

libgencurvefit

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# Chapter 1

## Data Structure Index

### 1.1 Data Structures

Here are the data structures with brief descriptions:

<a href="#">gencurvefitOptions</a>	5
<a href="#">mt19937p</a>	6





## Chapter 2

# File Index

### 2.1 File List

Here is a list of all files with brief descriptions:

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<code>/Users/andrew/Documents/Andy/programming/libgencurvefit/src/gencurvefit.c</code>	8
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## Chapter 3

# Data Structure Documentation

### 3.1 gencurvefitOptions Struct Reference

```
#include <gencurvefit.h>
```

#### Data Fields

- unsigned int [iterations](#)
- unsigned int [popsizeMultiplier](#)
- double [k\\_m](#)
- double [recomb](#)
- double [tolerance](#)
- unsigned int [strategy](#)
- double [temp](#)
- [updatefunction](#) [updatefun](#)
- unsigned int [updatefrequency](#)
- int [seed](#)
- int [useinitialguesses](#)

### 3.1.1 Field Documentation

3.1.1.1 unsigned int iterations

3.1.1.2 double k\_m

3.1.1.3 unsigned int popsizeMultiplier

3.1.1.4 double recomb

3.1.1.5 int seed

3.1.1.6 unsigned int strategy

3.1.1.7 double temp

3.1.1.8 double tolerance

3.1.1.9 unsigned int updatefrequency

3.1.1.10 updatefunction updatefun

3.1.1.11 int useinitialguesses

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

- /Users/andrew/Documents/Andy/programming/libgencurvefit/src/[gencurvefit.h](#)

## 3.2 mt19937p Struct Reference

```
#include <mt19937p.h>
```

### Data Fields

- unsigned long [mt](#) [N]
- int [mti](#)
- unsigned long [mag01](#) [2]

### 3.2.1 Field Documentation

3.2.1.1 unsigned long mag01[2]

3.2.1.2 unsigned long mt[N]

3.2.1.3 int mti

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

- /Users/andrew/Documents/Andy/programming/libgencurvefit/src/[mt19937p.h](#)

## Chapter 4

# File Documentation

### 4.1 `/Users/andrew/Documents/Andy/programming/libgencurvefit/src/errorEstima` File Reference

```
#include "gencurvefit.h"  
#include "math.h"  
#include "stdlib.h"  
#include "string.h"
```

#### Defines

- `#define TINY 1.0e-20`

#### Functions

- `int getCovarianceMatrix` (double \*\*covarianceMatrix, void \*userdata, [fitfunction](#) fitfun, double cost, double \*coefs, int numcoefs, unsigned int \*holdvector, double \*ydata, double \*edata, long data-points, double \*\*xdata, int numDataDims, int unitSD)

### 4.1.1 Define Documentation

#### 4.1.1.1 #define TINY 1.0e-20

### 4.1.2 Function Documentation

#### 4.1.2.1 int getCovarianceMatrix ( double \*\* covarianceMatrix, void \* userdata, fitfunction fitfun, double cost, double \* coefs, int numcoefs, unsigned int \* holdvector, double \* ydata, double \* edata, long datapoints, double \*\* xdata, int numDataDims, int unitSD )

## 4.2 /Users/andrew/Documents/Andy/programming/libgencurvefit/src/gencurvefit. File Reference

```
#include "gencurvefit.h"
#include "mt19937p.h"
#include <stdlib.h>
#include <time.h>
#include "math.h"
#include "string.h"
```

## Typedefs

- typedef struct [waveStats](#) waveStats
- typedef struct [genoptStruct](#) genoptStruct

## Functions

- void \* [malloc2d](#) (int ii, int jj, int sz)
- double [gnoise](#) (struct [mt19937p](#) \*myMT19937, double sd)
- int [genetic\\_optimisation](#) (fitfunction fitfun, [costfunction](#) costfun, unsigned int numcoefs, double \*coefs, const unsigned int \*holdvector, const double \*\*limits, long datapoints, const double \*ydata, const double \*\*xdata, const double \*edata, unsigned int numDataDims, double \*chi2, const [gencurvefitOptions](#) \*gco, void \*userdata)
- double [chisquared](#) (void \*userdata, const double \*params, unsigned int numcoefs, const double \*data, const double \*model, const double \*errors, long datapoints)
- double [robust](#) (void \*userdata, const double \*params, unsigned int numcoefs, const double \*data, const double \*model, const double \*errors, long datapoints)

## 4.2.1 Typedef Documentation

4.2.1.1 typedef struct genoptStruct genoptStruct

4.2.1.2 typedef struct waveStats waveStats

## 4.2.2 Function Documentation

4.2.2.1 double chisquared ( void \* *userdata*, const double \* *params*, unsigned int *numcoefs*, const double \* *data*, const double \* *model*, const double \* *errors*, long *datapoints* )

