# spec_tools

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# Contents

# 1 Todo List

**Member _csv< _T >::set_separator (const std::string &sSep)**

**Class _marker< _T >**

marker(const _marker<_T>&)

**Member main (int argc, char **argv)**

Parsing command line to get folder name and csv separator, for example.

# 2 Class Documentation

## 2.1 _csv< _T > Class Template Reference

This is the templated _csv class, initialized with double by default. STL parallel execution policy does not provide enhancements for simple operations.

`#include <csv.h>`

### Public Types

- enum eVerbose { **QUIET**, **DEBUG** }

  *Define verbosity values.*

### Public Member Functions

- _csv ()

  *Default constructor without parameters. These parameters must be set after by methods. It will rise lot of errors if something is missing.*
- _csv (const std::string &sFilename, const char &cSep)

  *Constructor with two parameters such as the name of the working file and the separator character as usual with csv.*
- _csv (const std::string &sFilename, const std::string &sSep)
- _csv (const std::vector< std::vector< _T > > &vvData)

  *Constructor fed with external data.*
- _csv (const std::vector< std::string > &vsHeader, const std::vector< std::vector< _T > > &vvData)

  *Constructor fed with external header and data.*
- _csv (const std::vector< std::string > &vsHeader, const std::vector< std::vector< _T > > &vvData, const char &cSep)

  *Constructor fed with external header and data.*
- bool read ()

  *Read the content of the file given to the constructor using boost. It detects the header and data consistency with digit sequence: {0123456789eE+-. tab std::endl} and basic regex and dimension matching between header and data line. It is able to recover basic errors such as 'tab'==' '. The method put NaN in the grid if an unrecoverable error appends. Data will be store in private variables.*
- bool show () const

  *Show whole data, i.e. the header and data with no restriction on length or terminal size. It uses boost::format in order to correct spacing of number and strings.*
- bool show (int iLine_stop) const

  *Show the header and data until "line_stop" line. Print all columns with terminal end-of-line. It uses boost::format in order to correct spacing of number and strings.*
- bool write ()

  *Write on disk what data are store.*
- const std::vector< _T > select_line (int line) const

  *Select the line "line" in data.*
- const std::vector< _T > select_column (int iCol) const

  *Select the column "col" in data.*
- const std::vector< std::vector< _T > > select (int iLine_min, int iLine_max, int iCol_min, int iCol_max) const

  *Select a sub grid in data, i.e. trim data to the rectangular* $[i_{min}, i_{max}] \times [j_{min}, j_{max}]$.
- bool set_data (const std::vector< std::vector< _T > > &vvData)

  *Set data with a vector of a vector.*
- bool set_column (const std::vector< _T > &vCol, int iCol)

  *Set a column with a vector.*
- bool **set_row** (const std::vector< _T > &vRow, int iRow)
- bool set_header (const std::vector< std::string > &vsHeader)

  *Set the header: the first line containing column name.*
- bool set_filename (const std::string &sFilename)

  *Set the filename for output or input. The fstream do not care about extension...*

- bool set_filename_out (const std::string &sFilename)

  *Set the filename for output. The fstream do not care about extension...*
- bool set_separator (const char &cSep)

  *Set the csv separator. Usually: '\t', ' ', ',', ';' ...*
- bool set_separator (const std::string &sSep)

  *Set the csv separator. Usually: '\t', ' ', ',', ';' ...*
- void set_verbose (eVerbose evV)

  *Set the verbose mode for debug. It does not deactivate error raising.*
- const std::string get_filename () const

  *Get the filename.*
- const std::string get_filename_out () const

  *Get the output filename.*
- const char get_separator () const

  *Get the separator.*
- const size_t get_header_size () const

  *Get size of the header.*
- const size_t get_data_size_i () const

  *Get data line size.*
- const size_t get_data_size_j () const

  *Get data column size.*
- const std::vector< std::vector< _T > > & get_data () const

  *Get data and return it as a vector of vector.*
- const std::vector< std::string > & get_header () const

  *Get column names and return it in a vector.*
- bool empty () const

  *Check if data are empty, and the emptiness of the first line, i.e. this->data[0].*
- bool check_dim ()

  *Check data dimension consistency, i.e. if all line dimensions are all equal.*
- bool **genrandspec** (_T TMin, _T TMax, _T TStep)
- bool transform_lin (_T TA, _T TB, int iCol)

  *Do Y=aX+b to the iCol-column.*
- bool **shift** (_T TVal)
- bool **shift** (_T TVal, int iCol)
- bool apply_max_threshold (_T TVal)

  *Delete $i$ line from the grid where $\mathbf{data}[i][j] > val$.*
- bool apply_min_threshold (_T TVal)

  *Delete $i$ line from the grid where $\mathbf{data}[i][j] < val$.*
- bool apply_max_threshold (_T TVal, int iCol)

  *Delete $i$ line from the grid where $\mathbf{data}[i][j \neq list] > val$.*
- bool apply_min_threshold (_T TVal, int iCol)

  *Delete $i$ line from the grid where $\mathbf{data}[i][j \neq list] < val$.*
- void zeroize ()

  *Set to zero data. One should find this useful...*
- void clear ()

  *Delete data and header.*
- _csv & **operator=** (const _csv &other) const
- bool **operator==** (const _csv &other) const

- bool **operator!=** (const _csv &other) const
- _csv & operator+ (const _csv &other) const

  *Sum with the 2nd column.*
- _csv & operator+ (const _T &other) const

  *Add a constant to the 2nd column.*
- _csv & operator- (const _csv &other) const

  *Sum with the 2nd column.*
- _csv & operator- (const _T &other) const

  *Substract a constant to the 2nd column.*
- _csv & operator* (const _csv &other) const

  *Inner product with the 2nd column.*
- _csv & operator* (const _T &other) const

  *Multiply by a constant the 2nd column.*
- _csv & operator/ (const _csv &other) const

  *Divide element by element the two columns.*
- _csv & operator/ (const _T &other) const

  *Divide by a non zero constant the 2nd column.*

#### 2.1.1 Detailed Description

**template<typename _T = double>**
**class _csv< _T >**

This is the templated _csv class, initialized with double by default. STL parallel execution policy does not provide enhancements for simple operations.

#### 2.1.2 Constructor & Destructor Documentation

##### 2.1.2.1 _csv() [1/6]

```
template<typename _T = double>
_csv< _T >::_csv ( )
```

Default constructor without parameters. These parameters must be set after by methods. It will rise lot of errors if something is missing.

Default constructor

##### 2.1.2.2 _csv() [2/6]

```
template<typename _T = double>
_csv< _T >::_csv (
            const std::string & sFilename,
            const char & cSep )  [explicit]
```

Constructor with two parameters such as the name of the working file and the separator character as usual with csv.

Constructor

**Parameters**

| | |
|---|---|
| *sFilename* | string Name of the input or output file with extension |
| *cSep* | char Separator char between column |

#### 2.1.2.3 _csv() [3/6]

```
template<typename _T = double>
_csv< _T >::_csv (
            const std::string & sFilename,
            const std::string & sSep )  [explicit]
```

**Parameters**

| | |
|---|---|
| *sFilename* | string Name of the input or output file with extension |
| *sSep* | string Separator char between column |

#### 2.1.2.4 _csv() [4/6]

```
template<typename _T = double>
_csv< _T >::_csv (
            const std::vector< std::vector< _T > > & vvData )  [explicit]
```

Constructor fed with external data.

