00215         *error_code = 0;
00216     }
00217     return x;
00218 }
00219
00220 void
00221 xml_node_set_int (xmlNode * node,
00222                  const xmlChar * prop,
00223                  int value)
00224 {
00225     xmlChar buffer[64];
00226     snprintf ((char *) buffer, 64, "%d", value);
00227     xmlSetProp (node, prop, buffer);
00228 }
00229
00230 void
00231 xml_node_set_uint (xmlNode * node,
00232                   const xmlChar * prop,
00233                   unsigned int value)
00234 {
00235     xmlChar buffer[64];
00236     snprintf ((char *) buffer, 64, "%u", value);
00237     xmlSetProp (node, prop, buffer);
00238 }
00239
00240 void
00241 xml_node_set_float (xmlNode * node,
00242                    const xmlChar * prop,
00243                    double value)
00244 {
00245     xmlChar buffer[64];
00246     snprintf ((char *) buffer, 64, "%.14lg", value);
00247     xmlSetProp (node, prop, buffer);
00248 }
00249
00250 int
00251 json_object_get_int (JsonObject * object,
00252                     const char *prop,
00253                     int *error_code)
00254 {
00255     const char *buffer;
00256     int i = 0;
00257     buffer = json_object_get_string_member (object, prop);
00258     if (!buffer)
00259         *error_code = 1;
00260     else
00261     {
00262         if (sscanf (buffer, "%d", &i) != 1)
00263             *error_code = 2;
00264         else

```

```
00290         *error_code = 0;
00291     }
00292     return i;
00293 }
00294
00300 unsigned int
00301 json_object_get_uint (JsonObject * object,
00302                      const char *prop,
00303                      int *error_code)
00304 {
00305     const char *buffer;
00306     unsigned int i = 0;
00307     buffer = json_object_get_string_member (object, prop);
00308     if (!buffer)
00309         *error_code = 1;
00310     else
00311     {
00312         if (sscanf (buffer, "%u", &i) != 1)
00313             *error_code = 2;
00314         else
00315             *error_code = 0;
00316     }
00317     return i;
00318 }
00319
00326 unsigned int
00327 json_object_get_uint_with_default (JsonObject * object,
00328                                   const char *prop,
00329                                   unsigned int default_value,
00330                                   int *error_code)
00331 {
00332     {
00333         unsigned int i;
00334         if (json_object_get_member (object, prop))
00335             i = json_object_get_uint (object, prop, error_code);
00336         else
00337         {
00338             i = default_value;
00339             *error_code = 0;
00340         }
00341         return i;
00342     }
00343 }
00344
00349 double
00350 json_object_get_float (JsonObject * object,
00351                       const char *prop,
00352                       int *error_code)
00353 {
00354     const char *buffer;
00355     double x = 0.;
00356     buffer = json_object_get_string_member (object, prop);
00357     if (!buffer)
00358         *error_code = 1;
00359     else
00360     {
00361         if (sscanf (buffer, "%lf", &x) != 1)
00362             *error_code = 2;
00363         else
00364             *error_code = 0;
00365     }
00366     return x;
00367 }
00368
00375 double
00376 json_object_get_float_with_default (JsonObject * object,
00377                                    const char *prop,
00378                                    double default_value,
00379                                    int *error_code)
00380 {
00381     {
00382         double x;
00383         if (json_object_get_member (object, prop))
00384             x = json_object_get_float (object, prop, error_code);
00385         else
00386         {
00387             x = default_value;
00388             *error_code = 0;
00389         }
00390         return x;
00391     }
00392 }
00393
00397 void
00398 json_object_set_int (JsonObject * object,
00399                    const char *prop,
00400                    int value)
00401 {
00402     char buffer[64];
00403     snprintf (buffer, 64, "%d", value);
00404     json_object_set_string_member (object, prop, buffer);
00405 }
```

```

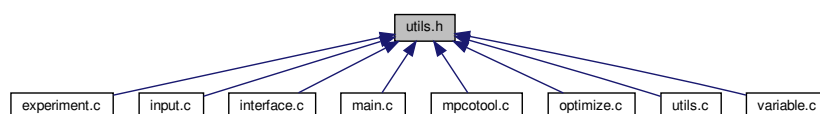
00405 }
00406
00410 void
00411 json_object_set_uint (JsonObject * object,
00412                      const char *prop,
00413                      unsigned int value)
00414 {
00415     char buffer[64];
00416     snprintf (buffer, 64, "%u", value);
00417     json_object_set_string_member (object, prop, buffer);
00418 }
00419
00420
00424 void
00425 json_object_set_float (JsonObject * object,
00426                      const char *prop,
00427                      double value)
00428 {
00429     char buffer[64];
00430     snprintf (buffer, 64, "%.14lg", value);
00431     json_object_set_string_member (object, prop, buffer);
00432 }
00433
00439 int
00440 cores_number ()
00441 {
00442     #ifdef G_OS_WIN32
00443         SYSTEM_INFO sysinfo;
00444         GetSystemInfo (&sysinfo);
00445         return sysinfo.dwNumberOfProcessors;
00446     #else
00447         return (int) sysconf (_SC_NPROCESSORS_ONLN);
00448     #endif
00449 }
00450
00451 #if HAVE_GTK
00452
00456 void
00457 process_pending ()
00458 {
00459     while (gtk_events_pending ())
00460         gtk_main_iteration ();
00461 }
00462
00468 unsigned int
00469 gtk_array_get_active (GtkRadioButton * array[],
00470                     unsigned int n)
00471 {
00472     unsigned int i;
00473     for (i = 0; i < n; ++i)
00474         if (gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (array[i])))
00475             break;
00476     return i;
00477 }
00478
00479 #endif

```

## 4.27 utils.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.*

## Functions

- void [show\\_message](#) (char \*title, char \*msg, int type)
- void [show\\_error](#) (char \*msg)
- int [xml\\_node\\_get\\_int](#) (xmlNode \*node, const xmlChar \*prop, int \*error\_code)
- unsigned int [xml\\_node\\_get\\_uint](#) (xmlNode \*node, const xmlChar \*prop, int \*error\_code)
- unsigned int [xml\\_node\\_get\\_uint\\_with\\_default](#) (xmlNode \*node, const xmlChar \*prop, unsigned int default\_value, int \*error\_code)
- double [xml\\_node\\_get\\_float](#) (xmlNode \*node, const xmlChar \*prop, int \*error\_code)
- double [xml\\_node\\_get\\_float\\_with\\_default](#) (xmlNode \*node, const xmlChar \*prop, double default\_value, int \*error\_code)
- void [xml\\_node\\_set\\_int](#) (xmlNode \*node, const xmlChar \*prop, int value)
- void [xml\\_node\\_set\\_uint](#) (xmlNode \*node, const xmlChar \*prop, unsigned int value)
- void [xml\\_node\\_set\\_float](#) (xmlNode \*node, const xmlChar \*prop, double value)
- int [json\\_object\\_get\\_int](#) (JsonObject \*object, const char \*prop, int \*error\_code)
- unsigned int [json\\_object\\_get\\_uint](#) (JsonObject \*object, const char \*prop, int \*error\_code)
- unsigned int [json\\_object\\_get\\_uint\\_with\\_default](#) (JsonObject \*object, const char \*prop, unsigned int default\_value, int \*error\_code)
- double [json\\_object\\_get\\_float](#) (JsonObject \*object, const char \*prop, int \*error\_code)
- double [json\\_object\\_get\\_float\\_with\\_default](#) (JsonObject \*object, const char \*prop, double default\_value, int \*error\_code)
- void [json\\_object\\_set\\_int](#) (JsonObject \*object, const char \*prop, int value)
- void [json\\_object\\_set\\_uint](#) (JsonObject \*object, const char \*prop, unsigned int value)
- void [json\\_object\\_set\\_float](#) (JsonObject \*object, const char \*prop, double value)
- int [cores\\_number](#) ()
- 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](#) )()  
*Pointer to the function to show pending events.*

### 4.27.1 Detailed Description

Header file to define some useful functions.

#### Authors

Javier Burguete.

#### Copyright

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

## 4.27.2 Function Documentation

### 4.27.2.1 cores\_number()

```
int cores_number ( )
```

Function to obtain the cores number.

#### Returns

Cores number.

Definition at line [440](#) of file [utils.c](#).