4.2.2.2 int genetic\_optimisation ( fitfunction *fitfun*, costfunction *costfun*, unsigned int *numcoefs*, double \* *coefs*, const unsigned int \* *holdvector*, const double \*\* *limits*, long *datapoints*, const double \* *ydata*, const double \*\* *xdata*, const double \* *edata*, unsigned int *numDataDims*, double \* *chi2*, const gencurvefitOptions \* *gco*, void \* *userdata* )

4.2.2.3 double gnoise ( struct mt19937p \* *myMT19937*, double *sd* )

4.2.2.4 void\* malloc2d ( int *ii*, int *jj*, int *sz* )

4.2.2.5 double robust ( void \* *userdata*, const double \* *params*, unsigned int *numcoefs*, const double \* *data*, const double \* *model*, const double \* *errors*, long *datapoints* )

## 4.3 /Users/andrew/Documents/Andy/programming/libgencurvefit/src/gencurvefit.h File Reference

### Data Structures

- struct [gencurvefitOptions](#)

### Defines

- #define [NO\\_MEMORY](#) -1
- #define [INCORRECT\\_LIMITS](#) -2
- #define [HOLDVECTOR\\_COEFS\\_MISMATCH](#) -3
- #define [NO\\_VARYING\\_PARAMS](#) -4
- #define [WRONG\\_NUMBER\\_OF\\_PARAMS](#) -5
- #define [COEFS\\_MUST\\_BE\\_WITHIN\\_LIMITS](#) -6
- #define [PROBLEM\\_CALCULATING\\_COVARIANCE](#) -7
- #define [PI](#) 3.14159265358979323846

### Typedefs

- typedef int(\* [fitfunction](#) )(void \*userdata, const double \*coefs, unsigned int numcoefs, double \*model, const double \*\*xdata, long datapoints, unsigned int numDataDims)
- typedef double(\* [costfunction](#) )(void \*userdata, const double \*params, unsigned int numcoefs, const double \*data, const double \*model, const double \*errors, long datapoints)
- typedef int(\* [updatefunction](#) )(void \*userdata, const double \*coefs, unsigned int numcoefs, unsigned int iterations, double cost, unsigned int updatetime, double convergenceNumber)
- typedef struct [gencurvefitOptions](#) [gencurvefitOptions](#)

## Functions

- void \* [malloc2d](#) (int ii, int jj, int sz)
  
- int [genetic\\_optimisation](#) ([fitfunction](#) fitfun, [costfunction](#) costfun, unsigned int numcoefs, double \*coefs, const unsigned int \*holdvector, const double \*\*limits, long datapoints, const double \*ydata, const double \*\*xdata, const double \*edata, unsigned int numDataDims, double \*chi2, const [gencurvefitOptions](#) \*gco, void \*userdata)
  
- int [getCovarianceMatrix](#) (double \*\*covarianceMatrix, void \*userdata, [fitfunction](#) fitfun, double cost, double \*coefs, int numcoefs, unsigned int \*holdvector, double \*ydata, double \*edata, long datapoints, double \*\*xdata, int numDataDims, int unitSD)
  
- double [chisquared](#) (void \*userdata, const double \*params, unsigned int numcoefs, const double \*data, const double \*model, const double \*errors, long datapoints)
  
- double [robust](#) (void \*userdata, const double \*params, unsigned int numcoefs, const double \*data, const double \*model, const double \*errors, long datapoints)





### 4.3.1 Define Documentation

- 4.3.1.1 `#define COEFS_MUST_BE_WITHIN_LIMITS -6`
- 4.3.1.2 `#define HOLDVECTOR_COEFS_MISMATCH -3`
- 4.3.1.3 `#define INCORRECT_LIMITS -2`
- 4.3.1.4 `#define NO_MEMORY -1`
- 4.3.1.5 `#define NO_VARYING_PARAMS -4`
- 4.3.1.6 `#define PI 3.14159265358979323846`
- 4.3.1.7 `#define PROBLEM_CALCULATING_COVARIANCE -7`
- 4.3.1.8 `#define WRONG_NUMBER_OF_PARAMS -5`

### 4.3.2 Typedef Documentation

- 4.3.2.1 `typedef double(* costfunction)(void *userdata, const double *params, unsigned int numcoefs, const double *data, const double *model, const double *errors, long datapoints)`
- 4.3.2.2 `typedef int(* fitfunction)(void *userdata, const double *coefs, unsigned int numcoefs, double *model, const double **xdata, long datapoints, unsigned int numDataDims)`
- 4.3.2.3 `typedef struct gencurvefitOptions gencurvefitOptions`
- 4.3.2.4 `typedef int(* updatefunction)(void *userdata, const double *coefs, unsigned int numcoefs, unsigned int iterations, double cost, unsigned int updatetime, double convergenceNumber)`