**Parameters**

| | |
|---|---|
| *vvData* | the data |

#### 2.1.2.5 _csv() [5/6]

```
template<typename _T = double>
_csv< _T >::_csv (
            const std::vector< std::string > & vsHeader,
            const std::vector< std::vector< _T > > & vvData )  [explicit]
```

Constructor fed with external header and data.

**Parameters**

| | |
|---|---|
| *vsHeader* | The vector of column name |
| *vvData* | the data |

#### 2.1.2.6 _csv() [6/6]

```
template<typename _T = double>
_csv< _T >::_csv (
            const std::vector< std::string > & vsHeader,
            const std::vector< std::vector< _T > > & vvData,
            const char & cSep )  [explicit]
```

Constructor fed with external header and data.

**Parameters**

| | |
|---|---|
| *vsHeader* | the vector of column name |
| *vvData* | the data |
| *cSep* | char Separator char between column |

### 2.1.3 Member Function Documentation

#### 2.1.3.1 apply_max_threshold() [1/2]

```
template<typename _T = double>
bool _csv< _T >::apply_max_threshold (
            _T TVal )
```

Delete $i$ line from the grid where $\mathbf{data}[i][j] > val$.

**Parameters**

| | |
|---|---|
| *TVal* | The max threshold |

**Returns**

true if all seems OK

#### 2.1.3.2 apply_max_threshold() [2/2]

```
template<typename _T = double>
bool _csv< _T >::apply_max_threshold (
            _T TVal,
            int iCol )
```

Delete $i$ line from the grid where $\mathbf{data}[i][j \neq list] > val$.

**Parameters**

| | |
|---|---|
| *TVal* | The max threshold |
| *iCol* | Select a column |

**Returns**

true if all seems OK

#### 2.1.3.3 apply_min_threshold() [1/2]

```
template<typename _T = double>
bool _csv< _T >::apply_min_threshold (
            _T TVal )
```

Delete $i$ line from the grid where $\mathbf{data}[i][j] < val$.

**Parameters**

| | |
|---|---|
| *TVal* | The min threshold |

**Returns**

true if all seems OK

#### 2.1.3.4 apply_min_threshold() [2/2]

```
template<typename _T = double>
bool _csv< _T >::apply_min_threshold (
            _T TVal,
            int iCol )
```

Delete $i$ line from the grid where $\mathbf{data}[i][j \neq list] < val$.

**Parameters**

| | |
|---|---|
| *TVal* | The min threshold |
| *iCol* | Select a column |

**Returns**

true if all seems OK

#### 2.1.3.5 check_dim()

```
template<typename _T = double>
bool _csv< _T >::check_dim ( )
```

Check data dimension consistency, i.e. if all line dimensions are all equal.

**Returns**

true if dimensions seem OK

#### 2.1.3.6 empty()

```
template<typename _T = double>
bool _csv< _T >::empty ( ) const
```

Check if data are empty, and the emptiness of the first line, i.e. this->data[0].

**Returns**

true if data are empty

#### 2.1.3.7 get_data()

```
template<typename _T = double>
const std::vector< std::vector< _T > > & _csv< _T >::get_data ( ) const
```

Get data and return it as a vector of vector.

**Returns**

std::vector<std::vector<_T> >

#### 2.1.3.8 get_data_size_i()

```
template<typename _T = double>
const size_t _csv< _T >::get_data_size_i ( ) const
```

Get data line size.

**Returns**

size_t

#### 2.1.3.9 get_data_size_j()

```
template<typename _T = double>
const size_t _csv< _T >::get_data_size_j ( ) const
```

Get data column size.

**Returns**

size_t

#### 2.1.3.10 get_filename()

```
template<typename _T = double>
const std::string _csv< _T >::get_filename ( ) const
```

Get the filename.

**Returns**

std::string

#### 2.1.3.11 get_filename_out()

```
template<typename _T = double>
const std::string _csv< _T >::get_filename_out ( ) const
```

Get the output filename.

**Returns**

std::string

#### 2.1.3.12 get_header()

```
template<typename _T = double>
const std::vector< _T > & _csv< _T >::get_header ( ) const
```

Get column names and return it in a vector.

**Returns**

std::vector<_T>

#### 2.1.3.13 get_header_size()

```
template<typename _T = double>
const size_t _csv< _T >::get_header_size ( ) const
```

Get size of the header.

**Returns**

size_t

#### 2.1.3.14 get_separator()

```
template<typename _T = double>
const char _csv< _T >::get_separator ( ) const
```

Get the separator.

**Returns**

char

#### 2.1.3.15 read()

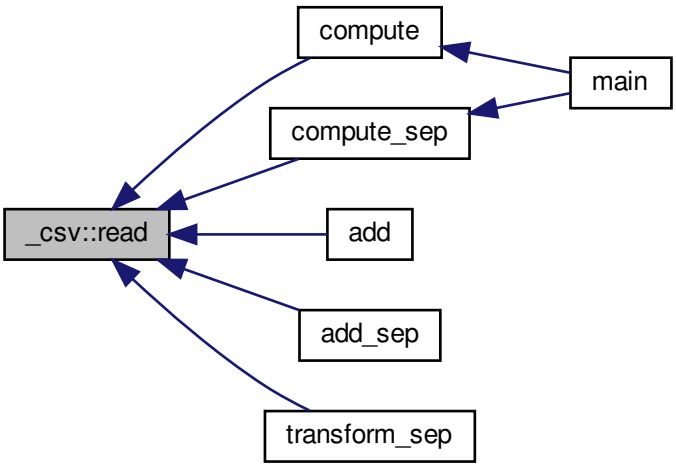
```
template<typename _T = double>
bool _csv< _T >::read ( )
```

Read the content of the file given to the constructor using boost. It detects the header and data consistency with digit sequence: {0123456789eE+-. tab std::endl} and basic regex and dimension matching between header and data line. It is able to recover basic errors such as 'tab'==' '. The method put NaN in the grid if an unrecoverable error appends. Data will be store in private variables.

**Returns**

true if all seems OK

Here is the caller graph for this function:




#### 2.1.3.16 select()

```
template<typename _T = double>
const std::vector< std::vector< _T > > & _csv< _T >::select (
            int iLine_min,
            int iLine_max,
            int iCol_min,
            int iCol_max ) const
```

Select a sub grid in data, i.e. trim data to the rectangular $[i_{min}, i_{max}] \times [j_{min}, j_{max}]$.

**Parameters**

| | |
|---|---|
| *iLine_min* | upper line $i_{min}$ |
| *iLine_max* | lower line $i_{max}$ |
| *iCol_min* | left column $j_{min}$ |
| *iCol_max* | right column $j_{max}$ |

**Returns**

std::vector<std::vector<_T> >

#### 2.1.3.17 select_column()

```
template<typename _T = double>
const std::vector< _T > & _csv< _T >::select_column (
            int iCol ) const
```

Select the column "col" in data.

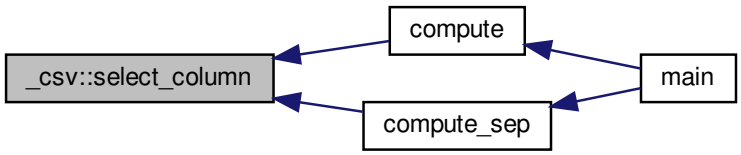
**Parameters**

| | |
|---|---|
| *iCol* | The column to select |

**Returns**

std::vector<_T>

Here is the caller graph for this function:




#### 2.1.3.18 select_line()

```
template<typename _T = double>
const std::vector< _T > & _csv< _T >::select_line (
            int iLine ) const
```

Select the line "line" in data.

