spec_tools

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Class _marker< _T >
marker(const _marker<_T>&)

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()

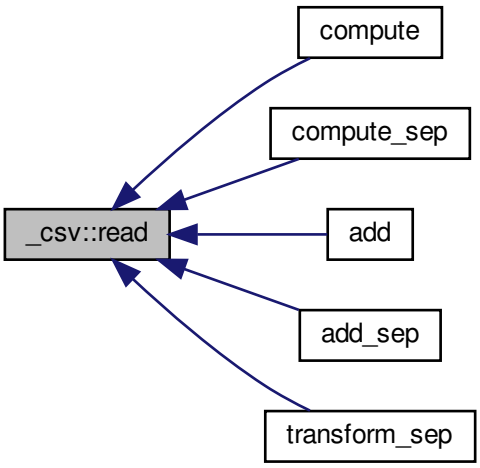
```
template<typename _T = double>
bool _csv< _T >::read ( )
```

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.

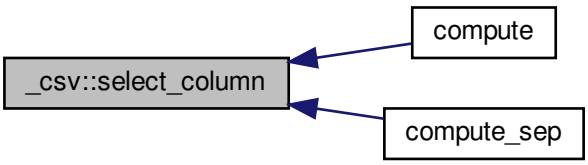
Parameters

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...

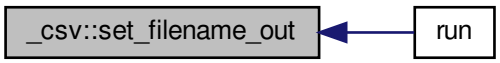
Parameters

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', ' ', ',', ';' ...

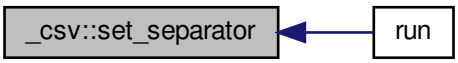
Parameters

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()

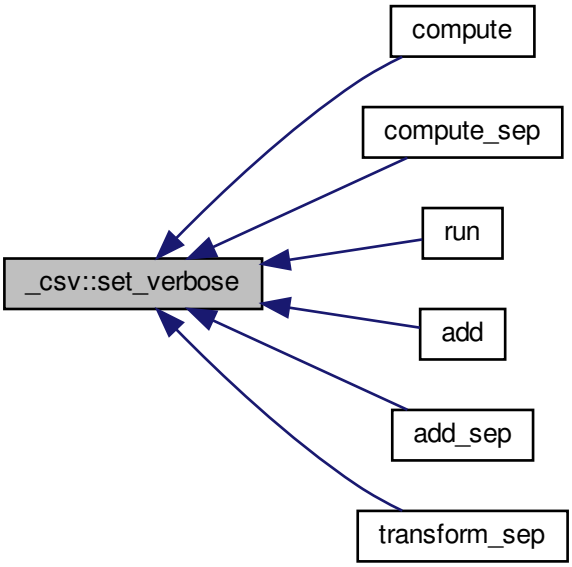
```
template<typename _T = double>
bool _csv< _T >::set_verbose (
            eVerbose evV )
```

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()

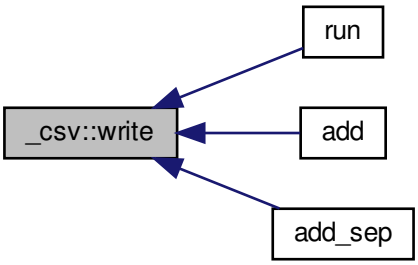
```
template<typename _T = double>
bool _csv< _T >::write ( )
```

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:

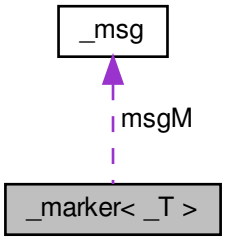
- csv.h

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.
- void set_wide (bool bWide)

  Define if the spectrum range is wide in order to reduce marker size with no overlaps.
- 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()

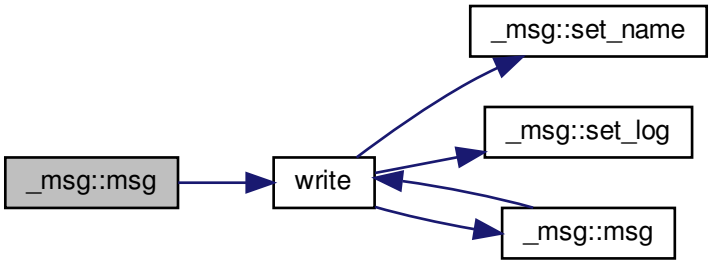
```
bool _msg::msg (
            eMsg emType,
            const std::string & sMsg )
```

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:

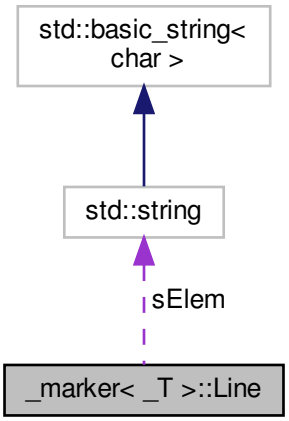
- spectra.h

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

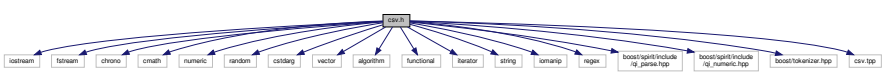
3 File Documentation

3.1 csv.h File Reference

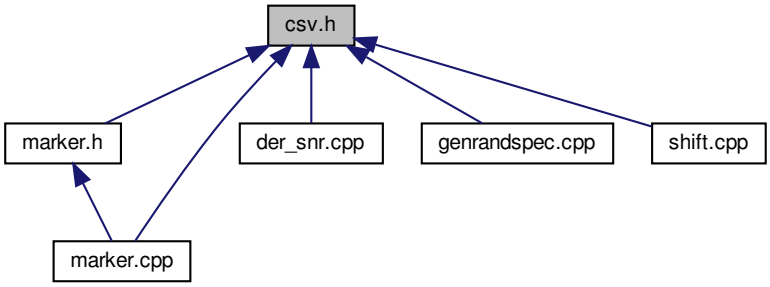
A basic class for csv manipulation.

```
#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 <tuple>
#include <chrono>
#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)
- double long CPU_utilization ()

  Get the CPU usage (%)
- std::tuple< double long, double long > **get_stat** ()
- int **main** (int argc, char **argv)

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()

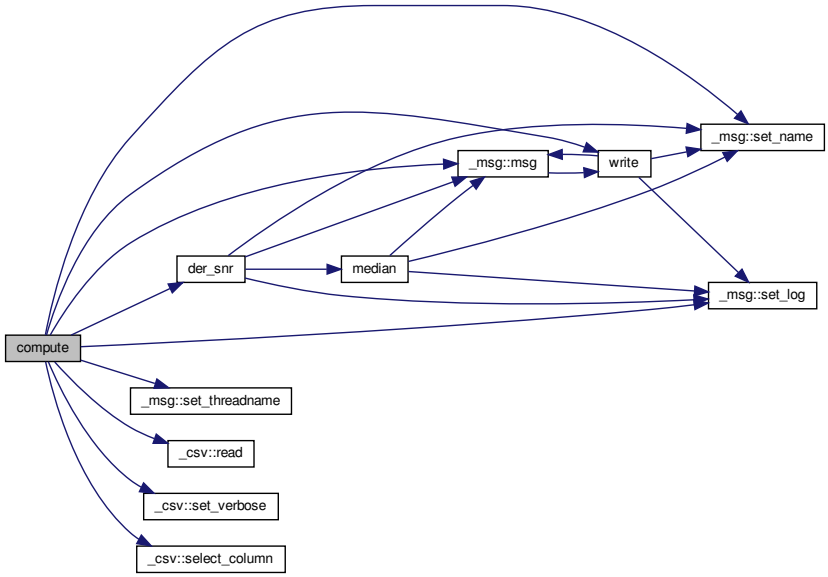
```
void compute (
            const std::vector< std::string > & list,
            const std::string & sOutput )
```

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:



3.2.3.2 compute_sep()

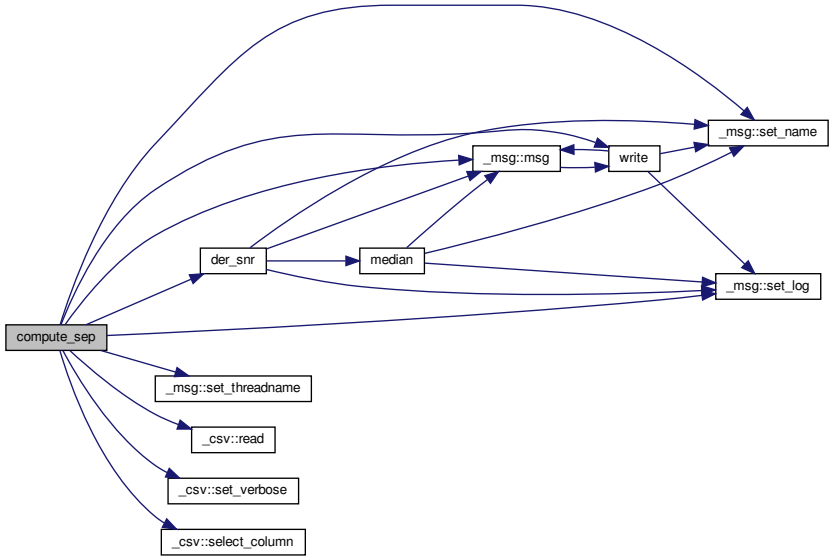
```
void compute_sep (
            const std::vector< std::string > & list,
            const std::string & sOutput,
            const char & cSep )
```

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:



3.2.3.3 der_snr()

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

Compute the S/N with der_snr method.

