GWSumm Documentation

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CONTENTS

The *gwsumm* package is a tool used by the Laser Interferometer Gravitational-wave Observatory (LIGO) to collect, aggregate, and visually summarise the sundry data produced throughout the experiment in order to characterise instrument performance.

The output of this package, known internally as the 'summary pages', give an archive of a number of figures or merit, including time-series amplitude trends, frequency spectra and spectrograms, and transient event triggers.

This package includes a collection of command-line utilities and a python module:

```
import gwsumm
```

CHAPTER

ONE

INSTALLATION

GWSumm is best installed with conda:

```
conda install -c conda-forge gwsumm
```

but can also be installed with pip:

```
python -m pip install gwsumm
```

Note, users with *LIGO.ORG* credentials have access to a software container with a regularly-updated build of GWSumm. For more information please refer to the LSCSoft Conda documentation.

CHAPTER

TWO

CONTRIBUTING

All code should follow the Python Style Guide outlined in PEP 0008; users can use the flake8 package to check their code for style issues before submitting.

See the contributions guide for the recommended procedure for proposing additions/changes.

The GWSumm project is hosted on GitHub:

- Issue tickets: https://github.com/gwpy/gwsumm/issues
- Source code: https://github.com/gwpy/gwsumm

2.1 License

GWSumm is distributed under the GNU General Public License.

2.1.1 What is GWSumm?

The *gwsumm* package ('the summary pages') is a python toolbox that can be used to generate a structured HTML webpage displaying graphical data that describe any and all aspects of gravitational-wave interferometer performance. The summary pages were developed in collaboration between the LIGO Laboratory and the GEO600 project with the goal of generating an automated daily summary of laser-interferometer operations and performance.

The LIGO Summary Pages are used to characterize and monitor the status of the detectors and their subsystems. In addition, data products and webpages from other analysis tools are included in the Summary Pages.

The output acts as a kind of daily magazine, allowing instrument scientists and data analysis teams a archived, searchable summary of the key figures of merit that will determine the sensitivity and ultimately the science output of these instruments.

Those readers who are members of the LIGO Scientific Collaboration, the Virgo Collaboration, or KAGRA can view the current LIGO summary pages at the following sites:

H1	https://ldas-jobs.ligo-wa.caltech.edu/~detchar/summary/
L1	https://ldas-jobs.ligo-la.caltech.edu/~detchar/summary/

Working model

The GWSumm package provides an abstract set of classes from which any user can build their own python program to read, manipulate, and display data. However, for the specific purpose of the LIGO instrumental summary pages, the *gw_summary* command-line executable is used to read in a number of INI-format configuration files that define what data should be read, how it should be manipulated, and how it should all be displayed.

These configuration files are made up `[tab-xxx]` section with the following format:

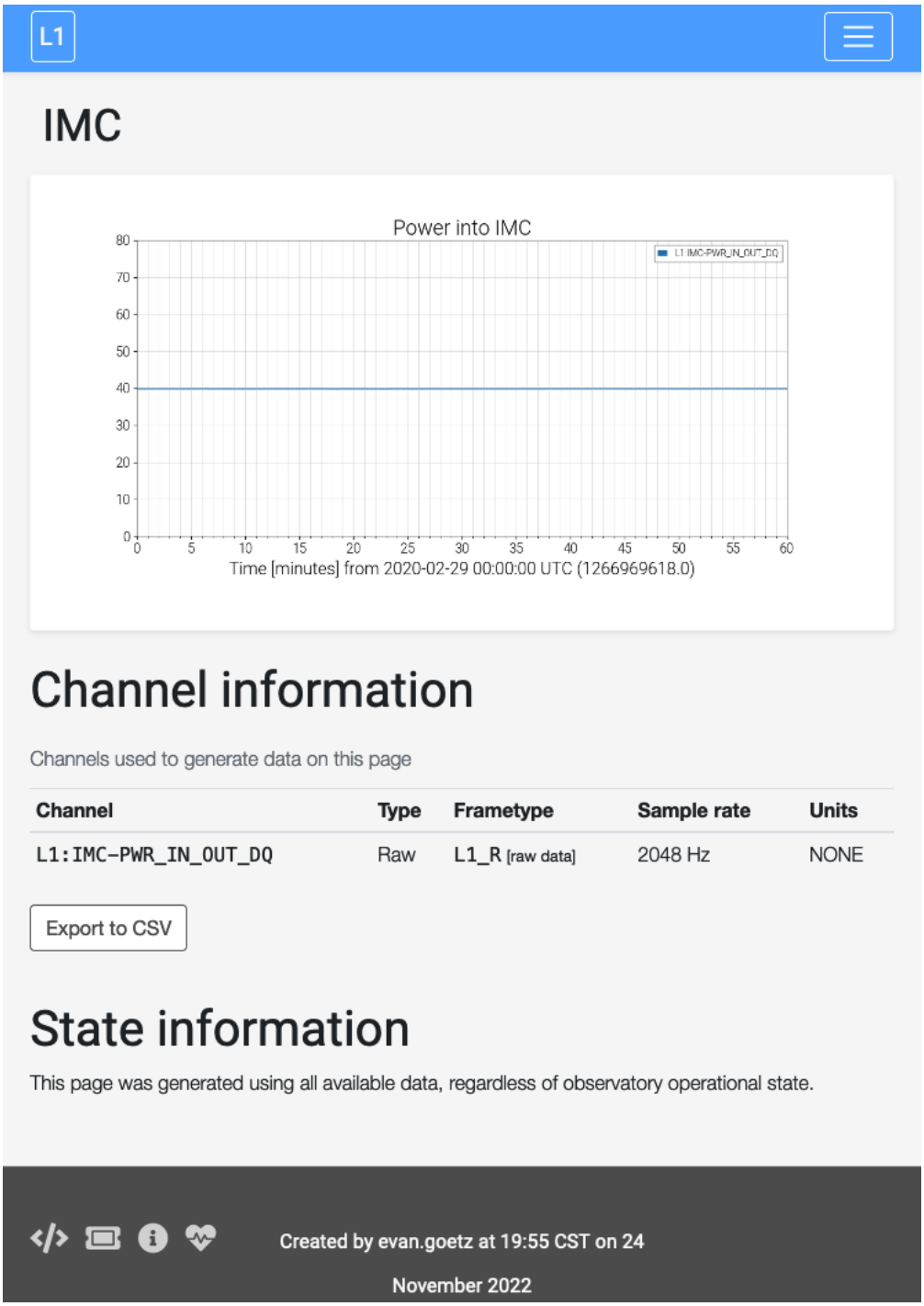
```
[tab-IMC]
name = Input mode cleaner
shortname = IMC
1 = L1:IMC-PWR_IN_OUT_DQ timeseries
1-ylim = 0,80
1-title = 'Power into IMC'
[html]
issues =
```