**Parameters**

| | |
|---|---|
| *iLine* | The line to select |

**Returns**

std::vector<_T>

#### 2.1.3.19 set_column()

```
template<typename _T = double>
bool _csv< _T >::set_column (
            const std::vector< _T > & vRow,
            int iRow )
```

Set a column with a vector.

Set a row with a vector.

**Parameters**

| | |
|---|---|
| *vCol* | std::vector<_T> vCol |
| *iCol* | Select a column |

**Returns**

true if all seems OK

**Parameters**

| | |
|---|---|
| *vRow* | std::vector<_T> vRow |
| *iRow* | Select a row |

**Returns**

true if all seems OK

#### 2.1.3.20 set_data()

```
template<typename _T = double>
void _csv< _T >::set_data (
            const std::vector< std::vector< _T > > & vvData )
```

Set data with a vector of a vector.

**Parameters**

| | |
|---|---|
| *vvData* | std::vector<std::vector<_T> > grid |

**Returns**

true if all seems OK

#### 2.1.3.21 set_filename()

```
template<typename _T = double>
bool _csv< _T >::set_filename (
            const std::string & sFilename )
```

Set the filename for output or input. The fstream do not care about extension...

**Parameters**

| | |
|---|---|
| *sFilename* | The filename with extension or not. |

**Returns**

true if all seems OK

#### 2.1.3.22 set_filename_out()

```
template<typename _T = double>
bool _csv< _T >::set_filename_out (
            const std::string & sFilename )
```

Set the filename for output. The fstream do not care about extension...

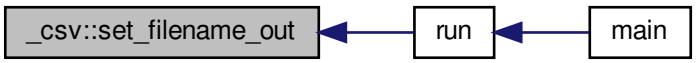
**Parameters**

| | |
|---|---|
| *sFilename* | The filename with extension or not. |

**Returns**

true if all seems OK

Here is the caller graph for this function:




#### 2.1.3.23 set_header()

```
template<typename _T = double>
bool _csv< _T >::set_header (
            const std::vector< std::string > & vsHeader )
```

Set the header: the first line containing column name.

**Parameters**

| | |
|---|---|
| *vsHeader* | string vector |

**Returns**

true if all seems OK

#### 2.1.3.24 set_separator() [1/2]

```
template<typename _T = double>
bool _csv< _T >::set_separator (
            const char & cSep )
```

Set the csv separator. Usually: '\t', ' ', ',', ';' ...

**Parameters**

| | |
|---|---|
| *cSep* | The sep character: '\t' for tabulation |

**Returns**

true if all seems OK

Here is the caller graph for this function:


#### 2.1.3.25 set_separator() [2/2]

```
template<typename _T = double>
bool _csv< _T >::set_separator (
            const std::string & sSep )
```

Set the csv separator. Usually: '\t', ' ', ',', ';' ...

**Todo**

**Parameters**

| | |
|---|---|
| *sSep* | The sep character: '\t' for tabulation |

**Returns**

true if all seems OK

#### 2.1.3.26 set_verbose()

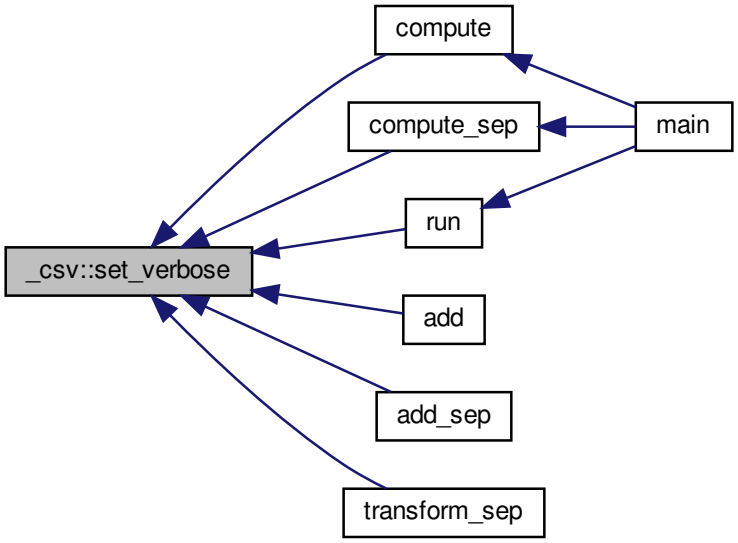
```
template<typename _T = double>
bool _csv< _T >::set_verbose (
            eVerbose evV )
```

Set the verbose mode for debug. It does not deactivate error raising.

**Parameters**

| | |
|---|---|
| *evV* | eVerbose::DEBUG for verbose mode and eVerbose::QUIET to keep quiet |

Here is the caller graph for this function:




#### 2.1.3.27 show() [1/2]

```
template<typename _T = double>
void _csv< _T >::show ( ) const
```

Show whole data, i.e. the header and data with no restriction on length or terminal size. It uses boost::format in order to correct spacing of number and strings.

**Returns**

true if all seems OK

#### 2.1.3.28 show() [2/2]

```
template<typename _T = double>
bool _csv< _T >::show (
            int iLine_stop ) const
```

Show the header and data until "line_stop" line. Print all columns with terminal end-of-line. It uses boost::format in order to correct spacing of number and strings.

**Parameters**

| | |
|---|---|
| *iLine_stop* | The number of lines where stop the display |

**Returns**

true if all seems OK

#### 2.1.3.29 transform_lin()

```
template<typename _T = double>
bool _csv< _T >::transform_lin (
            _T TA,
            _T TB,
            int iCol )
```

Do Y=aX+b to the iCol-column.

**Returns**

true if all seems OK

#### 2.1.3.30 write()

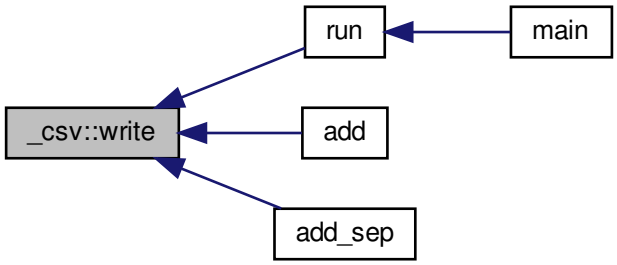
```
template<typename _T = double>
bool _csv< _T >::write ( )
```

Write on disk what data are store.

**Returns**

true if all seems OK

Here is the caller graph for this function:




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

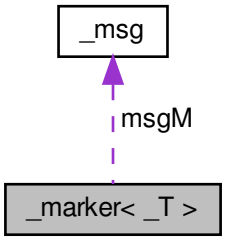
- csv.h

## 2.2 _marker< _T > Class Template Reference

A class to plot spectra with line markers using py matplotlib.