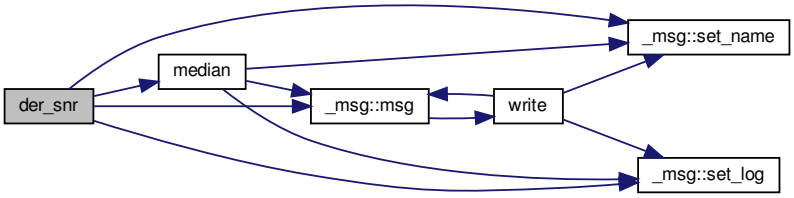
Parameters

vFlux	flux vector

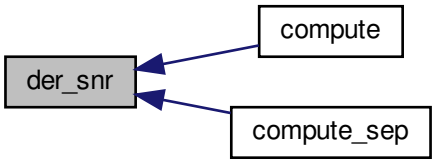
Returns

-1 if error happens

Here is the call graph for this function:



Here is the caller graph for this function:



3.2.3.4 median()

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

Simple computation of the median.

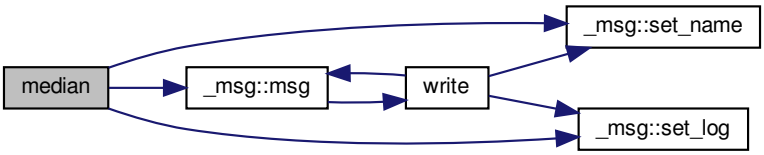
Parameters

vFlux	flux vector

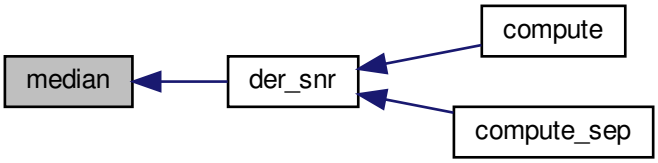
Returns

0 if error happens

Here is the call graph for this function:



Here is the caller graph for this function:



3.2.3.5 merge()

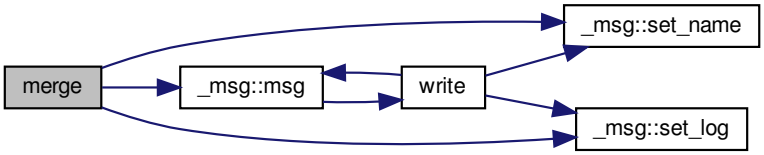
```
bool merge (
            const std::string & sPattern )
```

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:



3.2.3.6 write() [1/2]

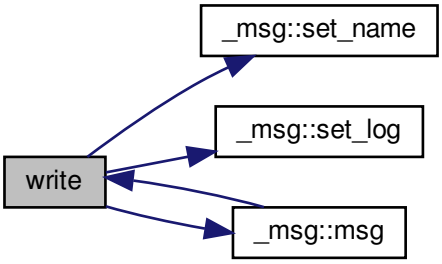
```
bool write (
            std::vector< std::string > vsResults,
            const std::string & sOutput )
```

Write on disk results with the default sep.

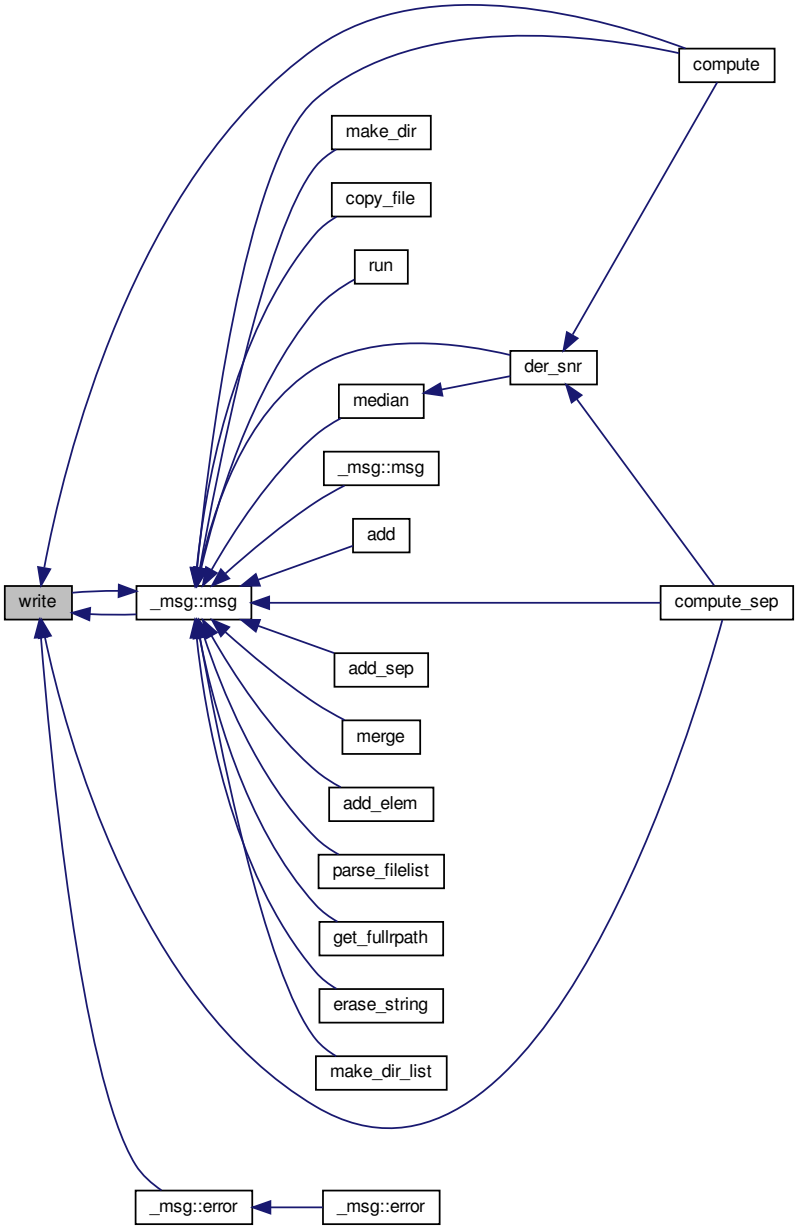
Parameters

vsResults	data to write
sOutput	output filename

Here is the call graph for this function:



Here is the caller graph for this function:



3.2.3.7 write() [2/2]