```
00441 {
00442     #ifdef G_OS_WIN32
00443         SYSTEM_INFO sysinfo;
00444         GetSystemInfo (&sysinfo);
00445         return sysinfo.dwNumberOfProcessors;
00446     #else
00447         return (int) sysconf (_SC_NPROCESSORS_ONLN);
00448     #endif
00449 }
```

### 4.27.2.2 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 [469](#) of file [utils.c](#).

```
00471 {
00472     unsigned int i;
00473     for (i = 0; i < n; ++i)
00474         if (gtk_toggle_button_get_active (GTK_TOGGLE_BUTTON (array[i])))
00475             break;
00476     return i;
00477 }
```

#### 4.27.2.3 json\_object\_get\_float()

```
double json_object_get_float (
    JsonObject * object,
    const char * prop,
    int * error_code )
```

Function to get a floating point number of a JSON object property.

##### Returns

Floating point number value.

##### Parameters

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>error_code</i>	Error code.

Definition at line 350 of file [utils.c](#).

```
00353 {
00354     const char *buffer;
00355     double x = 0.;
00356     buffer = json_object_get_string_member (object, prop);
00357     if (!buffer)
00358         *error_code = 1;
00359     else
00360     {
00361         if (sscanf (buffer, "%lf", &x) != 1)
00362             *error_code = 2;
00363         else
00364             *error_code = 0;
00365     }
00366     return x;
00367 }
```

#### 4.27.2.4 json\_object\_get\_float\_with\_default()

```
double json_object_get_float_with_default (
    JsonObject * object,
    const char * prop,
    double default_value,
    int * error_code )
```

Function to get a floating point number of a JSON object property with a default value.

##### Returns

Floating point number value.

**Parameters**

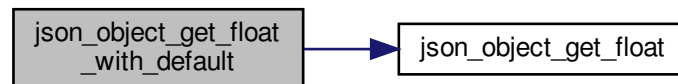
<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>default_value</i>	default value.
<i>error_code</i>	Error code.

Definition at line 376 of file [utils.c](#).

```

00382 {
00383     double x;
00384     if (json_object_get_member (object, prop))
00385         x = json_object_get_float (object, prop, error_code);
00386     else
00387     {
00388         x = default_value;
00389         *error_code = 0;
00390     }
00391     return x;
00392 }
```

Here is the call graph for this function:

**4.27.2.5 json\_object\_get\_int()**

```

int json_object_get_int (
    JsonObject * object,
    const char * prop,
    int * error_code )
```

Function to get an integer number of a JSON object property.

**Returns**

Integer number value.

**Parameters**

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>error_code</i>	Error code.



Definition at line 276 of file [utils.c](#).

```
00279 {
00280     const char *buffer;
00281     int i = 0;
00282     buffer = json_object_get_string_member (object, prop);
00283     if (!buffer)
00284         *error_code = 1;
00285     else
00286     {
00287         if (sscanf (buffer, "%d", &i) != 1)
00288             *error_code = 2;
00289         else
00290             *error_code = 0;
00291     }
00292     return i;
00293 }
```

#### 4.27.2.6 json\_object\_get\_uint()

```
unsigned int json_object_get_uint (
    JsonObject * object,
    const char * prop,
    int * error_code )
```

Function to get an unsigned integer number of a JSON object property.

##### Returns

Unsigned integer number value.

##### Parameters

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>error_code</i>	Error code.

Definition at line 301 of file [utils.c](#).

```
00304 {
00305     const char *buffer;
00306     unsigned int i = 0;
00307     buffer = json_object_get_string_member (object, prop);
00308     if (!buffer)
00309         *error_code = 1;
00310     else
00311     {
00312         if (sscanf (buffer, "%u", &i) != 1)
00313             *error_code = 2;
00314         else
00315             *error_code = 0;
00316     }
00317     return i;
00318 }
```

#### 4.27.2.7 json\_object\_get\_uint\_with\_default()

```
unsigned int json_object_get_uint_with_default (  
    JsonObject * object,  
    const char * prop,  
    unsigned int default_value,  
    int * error_code )
```

Function to get an unsigned integer number of a JSON object property with a default value.

##### Returns

Unsigned integer number value.

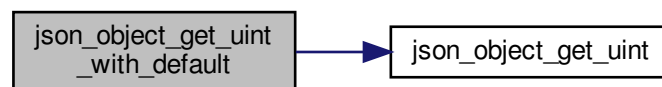
##### Parameters

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>default_value</i>	default value.
<i>error_code</i>	Error code.

Definition at line 327 of file [utils.c](#).

```
00332 {  
00333     unsigned int i;  
00334     if (json_object_get_member (object, prop))  
00335         i = json_object_get_uint (object, prop, error_code);  
00336     else  
00337     {  
00338         i = default_value;  
00339         *error_code = 0;  
00340     }  
00341     return i;  
00342 }
```

Here is the call graph for this function:



#### 4.27.2.8 json\_object\_set\_float()

```
void json_object_set_float (  
    JsonObject * object,  
    const char * prop,  
    double value )
```

Function to set a floating point number in a JSON object property.

## Parameters

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>value</i>	Floating point number value.

Definition at line 425 of file [utils.c](#).

```
00428 {  
00429     char buffer[64];  
00430     snprintf (buffer, 64, "%.14lg", value);  
00431     json_object_set_string_member (object, prop, buffer);  
00432 }
```

#### 4.27.2.9 json\_object\_set\_int()

```
void json_object_set_int (  
    JsonObject * object,  
    const char * prop,  
    int value )
```

Function to set an integer number in a JSON object property.

## Parameters

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>value</i>	Integer number value.

Definition at line 398 of file [utils.c](#).

```
00401 {  
00402     char buffer[64];  
00403     snprintf (buffer, 64, "%d", value);  
00404     json_object_set_string_member (object, prop, buffer);  
00405 }
```

#### 4.27.2.10 json\_object\_set\_uint()

```
void json_object_set_uint (  
    JsonObject * object,  
    const char * prop,  
    unsigned int value )
```

Function to set an unsigned integer number in a JSON object property.

## Parameters

<i>object</i>	JSON object.
<i>prop</i>	JSON property.
<i>value</i>	Unsigned integer number value.

Definition at line 411 of file [utils.c](#).

```
00415 {  
00416     char buffer[64];  
00417     snprintf (buffer, 64, "%u", value);  
00418     json_object_set_string_member (object, prop, buffer);  
00419 }
```

#### 4.27.2.11 process\_pending()

```
void process_pending ( )
```

Function to process events on long computation.

Definition at line 457 of file [utils.c](#).

```
00458 {  
00459     while (gtk_events_pending ())  
00460         gtk_main_iteration ();  
00461 }
```

#### 4.27.2.12 show\_error()

```
void show_error (  
    char * msg )
```

Function to show a dialog with an error message.

## Parameters

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

Definition at line 101 of file [utils.c](#).