`#include <marker.h>`

Collaboration diagram for _marker< _T >:




### Classes

- struct Line

  *Define a line.*

### Public Types

- typedef std::vector< Line > **vlList**

### Public Member Functions

- void **set_verbose** (const bool bVerbose)
- bool **set_data** (const std::vector< _T > &vTX, const std::vector< _T > &vTY)
- bool **set_title** (const std::string &sTitle)
- bool **set_label** (const std::string &sLabel)
- bool **set_xlabel** (const std::string &sXlabel)
- bool **set_ylabel** (const std::string &sYlabel)
- bool **set_xunit** (const std::string &sXunit)
- bool **set_yunit** (const std::string &sYunit)
- bool **set_output** (const std::string &sFilename)
- bool set_output (const std::string &sFilename, const int iDpi)

  *Set the picture filename with the extension (png, pdf, jpeg...) and the density (iDpi>50)*
- bool set_continuum (const _T TContinuum)

  *Set the continuum position and therefore ymax. Default is y=1.*
- bool set_supp (const _T TXmin, const _T TXmax)

*Set the support of the first spectrum.*

- bool **set_xmin** (const _T TXmin)
- bool **set_xmax** (const _T TXmax)
- bool **set_ymin** (const _T TYmin)
- bool **set_ymax** (const _T TYmax)
- bool **set_figsize** (int iHeight, int iWidth)
- void set_colorline (const std::string &sColor)

  *Set the color of the first curve.*
- bool **set_linewidth** (float fWidth)
- bool **set_titlesize** (int iSize)
- bool **set_labelsize** (int iSize)
- bool **set_ticklabelsize** (int iSize)
- bool set_annotatesize (int iSize)

  *Set the font size of markers.*
- bool **set_legendsize** (int iSize)
- bool **set_continnumsize** (float fWidth)
- void **set_showgrid** (bool bShowgrid)
- void set_dotted (bool bDotted)

  *Set secondary curves with dotted-style.*
- void set_dotdashed (bool bDotdashed)

  *Set secondary curves with dot-dashed-style.*
- bool set_scriptname (const std::string &sScriptname)

  *Set the name of the py script. Default is .plot.py.*
- bool set_log (const std::string &sLog)

  *Enable or disable log file. Default is .marker.log.*
- bool add_line (_T TWl, const std::string &sName)

  *Add a marker with a name on the figure.*
- bool add_line (_T TWl, const std::string &sName, bool bBold)

  *Add a marker with a name on the figure. bBold determines if the line must be highlighted.*
- bool add_data (const std::vector< _T > &vTX, const std::vector< _T > &vTY)

  *Add an additionnal spectrum which has to be plot.*
- bool add_data (const std::vector< _T > &vTX, const std::vector< _T > &vTY, const std::string &sLabel)

  *Add an additionnal spectrum which has to be plot.*
- _T **get_continuum** () const
- const std::pair< _T, _T > get_supp ()

  *Get the support of the first spectrum.*
- const std::string & **get_scriptname** ()
- const std::string & **get_output** ()
- const std::string & **get_title** () const
- const std::string & **get_label** () const
- const std::string & **get_xlabel** () const
- const std::string & **get_xunit** () const
- const std::string & **get_ylabel** () const
- const std::string & **get_yunit** () const
- const std::pair< int, int > get_figsize () const

  *Get the defined figsize, if defined. First: Height and Second: Width.*
- int **get_dpi** () const
- bool make ()

  *Write spectra, write script with markers.*
- int plot ()

  *Run the py script.*

**Protected Attributes**

- _msg msgM

### 2.2.1 Detailed Description

**template<typename _T = float>**
**class _marker< _T >**

A class to plot spectra with line markers using py matplotlib.

**Todo** marker(const _marker<_T>&)

### 2.2.2 Member Function Documentation

#### 2.2.2.1 get_figsize()

```
template<typename _T = float>
const std::pair< int, int > _marker< _T >::get_figsize ( ) const
```

Get the defined figsize, if defined. First: Height and Second: Width.

**Returns**

std::pair of 2 int

#### 2.2.2.2 get_supp()

```
template<typename _T = float>
const std::pair< _T, _T > _marker< _T >::get_supp ( )
```

Get the support of the first spectrum.

**Returns**

std::pair of 2 _T: [ $x_{min}$ $x_{max}$]

#### 2.2.2.3 set_colorline()

```
template<typename _T = float>
void _marker< _T >::set_colorline (
            const std::string & sColor )
```

Set the color of the first curve.

**Parameters**

| | |
|---|---|
| *sColor* | A string like "red", "green", "blue" or and a rgba hex string like "#rrggbbaa" |

#### 2.2.2.4 set_output()

```
template<typename _T = float>
bool _marker< _T >::set_output (
            const std::string & sFilename,
            const int iDpi )
```

Set the picture filename with the extension (png, pdf, jpeg...) and the density (iDpi>50)

**Parameters**

| | |
|---|---|
| *sFilename* | Picture name |
| *iDpi* | Density |

#### 2.2.2.5 set_supp()

```
template<typename _T = float>
bool _marker< _T >::set_supp (
            const _T TXmin,
            const _T TXmax )
```

Set the support of the first spectrum.

**Parameters**

| | |
|---|---|
| *TXmin* | $x_{min}$ |
| *TXmax* | $x_{max}$ |

### 2.2.3 Member Data Documentation

#### 2.2.3.1 msgM

```
template<typename _T = float>
_msg _marker< _T >::msgM  [protected]
```

Interface to print message to std output

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

- marker.h

## 2.3 _msg Class Reference

A class that sends string to std output and in a file...

```
#include <msg.h>
```

### Public Types

- enum eMsg {
  **START**, **MID**, **END**, **ERROR**,
  **THREADS** }

  *enum for method in order to define whether the message is at the begin, at the end or an error,*

### Public Member Functions

- **_msg** (const _msg &other)
- bool msg (const std::string &sMsg)

  *Send a message with eMsg::MID as default.*
- bool msg (eMsg emType, const std::string &sMsg)

  *Send a message...*
- bool error (const std::string &sMsg)

  *Send an error message...*
- template<typename ... Args>
  bool msg (const Args &...args)

  *A variadic formatter method that indeed sends arbitratry number of variable to the std output... with eMsg::MID as default.*
- template<typename ... Args>
  bool msg (eMsg emType, const Args &...args)

  *A variadic formatter method that indeed sends arbitratry number of variable to the std output... The first parameter is always the enum eMsg.*
- template<typename ... Args>
  bool error (const Args &...args)

  *A variadic formatter method that indeed sends arbitratry number of variable to the std error output... with eMsg::ERROR as default.*
- bool set_name (const std::string sName)

  *Set the name of the main instance.*
- bool set_threadname (const std::string sName)

  *Set the name of threads.*
- bool set_log (const std::string sLog)

  *Enable or disable log file.*
- void enable_log (bool bLog)

  *Enable or disable the log file.*

#### 2.3.1 Detailed Description

A class that sends string to std output and in a file...

#### 2.3.2 Member Function Documentation

##### 2.3.2.1 msg()

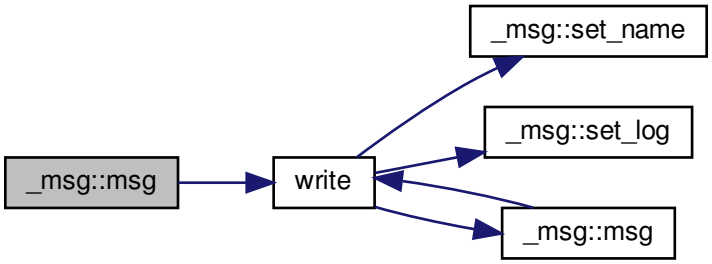
```
bool _msg::msg (
            eMsg emType,
            const std::string & sMsg )
```

Send a message...

**Parameters**

| | |
|---|---|
| *emType* | See enum eMsg:: |

Here is the call graph for this function:




The documentation for this class was generated from the following files:

- msg.h
- msg.cpp

## 2.4 _spectra Class Reference

### Public Member Functions

- **_spectra** (const _spectra &other)
- _spectra & **operator=** (const _spectra &other)
- bool **operator==** (const _spectra &other) const
- bool **operator!=** (const _spectra &other) const

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

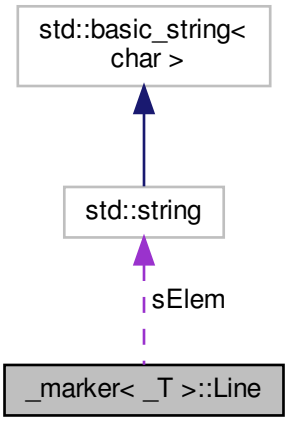
- spectra.h

## 2.5 _marker< _T >::Line Struct Reference

Define a line.