### 4.3.3 Function Documentation

- 4.3.3.1 `double chisquared ( void * userdata, const double * params, unsigned int numcoefs, const double * data, const double * model, const double * errors, long datapoints )`
- 4.3.3.2 `int genetic_optimisation ( fitfunction fitfun, costfunction costfun, unsigned int numcoefs, double * coefs, const unsigned int * holdvector, const double ** limits, long datapoints, const double * ydata, const double ** xdata, const double * edata, unsigned int numDataDims, double * chi2, const gencurvefitOptions * gco, void * userdata )`
- 4.3.3.3 `int getCovarianceMatrix ( double ** covarianceMatrix, void * userdata, fitfunction fitfun, double cost, double * coefs, int numcoefs, unsigned int * holdvector, double * ydata, double * edata, long datapoints, double ** xdata, int numDataDims, int unitSD )`
- 4.3.3.4 `void* malloc2d ( int ii, int jj, int sz )`
- 4.3.3.5 `double robust ( void * userdata, const double * params, unsigned int numcoefs, const double * data, const double * model, const double * errors, long datapoints )`

## 4.4 /Users/andrew/Documents/Andy/programming/libgencurvefit/src/mt19937p.c File Reference

```
#include "mt19937p.h"
```

## Defines

- #define [N](#) 624
- #define [M](#) 397
- #define [MATRIX\\_A](#) 0x9908b0df
- #define [UPPER\\_MASK](#) 0x80000000
- #define [LOWER\\_MASK](#) 0x7fffffff
- #define [TEMPERING\\_MASK\\_B](#) 0x9d2c5680
- #define [TEMPERING\\_MASK\\_C](#) 0xefc60000
- #define [TEMPERING\\_SHIFT\\_U](#)(y) (y >> 11)
- #define [TEMPERING\\_SHIFT\\_S](#)(y) (y << 7)
- #define [TEMPERING\\_SHIFT\\_T](#)(y) (y << 15)
- #define [TEMPERING\\_SHIFT\\_L](#)(y) (y >> 18)

## Functions

- void [sgenrand](#) (unsigned long seed, struct [mt19937p](#) \*config)
- double [genrand](#) (struct [mt19937p](#) \*config)
- unsigned long [genrand\\_int](#) (struct [mt19937p](#) \*config)

### 4.4.1 Define Documentation

4.4.1.1 `#define LOWER_MASK 0x7fffffff`

4.4.1.2 `#define M 397`

4.4.1.3 `#define MATRIX_A 0x9908b0df`

4.4.1.4 `#define N 624`

4.4.1.5 `#define TEMPERING_MASK_B 0x9d2c5680`

4.4.1.6 `#define TEMPERING_MASK_C 0xefc60000`

4.4.1.7 `#define TEMPERING_SHIFT_L( y ) (y >> 18)`

4.4.1.8 `#define TEMPERING_SHIFT_S( y ) (y << 7)`

4.4.1.9 `#define TEMPERING_SHIFT_T( y ) (y << 15)`

4.4.1.10 `#define TEMPERING_SHIFT_U( y ) (y >> 11)`

4.4.1.11 `#define UPPER_MASK 0x80000000`

### 4.4.2 Function Documentation

4.4.2.1 `double genrand ( struct mt19937p * config )`

4.4.2.2 `unsigned long genrand_int ( struct mt19937p * config )`

4.4.2.3 `void sgenrand ( unsigned long seed, struct mt19937p * config )`

## 4.5 /Users/andrew/Documents/Andy/programming/libgencurvefit/src/mt19937p.h File Reference

### Data Structures

- struct [mt19937p](#)

### Defines

- `#define` [MATRIX\\_A](#) 0x9908b0df
- `#define` [N](#) 624

### Functions

- void [sgenrand](#) (unsigned long seed, struct [mt19937p](#) \*config)
- double [genrand](#) (struct [mt19937p](#) \*config)
- unsigned long [genrand\\_int](#) (struct [mt19937p](#) \*config)

### 4.5.1 Define Documentation

4.5.1.1 `#define MATRIX_A 0x9908b0df`

4.5.1.2 `#define N 624`

### 4.5.2 Function Documentation

4.5.2.1 `double genrand ( struct mt19937p * config )`

4.5.2.2 `unsigned long genrand_int ( struct mt19937p * config )`

4.5.2.3 `void sgenrand ( unsigned long seed, struct mt19937p * config )`

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