```
bool write (
            std::vector< std::string > vsResults,
```

```
const std::string & sOutput,
const char & cSep )
```

Write on disk results.

Parameters

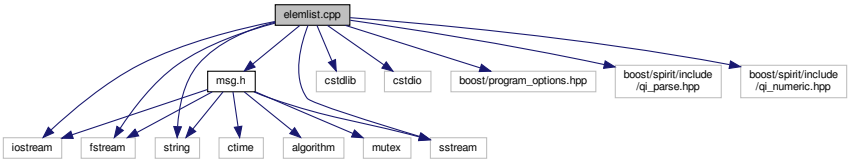
vsResults	data to write
sOutput	output filename
cSep	char separator

3.3 elemlist.cpp File Reference

Add a line to the elemlist.

```
#include <iostream>
#include <cstdlib>
#include <cstdio>
#include <fstream>
#include <string>
#include <sstream>
#include <boost/program_options.hpp>
#include <boost/spirit/include/qi_parse.hpp>
#include <boost/spirit/include/qi_numeric.hpp>
#include <msg.h>
```

Include dependency graph for elemlist.cpp:



Macros

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

Functions

- template<typename _T = std::string>
  bool add_elem (const std::string &sElem, _T TWl, const std::string &sFilename)

  Add a line to a file.
- template<typename _T = std::string>
  bool add_elem (const std::string &sSymbol, const std::string &sElem, _T TWl, const std::string &sFilename)

  Add a line to a file, with the indicator symbol.
- bool is_float (const std::string &sVal)

  Determine if a string is a number.
- int **main** (int argc, char **argv)

3.3.1 Detailed Description

Add a line to the elemlist.

Author

Audric Lemonnier

Version

0.1

Date

30/03/2020

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 ".elemlist.log"
```

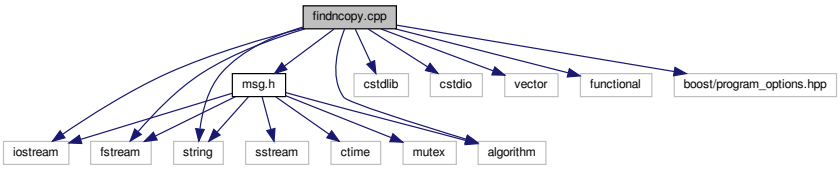
Define the default logfile

3.4 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)

3.4.1 Detailed Description

Copy files from a list in a new folder.