`#include <marker.h>`

Collaboration diagram for _marker< _T >::Line:




### Public Attributes

- _T **TWI**
- std::string **sElem**
- bool **bBold**

#### 2.5.1 Detailed Description

**template<typename _T = float>**
**struct _marker< _T >::Line**

Define a line.

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

- marker.h

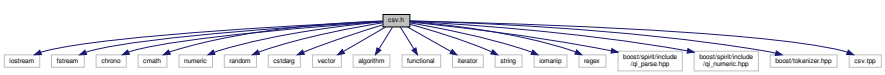
# 3 File Documentation

## 3.1 csv.h File Reference

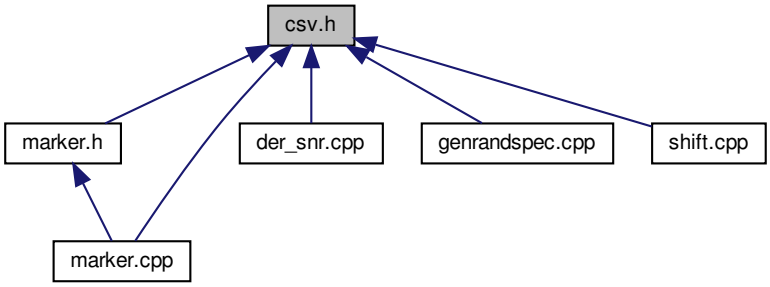
A basic class for csv manipulation.

```
#include <iostream>
#include <fstream>
#include <chrono>
#include <cmath>
#include <numeric>
#include <random>
#include <cstdarg>
#include <vector>
#include <algorithm>
#include <functional>
#include <iterator>
#include <string>
#include <iomanip>
#include <regex>
#include <boost/spirit/include/qi_parse.hpp>
#include <boost/spirit/include/qi_numeric.hpp>
#include <boost/tokenizer.hpp>
#include "csv.tpp"
```

Include dependency graph for csv.h:



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




### Classes

- class _csv< _T >

  *This is the templated _csv class, initialized with double by default. STL parallel execution policy does not provide enhancements for simple operations.*

#### 3.1.1 Detailed Description

A basic class for csv manipulation.

**Author**

Audric Lemonnier

**Version**

0.9

**Date**

07/04/2020

## 3.2 der_snr.cpp File Reference

An C++ implementation of the der_snr fortran code from: F. Stoehr et al: DER_SNR: A Simple & General Spectroscopic Signal-to-Noise Measurement Algorithm,
394, Astronomical Data Analysis Software and Systems (ADASS) XVII
2008ASPC..394..505S.

```
#include <iostream>
#include <cstdlib>
#include <cstdio>
#include <fstream>
#include <vector>
#include <algorithm>
#include <string>
#include <cmath>
#include <functional>
#include <thread>
#include <future>
#include <boost/program_options.hpp>
#include <csv.h>
#include <msg.h>
```

Include dependency graph for der_snr.cpp:


### Macros

- #define LOGFILE ".der_snr.log"
- #define HISTFILE ".history"

### Functions

- void compute (const std::vector< std::string > &list, const std::string &sOutput)

  *Compute S/N for all the string in the vector of strings. Default sep is tab. Used in the multithreaded mode.*
- void compute_sep (const std::vector< std::string > &list, const std::string &sOutput, const char &cSep)

  *Compute S/N for all the string in the vector of strings. Used in the multithreaded mode.*
- bool merge (const std::string &sPattern)

  *Merge files from threads following a filename pattern, i.e. the given output name.*
- bool write (std::vector< std::string > vsResults, const std::string &sOutput)

  *Write on disk results with the default sep.*
- bool write (std::vector< std::string > vsResults, const std::string &sOutput, const char &cSep)

  *Write on disk results.*
- float der_snr (const std::vector< float > &vFlux)

  *Compute the S/N with der_snr method.*
- double **der_snr** (const std::vector< double > &vFlux)

- float median (const std::vector< float > &vFlux)

  *Simple computation of the median.*
- double **median** (const std::vector< double > &vFlux)
- int main (int argc, char **argv)

  *This code removes zeros and negative values in csv located in "./data". The maximum of thread has been used to accelerate code.*

#### 3.2.1 Detailed Description

An C++ implementation of the der_snr fortran code from: F. Stoehr et al: DER_SNR: A Simple & General Spectroscopic Signal-to-Noise Measurement Algorithm,
394, Astronomical Data Analysis Software and Systems (ADASS) XVII
2008ASPC..394..505S.

Remove value under a threshold in a folder or in a file. This code is multi-threaded or not if not available.

**Author**

Audric Lemonnier

**Version**

0.2

**Date**

18/04/2020

#### 3.2.2 Macro Definition Documentation

##### 3.2.2.1 HISTFILE

```
#define HISTFILE ".history"
```

Define the default histfile (shared)

##### 3.2.2.2 LOGFILE

```
#define LOGFILE ".der_snr.log"
```

Define the default logfile

#### 3.2.3 Function Documentation

##### 3.2.3.1 compute()

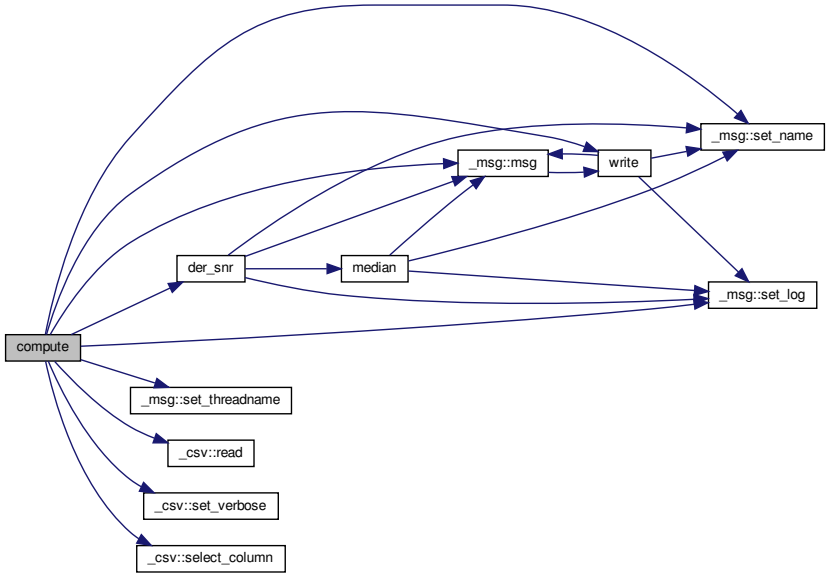
```
void compute (
            const std::vector< std::string > & list,
            const std::string & sOutput )
```

Compute S/N for all the string in the vector of strings. Default sep is tab. Used in the multithreaded mode.