```
00102 {  
00103     show_message (_("ERROR!"), msg, ERROR_TYPE);  
00104 }
```

Here is the call graph for this function:



#### 4.27.2.13 show\_message()

```
void show_message (  
    char * title,  
    char * msg,  
    int type )
```

Function to show a dialog with a message.

##### Parameters

<i>title</i>	Title.
<i>msg</i>	Message.
<i>type</i>	Message type.

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

```
00074 {  
00075 #if HAVE_GTK  
00076     GtkMessageDialog *dlg;  
00077  
00078     // Creating the dialog  
00079     dlg = (GtkMessageDialog *)  
00080         gtk_message_dialog_new (main_window, GTK_DIALOG_MODAL,  
00081                                 (GtkMessageType) type, GTK_BUTTONS_OK, "%s", msg);  
00082  
00083     // Setting the dialog title  
00084     gtk_window_set_title (GTK_WINDOW (dlg), title);  
00085  
00086     // Showing the dialog and waiting response  
00087     gtk_dialog_run (GTK_DIALOG (dlg));  
00088  
00089     // Closing and freeing memory  
00090     gtk_widget_destroy (GTK_WIDGET (dlg));  
00091  
00092 #else  
00093     printf ("%s: %s\n", title, msg);  
00094 #endif  
00095 }
```

#### 4.27.2.14 xml\_node\_get\_float()

```
double xml_node_get_float (
    xmlNode * node,
    const xmlChar * prop,
    int * error_code )
```

Function to get a floating point number of a XML node property.

##### Returns

Floating point number value.

##### Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>error_code</i>	Error code.

Definition at line 188 of file [utils.c](#).

```
00191 {
00192     double x = 0.;
00193     xmlChar *buffer;
00194     buffer = xmlGetProp (node, prop);
00195     if (!buffer)
00196         *error_code = 1;
00197     else
00198     {
00199         if (sscanf ((char *) buffer, "%lf", &x) != 1)
00200             *error_code = 2;
00201         else
00202             *error_code = 0;
00203         xmlFree (buffer);
00204     }
00205     return x;
00206 }
```

#### 4.27.2.15 xml\_node\_get\_float\_with\_default()

```
double xml_node_get_float_with_default (
    xmlNode * node,
    const xmlChar * prop,
    double default_value,
    int * error_code )
```

Function to get a floating point number of a XML node property with a default value.

##### Returns

Floating point number value.

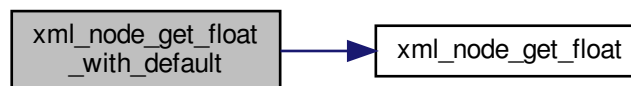
## Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>default_value</i>	default value.
<i>error_code</i>	Error code.

Definition at line 215 of file [utils.c](#).

```
00219 {  
00220     double x;  
00221     if (xmlHasProp (node, prop))  
00222         x = xml_node_get_float (node, prop, error_code);  
00223     else  
00224     {  
00225         x = default_value;  
00226         *error_code = 0;  
00227     }  
00228     return x;  
00229 }
```

Here is the call graph for this function:



## 4.27.2.16 xml\_node\_get\_int()

```
int xml_node_get_int (  
    xmlNode * node,  
    const xmlChar * prop,  
    int * error_code )
```

Function to get an integer number of a XML node property.

## Returns

Integer number value.

## Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>error_code</i>	Error code.

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

```

00115 {
00116     int i = 0;
00117     xmlChar *buffer;
00118     buffer = xmlGetProp (node, prop);
00119     if (!buffer)
00120         *error_code = 1;
00121     else
00122     {
00123         if (sscanf ((char *) buffer, "%d", &i) != 1)
00124             *error_code = 2;
00125         else
00126             *error_code = 0;
00127         xmlFree (buffer);
00128     }
00129     return i;
00130 }
```

#### 4.27.2.17 xml\_node\_get\_uint()

```

unsigned int xml_node_get_uint (
    xmlNode * node,
    const xmlChar * prop,
    int * error_code )
```

Function to get an unsigned integer number of a XML node property.

##### Returns

Unsigned integer number value.

##### Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>error_code</i>	Error code.

Definition at line 138 of file [utils.c](#).

```

00141 {
00142     unsigned int i = 0;
00143     xmlChar *buffer;
00144     buffer = xmlGetProp (node, prop);
00145     if (!buffer)
00146         *error_code = 1;
00147     else
00148     {
00149         if (sscanf ((char *) buffer, "%u", &i) != 1)
00150             *error_code = 2;
00151         else
00152             *error_code = 0;
00153         xmlFree (buffer);
00154     }
00155     return i;
00156 }
```



#### 4.27.2.18 xml\_node\_get\_uint\_with\_default()

```
unsigned int xml_node_get_uint_with_default (
    xmlNode * node,
    const xmlChar * prop,
    unsigned int default_value,
    int * error_code )
```

Function to get an unsigned integer number of a XML node property with a default value.

##### Returns

Unsigned integer number value.

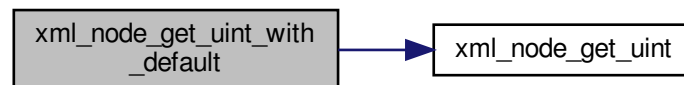
##### Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>default_value</i>	default value.
<i>error_code</i>	Error code.

Definition at line 165 of file [utils.c](#).

```
00170 {
00171     unsigned int i;
00172     if (xmlHasProp (node, prop))
00173         i = xml_node_get_uint (node, prop, error_code);
00174     else
00175     {
00176         i = default_value;
00177         *error_code = 0;
00178     }
00179     return i;
00180 }
```

Here is the call graph for this function:



#### 4.27.2.19 xml\_node\_set\_float()

```
void xml_node_set_float (
    xmlNode * node,
    const xmlChar * prop,
    double value )
```

Function to set a floating point number in a XML node property.

**Parameters**

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>value</i>	Floating point number value.

Definition at line [261](#) of file [utils.c](#).

```
00264 {  
00265     xmlChar buffer[64];  
00266     snprintf ((char *) buffer, 64, "%.14lg", value);  
00267     xmlSetProp (node, prop, buffer);  
00268 }
```

**4.27.2.20 xml\_node\_set\_int()**

```
void xml_node_set_int (  
    xmlNode * node,  
    const xmlChar * prop,  
    int value )
```

Function to set an integer number in a XML node property.

**Parameters**

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>value</i>	Integer number value.

Definition at line [235](#) of file [utils.c](#).

```
00238 {  
00239     xmlChar buffer[64];  
00240     snprintf ((char *) buffer, 64, "%d", value);  
00241     xmlSetProp (node, prop, buffer);  
00242 }
```

**4.27.2.21 xml\_node\_set\_uint()**

```
void xml_node_set_uint (  
    xmlNode * node,  
    const xmlChar * prop,  
    unsigned int value )
```

Function to set an unsigned integer number in a XML node property.

## Parameters

<i>node</i>	XML node.
<i>prop</i>	XML property.
<i>value</i>	Unsigned integer number value.

Definition at line 248 of file [utils.c](#).

```
00251 {
00252     xmlChar buffer[64];
00253     snprintf ((char *) buffer, 64, "%u", value);
00254     xmlSetProp (node, prop, buffer);
00255 }
```

## 4.28 utils.h

```
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 2012-2018, 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 #ifndef UTILS__H
00033 #define UTILS__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 void show_message (char *title, char *msg, int type);
00049 void show_error (char *msg);
00050 int xml_node_get_int (xmlNode * node, const xmlChar * prop, int *error_code);
00051 unsigned int xml_node_get_uint (xmlNode * node, const xmlChar * prop,
00052                                int *error_code);
00053 unsigned int xml_node_get_uint_with_default (xmlNode * node,
00054                                              const xmlChar * prop,
00055                                              unsigned int default_value,
00056                                              int *error_code);
00057 double xml_node_get_float (xmlNode * node, const xmlChar * prop,
00058                            int *error_code);
00059 double xml_node_get_float_with_default (xmlNode * node, const xmlChar * prop
```