Author

Audric Lemonnier

Version

0.1

Date

09/03/2020

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 ".findncopy.log"
```

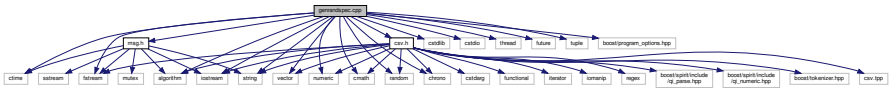
Define the default logfile

3.5 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 <tuple>
#include <chrono>
#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.
- double long **CPU_utilization** ()
- std::tuple< double long, double long > **get_stat** ()
- int **main** (int argc, char **argv)

3.5.1 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

3.5.2 Macro Definition Documentation

3.5.2.1 HISTFILE

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

Define the default histfile (shared)

3.5.2.2 LOGFILE

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

Define the default logfile

3.5.2.3 MaxFilepDir

```
#define MaxFilepDir 10
```

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

MaxFilepDir

3.6 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 <limits>
#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)

3.6.1 Detailed Description

Highlight lines on spectrum.

Author

Audric Lemonnier

Version

0.6

Date

29/04/2020

3.6.2 Macro Definition Documentation

3.6.2.1 HISTFILE

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

Define the default histfile (shared)

3.6.2.2 LOGFILE

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

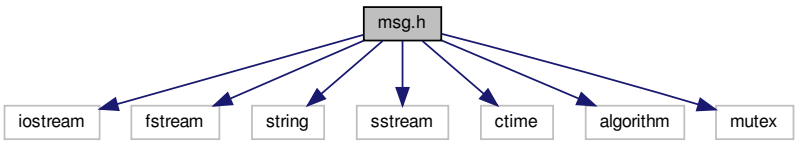
Define the default logfile

3.7 msg.h File Reference

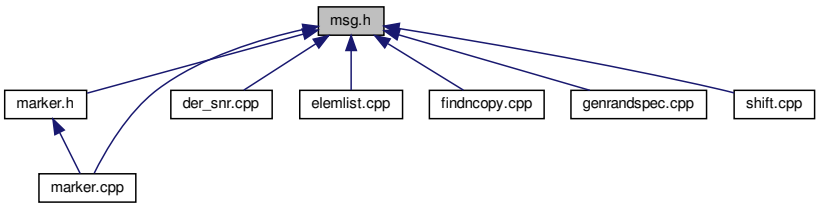
A class to print and write message.

```
#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...

3.7.1 Detailed Description

A class to print and write message.

Author

Audric Lemonnier

Version

0.2

Date

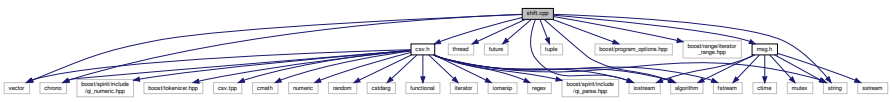
18/04/2020

3.8 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 <tuple>
#include <chrono>
#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.
- double long **CPU_utilization** ()
- std::tuple< double long, double long > **get_stat** ()
- int **main** (int argc, char **argv)

3.8.1 Detailed Description

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

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Version

0.3

Date

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3.8.2 Macro Definition Documentation

3.8.2.1 HISTFILE

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

Define the default histfile (shared)

3.8.2.2 LOGFILE

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

Define the default logfile

3.8.3 Function Documentation

3.8.3.1 transform_sep()

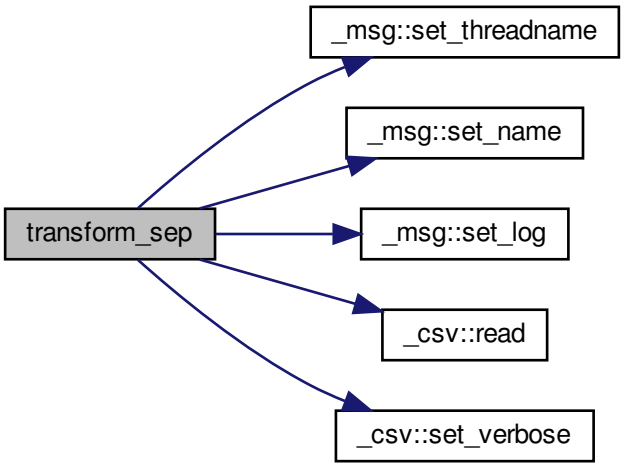
```
void transform_sep (
            const std::vector< std::string > & vsList,
            char cSep,
            float fVr )
```

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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