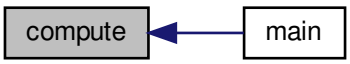
**Parameters**

| | |
|---|---|
| *list* | list of files |
| *sOutput* | output filename |

Here is the call graph for this function:




Here is the caller graph for this function:




#### 3.2.3.2 compute_sep()

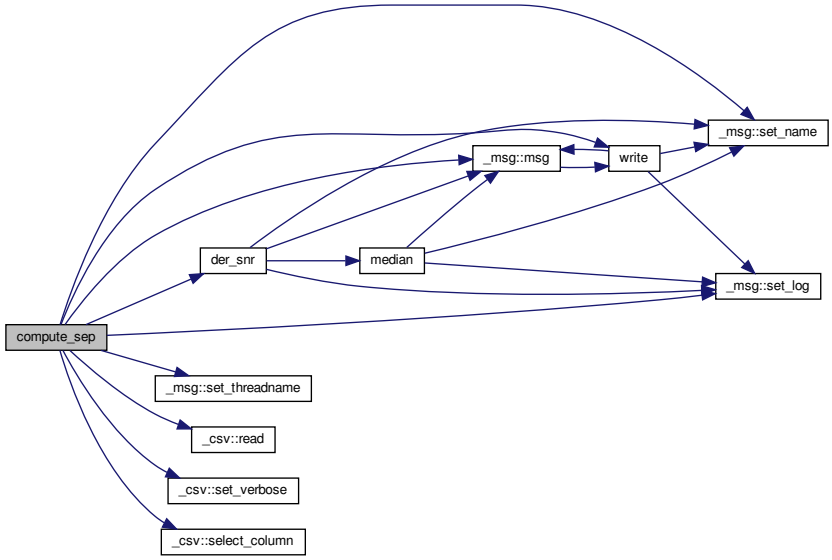
```
void compute_sep (
            const std::vector< std::string > & list,
            const std::string & sOutput,
            const char & cSep )
```

Compute S/N for all the string in the vector of strings. Used in the multithreaded mode.

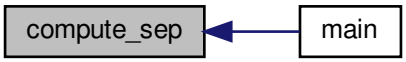
**Parameters**

| | |
|---|---|
| *list* | list of files |
| *sOutput* | output filename |
| *cSep* | char separator |

Here is the call graph for this function:




Here is the caller graph for this function:




#### 3.2.3.3 der_snr()

```
float der_snr (
            const std::vector< float > & vFlux )
```

Compute the S/N with der_snr method.

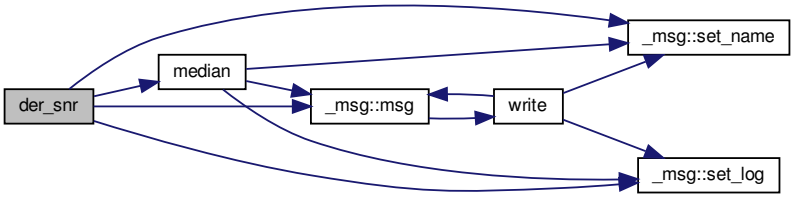
**Parameters**

| | |
|---|---|
| *vFlux* | flux vector |

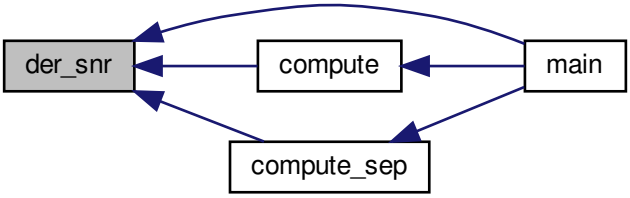
**Returns**

-1 if error happens

Here is the call graph for this function:




Here is the caller graph for this function:



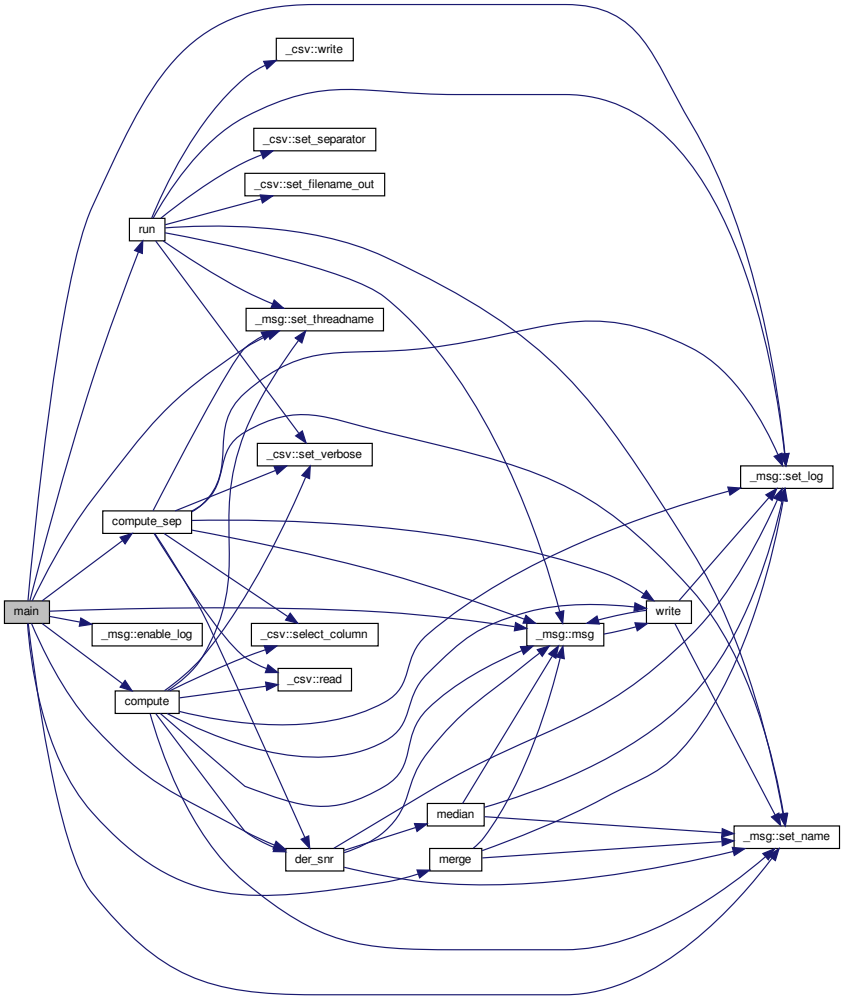

#### 3.2.3.4 main()

```
int main (
            int argc,
            char ** argv )
```

This code removes zeros and negative values in csv located in "./data". The maximum of thread has been used to accelerate code.

**Todo** Parsing command line to get folder name and csv separator, for example.

Here is the call graph for this function:




#### 3.2.3.5 median()

```
float median (
            const std::vector< float > & vFlux )
```

Simple computation of the median.

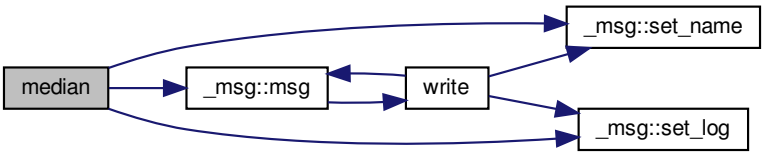
**Parameters**

| | |
|---|---|
| *vFlux* | flux vector |

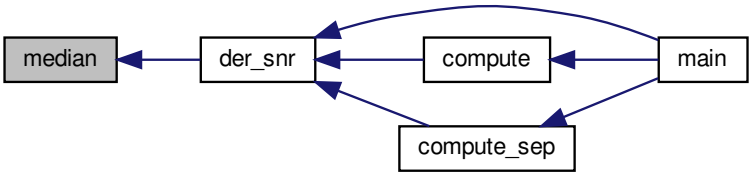
**Returns**

0 if error happens

Here is the call graph for this function:




Here is the caller graph for this function:




#### 3.2.3.6 merge()

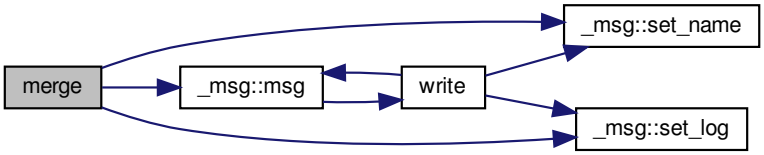
```
bool merge (
            const std::string & sPattern )
```

Merge files from threads following a filename pattern, i.e. the given output name.