```

00072         double default_value, int *error_code);
00073 void xml_node_set_int (xmlNode * node, const xmlChar * prop, int value);
00074 void xml_node_set_uint (xmlNode * node, const xmlChar * prop,
00075                        unsigned int value);
00076 void xml_node_set_float (xmlNode * node, const xmlChar * prop, double value);
00077 int json_object_get_int (JsonObject * object, const char *prop,
00078                        int *error_code);
00079 unsigned int json_object_get_uint (JsonObject * object, const char *prop,
00080                                int *error_code);
00081 unsigned int json_object_get_uint_with_default (JsonObject * object,
00082                                              const char *prop,
00083                                              unsigned int default_value,
00084                                              int *error_code);
00085 double json_object_get_float (JsonObject * object, const char *prop,
00086                             int *error_code);
00087 double json_object_get_float_with_default (JsonObject * object,
00088                                          const char *prop,
00089                                          double default_value,
00090                                          int *error_code);
00091 void json_object_set_int (JsonObject * object, const char *prop, int value);
00092 void json_object_set_uint (JsonObject * object, const char *prop,
00093                          unsigned int value);
00094 void json_object_set_float (JsonObject * object, const char *prop,
00095                           double value);
00096 int cores_number ();
00097 #if HAVE_GTK
00098 void process_pending ();
00099 unsigned int gtk_array_get_active (GtkRadioButton * array[], unsigned int n);
00100 #endif
00101
00102 #endif

```

## 4.29 variable.c File Reference

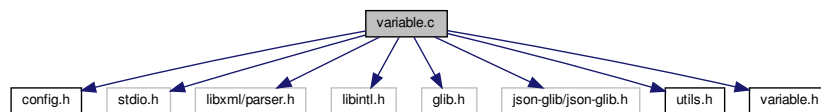
Source file to define the variable data.

```

#include "config.h"
#include <stdio.h>
#include <libxml/parser.h>
#include <libintl.h>
#include <glib.h>
#include <json-glib/json-glib.h>
#include "utils.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, XmlNode \*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.*

### 4.29.1 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](#).

### 4.29.2 Function Documentation

#### 4.29.2.1 [variable\\_error\(\)](#)

```
void variable_error (
    Variable * variable,
    char * message )
```

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

#### Parameters

<i>variable</i>	<a href="#">Variable</a> struct.
<i>message</i>	Error message.

Definition at line [85](#) of file [variable.c](#).

```
00089 {
00090     char buffer[64];
00091     if (!variable->name)
00092         snprintf (buffer, 64, "%s: %s", _("Variable"), message);
00093     else
00094         snprintf (buffer, 64, "%s %s: %s", _("Variable"), variable->name, message);
00095     error\_message = g\_strdup (buffer);
00096 }
```

#### 4.29.2.2 variable\_free()

```
void variable_free (
    Variable * variable,
    unsigned int type )
```

Function to free the memory of a [Variable](#) struct.

##### Parameters

<i>variable</i>	<a href="#">Variable</a> struct.
<i>type</i>	Type of input file.

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

```
00068 {
00069     #if DEBUG_VARIABLE
00070         fprintf (stderr, "variable_free: start\n");
00071     #endif
00072     if (type == INPUT_TYPE_XML)
00073         xmlFree (variable->name);
00074     else
00075         g_free (variable->name);
00076     #if DEBUG_VARIABLE
00077         fprintf (stderr, "variable_free: end\n");
00078     #endif
00079 }
```

#### 4.29.2.3 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>	<a href="#">Variable</a> 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 264 of file [variable.c](#).

```
00269 {
```

```

00270     JsonObject *object;
00271     const char *label;
00272     int error_code;
00273     #if DEBUG_VARIABLE
00274     fprintf (stderr, "variable_open_json: start\n");
00275     #endif
00276     object = json_node_get_object (node);
00277     label = json_object_get_string_member (object, LABEL_NAME);
00278     if (!label)
00279     {
00280         variable_error (variable, _("no name"));
00281         goto exit_on_error;
00282     }
00283     variable->name = g_strdup (label);
00284     if (json_object_get_member (object, LABEL_MINIMUM))
00285     {
00286         variable->rangemin
00287         = json_object_get_float (object, LABEL_MINIMUM, &error_code);
00288         if (error_code)
00289         {
00290             variable_error (variable, _("bad minimum"));
00291             goto exit_on_error;
00292         }
00293         variable->rangeminabs
00294         = json_object_get_float_with_default (object,
00295         LABEL_ABSOLUTE_MINIMUM,
00296         -G_MAXDOUBLE, &error_code);
00297         if (error_code)
00298         {
00299             variable_error (variable, _("bad absolute minimum"));
00300             goto exit_on_error;
00301         }
00302         if (variable->rangemin < variable->rangeminabs)
00303         {
00304             variable_error (variable, _("minimum range not allowed"));
00305             goto exit_on_error;
00306         }
00307     }
00308     else
00309     {
00310         variable_error (variable, _("no minimum range"));
00311         goto exit_on_error;
00312     }
00313     if (json_object_get_member (object, LABEL_MAXIMUM))
00314     {
00315         variable->rangemax
00316         = json_object_get_float (object, LABEL_MAXIMUM, &error_code);
00317         if (error_code)
00318         {
00319             variable_error (variable, _("bad maximum"));
00320             goto exit_on_error;
00321         }
00322         variable->rangemaxabs
00323         = json_object_get_float_with_default (object,
00324         LABEL_ABSOLUTE_MAXIMUM,
00325         G_MAXDOUBLE, &error_code);
00326         if (error_code)
00327         {
00328             variable_error (variable, _("bad absolute maximum"));
00329             goto exit_on_error;
00330         }
00331         if (variable->rangemax > variable->rangemaxabs)
00332         {
00333             variable_error (variable, _("maximum range not allowed"));
00334             goto exit_on_error;
00335         }
00336         if (variable->rangemax < variable->rangemin)
00337         {
00338             variable_error (variable, _("bad range"));
00339             goto exit_on_error;
00340         }
00341     }
00342     else
00343     {
00344         variable_error (variable, _("no maximum range"));
00345         goto exit_on_error;
00346     }
00347     variable->precision
00348     = json_object_get_uint_with_default (object,
00349     LABEL_PRECISION,
00350     DEFAULT_PRECISION, &error_code);
00351     if (error_code || variable->precision >= NPRECISIONS)
00352     {
00353         variable_error (variable, _("bad precision"));
00354         goto exit_on_error;
00355     }
00356     if (algorithm == ALGORITHM_SWEEP || algorithm ==

```

```

ALGORITHM_ORTHOGONAL)
00354 {
00355     if (json_object_get_member (object, LABEL_NSWEEPS))
00356     {
00357         variable->nsweeps
00358         = json_object_get_uint (object, LABEL_NSWEEPS, &error_code);
00359         if (error_code || !variable->nsweeps)
00360         {
00361             variable_error (variable, _("bad sweeps"));
00362             goto exit_on_error;
00363         }
00364     }
00365     else
00366     {
00367         variable_error (variable, _("no sweeps number"));
00368         goto exit_on_error;
00369     }
00370 #if DEBUG_VARIABLE
00371     fprintf (stderr, "variable_open_json: nsweeps=%u\n", variable->nsweeps);
00372 #endif
00373 }
00374 if (algorithm == ALGORITHM_GENETIC)
00375 {
00376     // Obtaining bits representing each variable
00377     if (json_object_get_member (object, LABEL_NBITS))
00378     {
00379         variable->nbits
00380         = json_object_get_uint (object, LABEL_NBITS, &error_code);
00381         if (error_code || !variable->nbits)
00382         {
00383             variable_error (variable, _("invalid bits number"));
00384             goto exit_on_error;
00385         }
00386     }
00387     else
00388     {
00389         variable_error (variable, _("no bits number"));
00390         goto exit_on_error;
00391     }
00392 }
00393 else if (nsteps)
00394 {
00395     variable->step = json_object_get_float (object,
00396     LABEL_STEP, &error_code);
00397     if (error_code || variable->step < 0.)
00398     {
00399         variable_error (variable, _("bad step size"));
00400         goto exit_on_error;
00401     }
00402 }
00403 #if DEBUG_VARIABLE
00404     fprintf (stderr, "variable_open_json: end\n");
00405 #endif
00406     return 1;
00407 exit_on_error:
00408     variable_free (variable, INPUT_TYPE_JSON);
00409 #if DEBUG_VARIABLE
00410     fprintf (stderr, "variable_open_json: end\n");
00411 #endif
00412     return 0;
00413 }