**Parameters**

| | |
|---|---|
| *sPattern* | basename without ext |

Here is the call graph for this function:




Here is the caller graph for this function:


#### 3.2.3.7 write() [1/2]

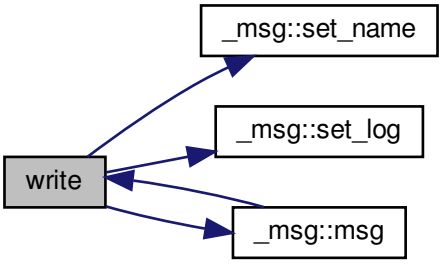
```
bool write (
            std::vector< std::string > vsResults,
            const std::string & sOutput )
```

Write on disk results with the default sep.

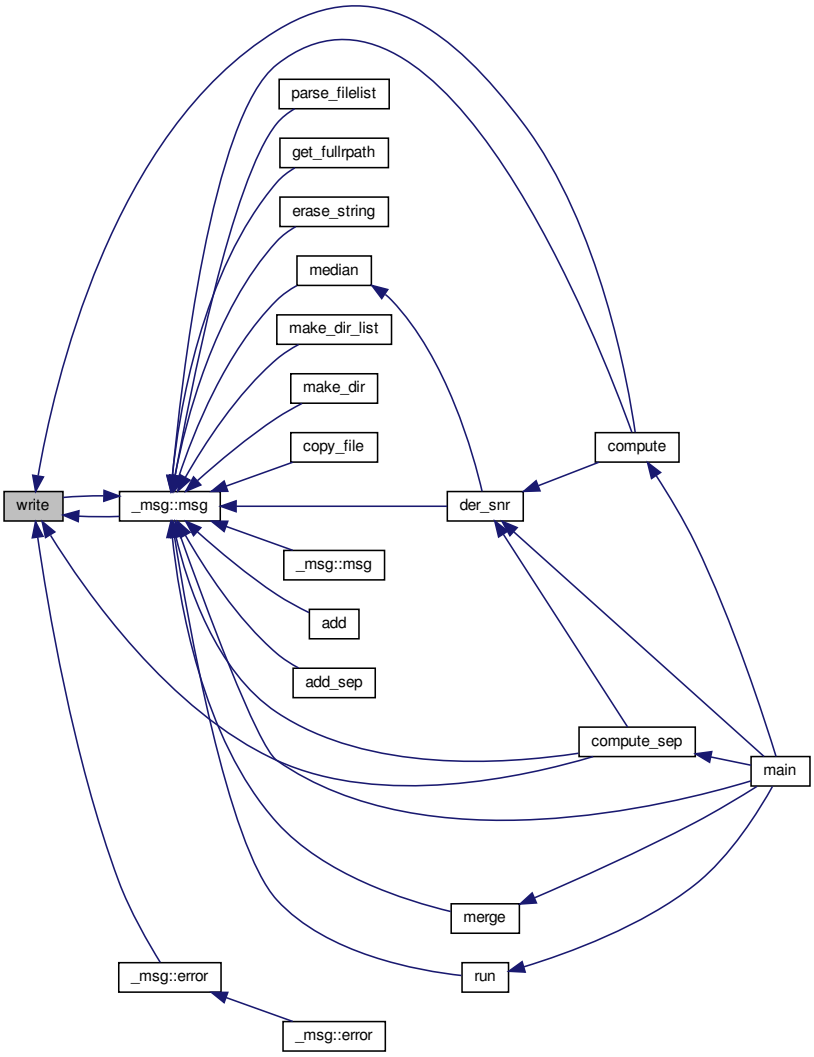
**Parameters**

| | |
|---|---|
| *vsResults* | data to write |
| *sOutput* | output filename |

Here is the call graph for this function:



Here is the caller graph for this function:




#### 3.2.3.8 write() [2/2]

```
bool write (
            std::vector< std::string > vsResults,
            const std::string & sOutput,
            const char & cSep )
```

Write on disk results.

**Parameters**

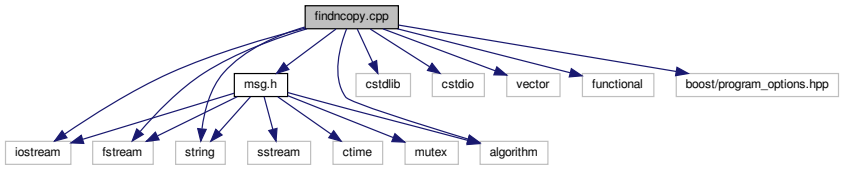
| | |
|---|---|
| *vsResults* | data to write |
| *sOutput* | output filename |
| *cSep* | char separator |

## 3.3 findncopy.cpp File Reference

Copy files from a list in a new folder.

```
#include <iostream>
#include <cstdlib>
#include <cstdio>
#include <fstream>
#include <vector>
#include <string>
#include <algorithm>
#include <functional>
#include <boost/program_options.hpp>
#include <msg.h>
```

Include dependency graph for findncopy.cpp:




**Macros**

- #define LOGFILE ".findncopy.log"
- #define HISTFILE ".history"

**Functions**

- std::vector< std::string > parse_filelist (std::fstream &flux)

  *Create a vector of strings from the filelist.*
- std::vector< std::string > get_fullrpath (std::vector< std::string > &vsFilelist, const fs::path &fspPidir)

  *Get the full relative path of all file.*
- std::vector< std::string > get_fullrpath (std::vector< std::string > &vsFilelist, const fs::path &fspPidir, const std::string &sExclude)

  *Get the full relative path of all file and exclude a string in paths.*
- void erase_string (std::vector< std::string > &vsFullrpath, const std::string &sToerase)

*Erase a string pattern in the path list.*

- std::vector< std::string > make_dir_list (const fs::path &fspPath, const std::string &sDirbase)

  *Make a list of the folder structure.*
- void make_dir (const std::vector< std::string > &vsBaserpath, const std::string &sOfolder)

  *Recreate the folder structure.*
- void copy_file (std::vector< std::string > &vsFullrpath, const std::string &sOfolder, const std::string &sIfolder)

  *Copy the found files.*
- int **main** (int argc, char **argv)

#### 3.3.1 Detailed Description

Copy files from a list in a new folder.

**Author**

Audric Lemonnier

**Version**

0.1

**Date**

09/03/2020

#### 3.3.2 Macro Definition Documentation

##### 3.3.2.1 HISTFILE

```
#define HISTFILE ".history"
```

Define the default histfile (shared)

##### 3.3.2.2 LOGFILE

```
#define LOGFILE ".findncopy.log"
```

Define the default logfile

## 3.4 genrandspec.cpp File Reference

Generate a set of randomized-flux spectra between two wavelengths for test purposes.

```
#include <iostream>
#include <cstdlib>
#include <cstdio>
#include <fstream>
#include <vector>
#include <algorithm>
#include <numeric>
#include <string>
#include <cmath>
#include <random>
#include <thread>
#include <future>
#include <ctime>
#include <boost/program_options.hpp>
#include <csv.h>
#include <msg.h>
```

Include dependency graph for genrandspec.cpp:


### Macros

- #define LOGFILE ".genrandspec.log"
- #define HISTFILE ".history"
- #define MaxFilepDir 10

  *Set the maximum number of files to create in a folder.*

### Functions

- void run (const std::string &sOutput, char cSep, float fMinw, float fMaxw, float fStep)

  *Write random spectra on disk.*
- int **main** (int argc, char **argv)

#### 3.4.1 Detailed Description

Generate a set of randomized-flux spectra between two wavelengths for test purposes.

#### Author

Audric Lemonnier

**Version**

0.4

**Date**

18/04/2020

#### 3.4.2 Macro Definition Documentation

##### 3.4.2.1 HISTFILE

```
#define HISTFILE ".history"
```

Define the default histfile (shared)

##### 3.4.2.2 LOGFILE

```
#define LOGFILE ".genrandspec.log"
```

Define the default logfile

##### 3.4.2.3 MaxFilepDir

```
#define MaxFilepDir 10
```

Set the maximum number of files to create in a folder.

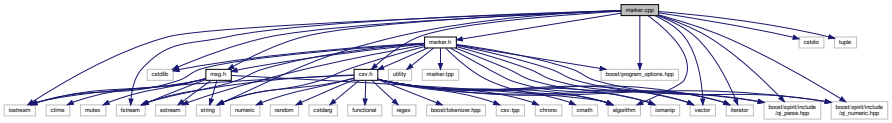
MaxFilepDir

## 3.5 marker.cpp File Reference

Highlight lines on spectrum.

```
#include <iostream>
#include <cstdlib>
#include <cstdio>
#include <fstream>
#include <vector>
#include <tuple>
#include <string>
#include <algorithm>
#include <iterator>
#include <boost/program_options.hpp>
#include <boost/spirit/include/qi_parse.hpp>
#include <boost/spirit/include/qi_numeric.hpp>
#include <marker.h>
#include <msg.h>
#include <csv.h>
```

Include dependency graph for marker.cpp:



#### Macros

- #define LOGFILE ".marker.log"
- #define HISTFILE ".history"

#### Functions

- int **main** (int argc, char **argv)

### 3.5.1 Detailed Description

Highlight lines on spectrum.

#### Author

Audric Lemonnier

#### Version

0.4

#### Date

21/04/2020

### 3.5.2 Macro Definition Documentation

#### 3.5.2.1 HISTFILE

```
#define HISTFILE ".history"
```

Define the default histfile (shared)

#### 3.5.2.2 LOGFILE

```
#define LOGFILE ".marker.log"
```

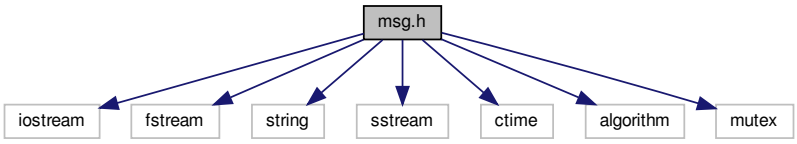
Define the default logfile

## 3.6 msg.h File Reference

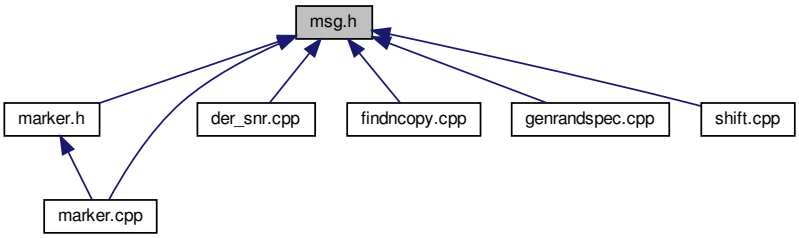
A class to print and write message.

```
#include <iostream>
#include <fstream>
#include <string>
#include <sstream>
#include <ctime>
#include <algorithm>
#include <mutex>
```

Include dependency graph for msg.h:




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




### Classes

- class _msg

  *A class that sends string to std output and in a file...*

### 3.6.1 Detailed Description

A class to print and write message.

**Author**

Audric Lemonnier

**Version**

0.2

**Date**

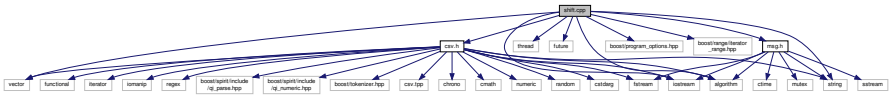
18/04/2020

## 3.7 shift.cpp File Reference

Shift whole spectrum by a given wavelength. This code is multi-threaded or not if not available.

```
#include <iostream>
#include <vector>
#include <algorithm>
#include <thread>
#include <future>
#include <string>
#include <boost/program_options.hpp>
#include <boost/range/iterator_range.hpp>
#include <csv.h>
#include <msg.h>
```

Include dependency graph for shift.cpp:




**Macros**

- #define **CLIGHT** 299792.458
- #define LOGFILE ".shift.log"
- #define HISTFILE ".history"

**Functions**

- void add (const std::vector< std::string > &vsList, float fWavelength)

  *Add the defined wavelength to the first column of spectra. Default sep is '\t'.*
- void add_sep (const std::vector< std::string > &vsList, char cSep, float fWavelength)

  *Add the defined wavelength to the first column of spectra.*
- void transform_sep (const std::vector< std::string > &vsList, char cSep, float fVr)

  *Correct the radial velocity effect on spectra. Perform a linear transformation.*
- int **main** (int argc, char **argv)

### 3.7.1 Detailed Description

Shift whole spectrum by a given wavelength. This code is multi-threaded or not if not available.

**Author**

Audric Lemonnier

**Version**

0.3

**Date**

18/04/2020

### 3.7.2 Macro Definition Documentation

#### 3.7.2.1 HISTFILE

```
#define HISTFILE ".history"
```

Define the default histfile (shared)

#### 3.7.2.2 LOGFILE

```
#define LOGFILE ".shift.log"
```

Define the default logfile

### 3.7.3 Function Documentation

#### 3.7.3.1 transform_sep()

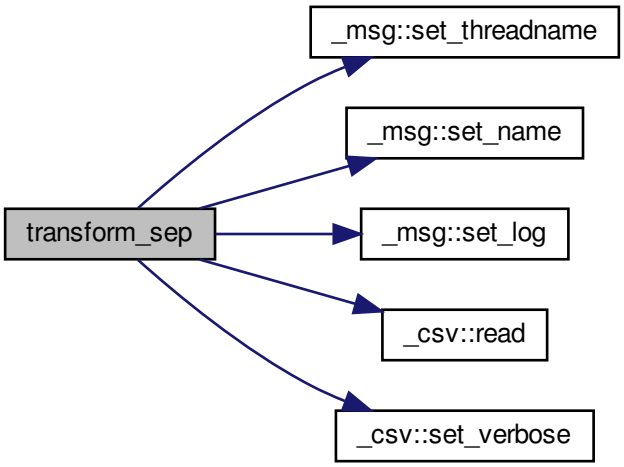
```
void transform_sep (
            const std::vector< std::string > & vsList,
            char cSep,
            float fVr )
```

Correct the radial velocity effect on spectra. Perform a linear transformation.

**Parameters**

| | |
|---|---|
| *fVr* | Radial Velocity |

Here is the call graph for this function:



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