```

Here is the call graph for this function:





## 4.29.2.4 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 104 of file [variable.c](#).

```
00109 {
00110     int error_code;
00111
00112     #if DEBUG_VARIABLE
00113         fprintf (stderr, "variable_open_xml: start\n");
00114     #endif
00115
00116     variable->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00117     if (!variable->name)
00118     {
00119         variable_error (variable, _("no name"));
00120         goto exit_on_error;
00121     }
00122     if (xmlHasProp (node, (const xmlChar *) LABEL_MINIMUM))
00123     {
00124         variable->rangemin
00125             = xml_node_get_float (node, (const xmlChar *) LABEL_MINIMUM,
00126                                   &error_code);
00127         if (error_code)
00128         {
00129             variable_error (variable, _("bad minimum"));
00130             goto exit_on_error;
00131         }
00132         variable->rangeminabs = xml_node_get_float_with_default
00133             (node, (const xmlChar *) LABEL_ABSOLUTE_MINIMUM, -G_MAXDOUBLE,
00134             &error_code);
00135         if (error_code)
00136         {
00137             variable_error (variable, _("bad absolute minimum"));
00138             goto exit_on_error;
00139         }
00140         if (variable->rangemin < variable->rangeminabs)
00141         {
00142             variable_error (variable, _("minimum range not allowed"));
00143             goto exit_on_error;
00144         }
00145     }
00146     else
00147     {
00148         variable_error (variable, _("no minimum range"));
00149         goto exit_on_error;
00150     }
00151     if (xmlHasProp (node, (const xmlChar *) LABEL_MAXIMUM))
00152     {
00153         variable->rangemax
00154             = xml_node_get_float (node, (const xmlChar *) LABEL_MAXIMUM,
00155                                   &error_code);
```

```

00156     if (error_code)
00157     {
00158         variable_error (variable, _("bad maximum"));
00159         goto exit_on_error;
00160     }
00161     variable->rangemaxabs = xml_node_get_float_with_default
00162     (node, (const xmlChar *) LABEL_ABSOLUTE_MAXIMUM, G_MAXDOUBLE,
00163      &error_code);
00164     if (error_code)
00165     {
00166         variable_error (variable, _("bad absolute maximum"));
00167         goto exit_on_error;
00168     }
00169     if (variable->rangemax > variable->rangemaxabs)
00170     {
00171         variable_error (variable, _("maximum range not allowed"));
00172         goto exit_on_error;
00173     }
00174     if (variable->rangemax < variable->rangemin)
00175     {
00176         variable_error (variable, _("bad range"));
00177         goto exit_on_error;
00178     }
00179 }
00180 else
00181 {
00182     variable_error (variable, _("no maximum range"));
00183     goto exit_on_error;
00184 }
00185 variable->precision
00186 = xml_node_get_uint_with_default (node, (const xmlChar *)
LABEL_PRECISION,
                                DEFAULT_PRECISION, &error_code);
00187 if (error_code || variable->precision >= NPRECISIONS)
00188 {
00189     variable_error (variable, _("bad precision"));
00190     goto exit_on_error;
00191 }
00192 }
00193 if (algorithm == ALGORITHM_SWEEP || algorithm ==
ALGORITHM_ORTHOGONAL)
00194 {
00195     if (xmlHasProp (node, (const xmlChar *) LABEL_NSWEEPS))
00196     {
00197         variable->nsweeps
00198         = xml_node_get_uint (node, (const xmlChar *) LABEL_NSWEEPS,
                                &error_code);
00199         if (error_code || !variable->nsweeps)
00200         {
00201             variable_error (variable, _("bad sweeps"));
00202             goto exit_on_error;
00203         }
00204     }
00205 }
00206 else
00207 {
00208     variable_error (variable, _("no sweeps number"));
00209     goto exit_on_error;
00210 }
00211 #if DEBUG_VARIABLE
00212 fprintf (stderr, "variable_open_xml: nsweeps=%u\n", variable->nsweeps);
00213 #endif
00214 }
00215 if (algorithm == ALGORITHM_GENETIC)
00216 {
00217     // Obtaining bits representing each variable
00218     if (xmlHasProp (node, (const xmlChar *) LABEL_NBITS))
00219     {
00220         variable->nbits
00221         = xml_node_get_uint (node, (const xmlChar *) LABEL_NBITS,
                                &error_code);
00222         if (error_code || !variable->nbits)
00223         {
00224             variable_error (variable, _("invalid bits number"));
00225             goto exit_on_error;
00226         }
00227     }
00228 }
00229 else
00230 {
00231     variable_error (variable, _("no bits number"));
00232     goto exit_on_error;
00233 }
00234 }
00235 else if (nsteps)
00236 {
00237     variable->step
00238     = xml_node_get_float (node, (const xmlChar *)
LABEL_STEP, &error_code);
00239     if (error_code || variable->step < 0.)

```

```

00240     {
00241         variable_error (variable, _("bad step size"));
00242         goto exit_on_error;
00243     }
00244 }
00245
00246 #if DEBUG_VARIABLE
00247 fprintf (stderr, "variable_open_xml: end\n");
00248 #endif
00249 return 1;
00250 exit_on_error:
00251 variable_free (variable, INPUT_TYPE_XML);
00252 #if DEBUG_VARIABLE
00253 fprintf (stderr, "variable_open_xml: end\n");
00254 #endif
00255 return 0;
00256 }

```

Here is the call graph for this function:



### 4.29.3 Variable Documentation

#### 4.29.3.1 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 50 of file [variable.c](#).

#### 4.29.3.2 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 55 of file [variable.c](#).

## 4.30 variable.c

```

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 2012-2018, 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 "utils.h"
00040 #include "variable.h"
00041
00042 #define DEBUG_VARIABLE 0
00043
00044 const char *format[NPRECISIONS] = {
00045     "%.0lf", "%.1lf", "%.2lf", "%.3lf", "%.4lf", "%.5lf", "%.6lf", "%.7lf",
00046     "%.8lf", "%.9lf", "%.10lf", "%.11lf", "%.12lf", "%.13lf", "%.14lf"
00047 };
00048
00049 const double precision[NPRECISIONS] = {
00050     1., 0.1, 0.01, 1e-3, 1e-4, 1e-5, 1e-6, 1e-7, 1e-8, 1e-9, 1e-10, 1e-11,
00051     1e-12, 1e-13, 1e-14
00052 };
00053
00054 void
00055 variable_free (Variable * variable,
00056               unsigned int type)
00057 {
00058     #if DEBUG_VARIABLE
00059         fprintf (stderr, "variable_free: start\n");
00060     #endif
00061     if (type == INPUT_TYPE_XML)
00062         xmlFree (variable->name);
00063     else
00064         g_free (variable->name);
00065     #if DEBUG_VARIABLE
00066         fprintf (stderr, "variable_free: end\n");
00067     #endif
00068 }
00069
00070 void
00071 variable_error (Variable * variable,
00072                char *message)
00073 {
00074     char buffer[64];
00075     if (!variable->name)
00076         snprintf (buffer, 64, "%s: %s", _("Variable"), message);
00077     else
00078         snprintf (buffer, 64, "%s %s: %s", _("Variable"), variable->name, message);
00079     error_message = g_strdup (buffer);
00080 }
00081
00082 int
00083 variable_open_xml (Variable * variable,
00084                   xmlNode * node,

```

```

00106             unsigned int algorithm,
00107             unsigned int nsteps)
00109 {
00110     int error_code;
00111
00112     #if DEBUG_VARIABLE
00113     fprintf (stderr, "variable_open_xml: start\n");
00114     #endif
00115
00116     variable->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00117     if (!variable->name)
00118     {
00119         variable_error (variable, _("no name"));
00120         goto exit_on_error;
00121     }
00122     if (xmlHasProp (node, (const xmlChar *) LABEL_MINIMUM))
00123     {
00124         variable->rangemin
00125         = xml_node_get_float (node, (const xmlChar *) LABEL_MINIMUM,
00126                               &error_code);
00127         if (error_code)
00128         {
00129             variable_error (variable, _("bad minimum"));
00130             goto exit_on_error;
00131         }
00132         variable->rangeminabs = xml_node_get_float_with_default
00133         (node, (const xmlChar *) LABEL_ABSOLUTE_MINIMUM, -G_MAXDOUBLE,
00134          &error_code);
00135         if (error_code)
00136         {
00137             variable_error (variable, _("bad absolute minimum"));
00138             goto exit_on_error;
00139         }
00140         if (variable->rangemin < variable->rangeminabs)
00141         {
00142             variable_error (variable, _("minimum range not allowed"));
00143             goto exit_on_error;
00144         }
00145     }
00146     else
00147     {
00148         variable_error (variable, _("no minimum range"));
00149         goto exit_on_error;
00150     }
00151     if (xmlHasProp (node, (const xmlChar *) LABEL_MAXIMUM))
00152     {
00153         variable->rangemax
00154         = xml_node_get_float (node, (const xmlChar *) LABEL_MAXIMUM,
00155                               &error_code);
00156         if (error_code)
00157         {
00158             variable_error (variable, _("bad maximum"));
00159             goto exit_on_error;
00160         }
00161         variable->rangemaxabs = xml_node_get_float_with_default
00162         (node, (const xmlChar *) LABEL_ABSOLUTE_MAXIMUM, G_MAXDOUBLE,
00163          &error_code);
00164         if (error_code)
00165         {
00166             variable_error (variable, _("bad absolute maximum"));
00167             goto exit_on_error;
00168         }
00169         if (variable->rangemax > variable->rangemaxabs)
00170         {
00171             variable_error (variable, _("maximum range not allowed"));
00172             goto exit_on_error;
00173         }
00174         if (variable->rangemax < variable->rangemin)
00175         {
00176             variable_error (variable, _("bad range"));
00177             goto exit_on_error;
00178         }
00179     }
00180     else
00181     {
00182         variable_error (variable, _("no maximum range"));
00183         goto exit_on_error;
00184     }
00185     variable->precision
00186     = xml_node_get_uint_with_default (node, (const xmlChar *)
00187     LABEL_PRECISION,
00188     DEFAULT_PRECISION, &error_code);
00189     if (error_code || variable->precision >= NPRECISIONS)
00190     {
00191         variable_error (variable, _("bad precision"));
00192         goto exit_on_error;
00193     }

```

```

00193     if (algorithm == ALGORITHM_SWEEP || algorithm ==
ALGORITHM_ORTHOGONAL)
00194     {
00195         if (xmlHasProp (node, (const xmlChar *) LABEL_NSWEEPS))
00196         {
00197             variable->nsweeps
00198             = xml_node_get_uint (node, (const xmlChar *) LABEL_NSWEEPS,
00199                                &error_code);
00200             if (error_code || !variable->nsweeps)
00201             {
00202                 variable_error (variable, _("bad sweeps"));
00203                 goto exit_on_error;
00204             }
00205         }
00206         else
00207         {
00208             variable_error (variable, _("no sweeps number"));
00209             goto exit_on_error;
00210         }
00211         #if DEBUG_VARIABLE
00212         fprintf (stderr, "variable_open_xml: nsweeps=%u\n", variable->nsweeps);
00213         #endif
00214     }
00215     if (algorithm == ALGORITHM_GENETIC)
00216     {
00217         // Obtaining bits representing each variable
00218         if (xmlHasProp (node, (const xmlChar *) LABEL_NBITS))
00219         {
00220             variable->nbits
00221             = xml_node_get_uint (node, (const xmlChar *) LABEL_NBITS,
00222                                &error_code);
00223             if (error_code || !variable->nbits)
00224             {
00225                 variable_error (variable, _("invalid bits number"));
00226                 goto exit_on_error;
00227             }
00228         }
00229         else
00230         {
00231             variable_error (variable, _("no bits number"));
00232             goto exit_on_error;
00233         }
00234     }
00235     else if (nsteps)
00236     {
00237         variable->step
00238         = xml_node_get_float (node, (const xmlChar *)
LABEL_STEP, &error_code);
00239         if (error_code || variable->step < 0.)
00240         {
00241             variable_error (variable, _("bad step size"));
00242             goto exit_on_error;
00243         }
00244     }
00245     #if DEBUG_VARIABLE
00246     fprintf (stderr, "variable_open_xml: end\n");
00247     #endif
00248     return 1;
00249 exit_on_error:
00250     variable_free (variable, INPUT_TYPE_XML);
00251     #if DEBUG_VARIABLE
00252     fprintf (stderr, "variable_open_xml: end\n");
00253     #endif
00254     return 0;
00255 }
00256
00257 int
00264 variable_open_json (Variable * variable,
00265                     JsonNode * node,
00266                     unsigned int algorithm,
00267                     unsigned int nsteps)
00268 {
00269     JsonObject *object;
00270     const char *label;
00271     int error_code;
00272     #if DEBUG_VARIABLE
00273     fprintf (stderr, "variable_open_json: start\n");
00274     #endif
00275     object = json_node_get_object (node);
00276     label = json_object_get_string_member (object, LABEL_NAME);
00277     if (!label)
00278     {
00279         variable_error (variable, _("no name"));
00280         goto exit_on_error;
00281     }
00282     variable->name = g_strdup (label);

```

```

00284     if (json_object_get_member (object, LABEL_MINIMUM))
00285     {
00286         variable->rangemin
00287         = json_object_get_float (object, LABEL_MINIMUM, &error_code);
00288         if (error_code)
00289         {
00290             variable_error (variable, _("bad minimum"));
00291             goto exit_on_error;
00292         }
00293         variable->rangeminabs
00294         = json_object_get_float_with_default (object,
00295 LABEL_ABSOLUTE_MINIMUM,
00296                                             -G_MAXDOUBLE, &error_code);
00297         if (error_code)
00298         {
00299             variable_error (variable, _("bad absolute minimum"));
00300             goto exit_on_error;
00301         }
00302         if (variable->rangemin < variable->rangeminabs)
00303         {
00304             variable_error (variable, _("minimum range not allowed"));
00305             goto exit_on_error;
00306         }
00307     }
00308     else
00309     {
00310         variable_error (variable, _("no minimum range"));
00311         goto exit_on_error;
00312     }
00313     if (json_object_get_member (object, LABEL_MAXIMUM))
00314     {
00315         variable->rangemax
00316         = json_object_get_float (object, LABEL_MAXIMUM, &error_code);
00317         if (error_code)
00318         {
00319             variable_error (variable, _("bad maximum"));
00320             goto exit_on_error;
00321         }
00322         variable->rangemaxabs
00323         = json_object_get_float_with_default (object,
00324 LABEL_ABSOLUTE_MAXIMUM,
00325                                             G_MAXDOUBLE, &error_code);
00326         if (error_code)
00327         {
00328             variable_error (variable, _("bad absolute maximum"));
00329             goto exit_on_error;
00330         }
00331         if (variable->rangemax > variable->rangemaxabs)
00332         {
00333             variable_error (variable, _("maximum range not allowed"));
00334             goto exit_on_error;
00335         }
00336         if (variable->rangemax < variable->rangemin)
00337         {
00338             variable_error (variable, _("bad range"));
00339             goto exit_on_error;
00340         }
00341     }
00342     else
00343     {
00344         variable_error (variable, _("no maximum range"));
00345         goto exit_on_error;
00346     }
00347     variable->precision
00348     = json_object_get_uint_with_default (object,
00349 LABEL_PRECISION,
00350                                         DEFAULT_PRECISION, &error_code);
00351     if (error_code || variable->precision >= NPRECISIONS)
00352     {
00353         variable_error (variable, _("bad precision"));
00354         goto exit_on_error;
00355     }
00356     if (algorithm == ALGORITHM_SWEEP || algorithm ==
00357 ALGORITHM_ORTHOGONAL)
00358     {
00359         if (json_object_get_member (object, LABEL_NSWEEPS))
00360         {
00361             variable->nsweeps
00362             = json_object_get_uint (object, LABEL_NSWEEPS, &error_code);
00363             if (error_code || !variable->nsweeps)
00364             {
00365                 variable_error (variable, _("bad sweeps"));
00366                 goto exit_on_error;
00367             }
00368         }
00369     }
00370     else
00371     {
00372         // ...

```

```

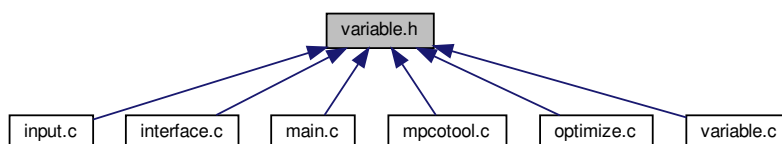
00367         variable_error (variable, _("no sweeps number"));
00368         goto exit_on_error;
00369     }
00370 #if DEBUG_VARIABLE
00371     fprintf (stderr, "variable_open_json: nsweeps=%u\n", variable->nsweeps);
00372 #endif
00373 }
00374 if (algorithm == ALGORITHM_GENETIC)
00375 {
00376     // Obtaining bits representing each variable
00377     if (json_object_get_member (object, LABEL_NBITS))
00378     {
00379         variable->nbits
00380         = json_object_get_uint (object, LABEL_NBITS, &error_code);
00381         if (error_code || !variable->nbits)
00382         {
00383             variable_error (variable, _("invalid bits number"));
00384             goto exit_on_error;
00385         }
00386     }
00387     else
00388     {
00389         variable_error (variable, _("no bits number"));
00390         goto exit_on_error;
00391     }
00392 }
00393 else if (nsteps)
00394 {
00395     variable->step = json_object_get_float (object,
00396     LABEL_STEP, &error_code);
00397     if (error_code || variable->step < 0.)
00398     {
00399         variable_error (variable, _("bad step size"));
00400         goto exit_on_error;
00401     }
00402 }
00403 #if DEBUG_VARIABLE
00404     fprintf (stderr, "variable_open_json: end\n");
00405 #endif
00406     return 1;
00407 exit_on_error:
00408     variable_free (variable, INPUT_TYPE_JSON);
00409 #if DEBUG_VARIABLE
00410     fprintf (stderr, "variable_open_json: end\n");
00411 #endif
00412     return 0;
00413 }

```

## 4.31 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, 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.*

### 4.31.1 Detailed Description

Header file to define the variable data.

#### Authors

Javier Burguete.

#### Copyright

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

### 4.31.2 Enumeration Type Documentation

#### 4.31.2.1 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 };
```

## 4.31.3 Function Documentation

### 4.31.3.1 variable\_error()

```
void variable_error (
    Variable * variable,
    char * message )
```

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

#### Parameters

<i>variable</i>	<a href="#">Variable</a> struct.
<i>message</i>	Error message.

Definition at line 85 of file [variable.c](#).

```
00089 {
00090     char buffer[64];
00091     if (!variable->name)
00092         snprintf (buffer, 64, "%s: %s", _("Variable"), message);
00093     else
00094         snprintf (buffer, 64, "%s %s: %s", _("Variable"), variable->name, message);
00095     error_message = g_strdup (buffer);
00096 }
```

### 4.31.3.2 variable\_free()

```
void variable_free (
    Variable * variable,
    unsigned int type )
```

Function to free the memory of a [Variable](#) struct.

## Parameters

<i>variable</i>	<a href="#">Variable</a> struct.
<i>type</i>	Type of input file.

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

```

00068 {
00069     #if DEBUG_VARIABLE
00070         fprintf (stderr, "variable_free: start\n");
00071     #endif
00072     if (type == INPUT_TYPE_XML)
00073         xmlFree (variable->name);
00074     else
00075         g_free (variable->name);
00076     #if DEBUG_VARIABLE
00077         fprintf (stderr, "variable_free: end\n");
00078     #endif
00079 }
```

## 4.31.3.3 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>	<a href="#">Variable</a> 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 264 of file [variable.c](#).

```

00269 {
00270     JsonObject *object;
00271     const char *label;
00272     int error_code;
00273     #if DEBUG_VARIABLE
00274         fprintf (stderr, "variable_open_json: start\n");
00275     #endif
00276     object = json_node_get_object (node);
00277     label = json_object_get_string_member (object, LABEL_NAME);
00278     if (!label)
00279     {
00280         variable_error (variable, _("no name"));
00281         goto exit_on_error;
00282     }
```

```

00282     }
00283     variable->name = g_strdup (label);
00284     if (json_object_get_member (object, LABEL_MINIMUM))
00285     {
00286         variable->rangemin
00287         = json_object_get_float (object, LABEL_MINIMUM, &error_code);
00288         if (error_code)
00289         {
00290             variable_error (variable, _("bad minimum"));
00291             goto exit_on_error;
00292         }
00293         variable->rangeminabs
00294         = json_object_get_float_with_default (object,
00295         LABEL_ABSOLUTE_MINIMUM,
00296         -G_MAXDOUBLE, &error_code);
00297         if (error_code)
00298         {
00299             variable_error (variable, _("bad absolute minimum"));
00300             goto exit_on_error;
00301         }
00302         if (variable->rangemin < variable->rangeminabs)
00303         {
00304             variable_error (variable, _("minimum range not allowed"));
00305             goto exit_on_error;
00306         }
00307     }
00308     else
00309     {
00310         variable_error (variable, _("no minimum range"));
00311         goto exit_on_error;
00312     }
00313     if (json_object_get_member (object, LABEL_MAXIMUM))
00314     {
00315         variable->rangemax
00316         = json_object_get_float (object, LABEL_MAXIMUM, &error_code);
00317         if (error_code)
00318         {
00319             variable_error (variable, _("bad maximum"));
00320             goto exit_on_error;
00321         }
00322         variable->rangemaxabs
00323         = json_object_get_float_with_default (object,
00324         LABEL_ABSOLUTE_MAXIMUM,
00325         G_MAXDOUBLE, &error_code);
00326         if (error_code)
00327         {
00328             variable_error (variable, _("bad absolute maximum"));
00329             goto exit_on_error;
00330         }
00331         if (variable->rangemax > variable->rangemaxabs)
00332         {
00333             variable_error (variable, _("maximum range not allowed"));
00334             goto exit_on_error;
00335         }
00336         if (variable->rangemax < variable->rangemin)
00337         {
00338             variable_error (variable, _("bad range"));
00339             goto exit_on_error;
00340         }
00341     }
00342     else
00343     {
00344         variable_error (variable, _("no maximum range"));
00345         goto exit_on_error;
00346     }
00347     variable->precision
00348     = json_object_get_uint_with_default (object,
00349     LABEL_PRECISION,
00350     DEFAULT_PRECISION, &error_code);
00351     if (error_code || variable->precision >= NPRECISIONS)
00352     {
00353         variable_error (variable, _("bad precision"));
00354         goto exit_on_error;
00355     }
00356     if (algorithm == ALGORITHM_SWEEP || algorithm ==
00357     ALGORITHM_ORTHOGONAL)
00358     {
00359         if (json_object_get_member (object, LABEL_NSWEEPS))
00360         {
00361             variable->nsweeps
00362             = json_object_get_uint (object, LABEL_NSWEEPS, &error_code);
00363             if (error_code || !variable->nsweeps)
00364             {
00365                 variable_error (variable, _("bad sweeps"));
00366                 goto exit_on_error;
00367             }
00368         }
00369     }

```

```

00365     else
00366     {
00367         variable_error (variable, _("no sweeps number"));
00368         goto exit_on_error;
00369     }
00370 #if DEBUG_VARIABLE
00371     fprintf (stderr, "variable_open_json: nsweeps=%u\n", variable->nsweeps);
00372 #endif
00373 }
00374 if (algorithm == ALGORITHM_GENETIC)
00375 {
00376     // Obtaining bits representing each variable
00377     if (json_object_get_member (object, LABEL_NBITS))
00378     {
00379         variable->nbits
00380         = json_object_get_uint (object, LABEL_NBITS, &error_code);
00381         if (error_code || !variable->nbits)
00382         {
00383             variable_error (variable, _("invalid bits number"));
00384             goto exit_on_error;
00385         }
00386     }
00387     else
00388     {
00389         variable_error (variable, _("no bits number"));
00390         goto exit_on_error;
00391     }
00392 }
00393 else if (nsteps)
00394 {
00395     variable->step = json_object_get_float (object,
00396     LABEL_STEP, &error_code);
00397     if (error_code || variable->step < 0.)
00398     {
00399         variable_error (variable, _("bad step size"));
00400         goto exit_on_error;
00401     }
00402 }
00403 #if DEBUG_VARIABLE
00404     fprintf (stderr, "variable_open_json: end\n");
00405 #endif
00406     return 1;
00407 exit_on_error:
00408     variable_free (variable, INPUT_TYPE_JSON);
00409 #if DEBUG_VARIABLE
00410     fprintf (stderr, "variable_open_json: end\n");
00411 #endif
00412     return 0;
00413 }

```

Here is the call graph for this function:



#### 4.31.3.4 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 104 of file [variable.c](#).

```

00109 {
00110     int error_code;
00111
00112     #if DEBUG_VARIABLE
00113     fprintf (stderr, "variable_open_xml: start\n");
00114     #endif
00115
00116     variable->name = (char *) xmlGetProp (node, (const xmlChar *) LABEL_NAME);
00117     if (!variable->name)
00118     {
00119         variable_error (variable, _("no name"));
00120         goto exit_on_error;
00121     }
00122     if (xmlHasProp (node, (const xmlChar *) LABEL_MINIMUM))
00123     {
00124         variable->rangemin
00125             = xml_node_get_float (node, (const xmlChar *) LABEL_MINIMUM,
00126                                   &error_code);
00127         if (error_code)
00128         {
00129             variable_error (variable, _("bad minimum"));
00130             goto exit_on_error;
00131         }
00132         variable->rangeminabs = xml_node_get_float_with_default
00133             (node, (const xmlChar *) LABEL_ABSOLUTE_MINIMUM, -G_MAXDOUBLE,
00134             &error_code);
00135         if (error_code)
00136         {
00137             variable_error (variable, _("bad absolute minimum"));
00138             goto exit_on_error;
00139         }
00140         if (variable->rangemin < variable->rangeminabs)
00141         {
00142             variable_error (variable, _("minimum range not allowed"));
00143             goto exit_on_error;
00144         }
00145     }
00146     else
00147     {
00148         variable_error (variable, _("no minimum range"));
00149         goto exit_on_error;
00150     }
00151     if (xmlHasProp (node, (const xmlChar *) LABEL_MAXIMUM))
00152     {
00153         variable->rangemax
00154             = xml_node_get_float (node, (const xmlChar *) LABEL_MAXIMUM,
00155                                   &error_code);
00156         if (error_code)
00157         {
00158             variable_error (variable, _("bad maximum"));
00159             goto exit_on_error;
00160         }
00161         variable->rangemaxabs = xml_node_get_float_with_default
00162             (node, (const xmlChar *) LABEL_ABSOLUTE_MAXIMUM, G_MAXDOUBLE,
00163             &error_code);
00164         if (error_code)
00165         {
00166             variable_error (variable, _("bad absolute maximum"));
00167             goto exit_on_error;
00168         }
00169         if (variable->rangemax > variable->rangemaxabs)
00170         {
00171             variable_error (variable, _("maximum range not allowed"));
00172             goto exit_on_error;

```

```

00173     }
00174     if (variable->rangemax < variable->rangemin)
00175     {
00176         variable_error (variable, _("bad range"));
00177         goto exit_on_error;
00178     }
00179 }
00180 else
00181 {
00182     variable_error (variable, _("no maximum range"));
00183     goto exit_on_error;
00184 }
00185 variable->precision
00186 = xml_node_get_uint_with_default (node, (const xmlChar *)
LABEL_PRECISION,
                                DEFAULT_PRECISION, &error_code);
00187 if (error_code || variable->precision >= NPRECISIONS)
00188 {
00189     variable_error (variable, _("bad precision"));
00190     goto exit_on_error;
00191 }
00192 }
00193 if (algorithm == ALGORITHM_SWEEP || algorithm ==
ALGORITHM_ORTHOGONAL)
00194 {
00195     if (xmlHasProp (node, (const xmlChar *) LABEL_NSWEEPS))
00196     {
00197         variable->nsweeps
00198         = xml_node_get_uint (node, (const xmlChar *) LABEL_NSWEEPS,
                                &error_code);
00199         if (error_code || !variable->nsweeps)
00200         {
00201             variable_error (variable, _("bad sweeps"));
00202             goto exit_on_error;
00203         }
00204     }
00205 }
00206 else
00207 {
00208     variable_error (variable, _("no sweeps number"));
00209     goto exit_on_error;
00210 }
00211 #if DEBUG_VARIABLE
00212 fprintf (stderr, "variable_open_xml: nsweeps=%u\n", variable->nsweeps);
00213 #endif
00214 }
00215 if (algorithm == ALGORITHM_GENETIC)
00216 {
00217     // Obtaining bits representing each variable
00218     if (xmlHasProp (node, (const xmlChar *) LABEL_NBITS))
00219     {
00220         variable->nbits
00221         = xml_node_get_uint (node, (const xmlChar *) LABEL_NBITS,
                                &error_code);
00222         if (error_code || !variable->nbits)
00223         {
00224             variable_error (variable, _("invalid bits number"));
00225             goto exit_on_error;
00226         }
00227     }
00228 }
00229 else
00230 {
00231     variable_error (variable, _("no bits number"));
00232     goto exit_on_error;
00233 }
00234 }
00235 else if (nsteps)
00236 {
00237     variable->step
00238     = xml_node_get_float (node, (const xmlChar *)
LABEL_STEP, &error_code);
00239     if (error_code || variable->step < 0.)
00240     {
00241         variable_error (variable, _("bad step size"));
00242         goto exit_on_error;
00243     }
00244 }
00245 }
00246 #if DEBUG_VARIABLE
00247 fprintf (stderr, "variable_open_xml: end\n");
00248 #endif
00249 return 1;
00250 exit_on_error:
00251 variable_free (variable, INPUT_TYPE_XML);
00252 #if DEBUG_VARIABLE
00253 fprintf (stderr, "variable_open_xml: end\n");
00254 #endif
00255 return 0;
00256 }

```

Here is the call graph for this function:



## 4.32 variable.h

```

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 2012-2018, 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 #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,
  
```



```
00074             unsigned int algorithm, unsigned int nsteps);
00075 int variable_open_json (Variable * variable, JsonNode * node,
00076             unsigned int algorithm, unsigned int nsteps);
00077
00078 #endif
```



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