This block defines the `IMC` tab, with a `name` (and a `shortname`): a single `timeseries` plot of the `L1:IMC-PWR_IN_OUT_DQ` channel. The plot has been customised with a y-axis limit and a title. This also defines the required `[html]` section, where the required key `issues` is defined. This example can be saved to a file called `imc.ini`.

This tab is then generated by passing it to the *gw_summary* executable, along with some GPS times over which to run:

```
$ gw_summary gps 'Feb 29 2020 00:00' 'Feb 29 2020 01:00' --config-file imc.ini
```

This minimal setup will produce the following HTML page *1266969618-1266973218/imc/index.html*:


L1
IMC
Power into IMC
L1:IMC-PWR_IN_OUT_DQ
80
70
60
50
40
30
20
10
0
0
5
10
15
20
25
30
35
40
45
50
55
60
Time [minutes] from 2020-02-29 00:00:00 UTC (1266969618.0)
Channel information
Channels used to generate data on this page
Channel
Type
Frametype
Sample rate
Units
L1:IMC-PWR_IN_OUT_DQ
Raw
L1_R [raw data]
2048 Hz
NONE
Export to CSV
State information
This page was generated using all available data, regardless of observatory operational state.
Created by evan.goetz at 19:55 CST on 24
November 2022

2.1.2 Command-line interface

GW Summary

The primary interface for GWSumm is a command-line utility called *gw_summary*. For a full explanation of the available command-line arguments and options, you can run

```
$ python ../bin/gw_summary --help
python: can't open file '/home/docs/checkouts/readthedocs.org/user_builds/gwsumm/
↪checkouts/stable/docs/../bin/gw_summary': [Errno 2] No such file or directory
```

This tool can be run in four modes: daily, weekly, and monthly analyses, and a specific range of GPS times.

Day mode

To run in daily summary mode, the following command-line options are available:

```
$ python gw_summary day --help
python: can't open file '/home/docs/checkouts/readthedocs.org/user_builds/gwsumm/
↪checkouts/stable/docs/gw_summary': [Errno 2] No such file or directory
```

Week mode

The arguments in weekly mode are as follows:

```
$ python gw_summary week --help
python: can't open file '/home/docs/checkouts/readthedocs.org/user_builds/gwsumm/
↪checkouts/stable/docs/gw_summary': [Errno 2] No such file or directory
```

Month mode

In monthly mode:

```
$ python gw_summary month --help
python: can't open file '/home/docs/checkouts/readthedocs.org/user_builds/gwsumm/
↪checkouts/stable/docs/gw_summary': [Errno 2] No such file or directory
```

GPS mode

To run within a specific (but arbitrary) range of GPS seconds:

```
$ python gw_summary gps --help
python: can't open file '/home/docs/checkouts/readthedocs.org/user_builds/gwsumm/
↪checkouts/stable/docs/gw_summary': [Errno 2] No such file or directory
```

Batch mode

To stage a batch of analyses with a large collection of configuration files, as is done in embarrassingly parallel fashion when the summary pages run online, you can use the *gw_summary_pipe* command-line utility. This tool uses HT Condor to schedule and run jobs in parallel.

To see all the available arguments and options for this tool, you can run with *–help* as usual:

```
$ python gw_summary_pipe --help
python: can't open file '/home/docs/checkouts/readthedocs.org/user_builds/gwsumm/
↪checkouts/stable/docs/gw_summary_pipe': [Errno 2] No such file or directory
```

2.1.3 Automatic generation for LIGO

The LIGO Detector Characterization group use the *gwsumm* package to generate daily, weekly, and monthly summaries of the performance of the LIGO detectors. These data generation runs are automatically completed using the HTCondor high-throughput job scheduler.

Members of the LIGO Scientific Collaboration or the Virgo Collaboration can view more details on the HTCondor configuration here.

2.1.4 Introduction to Tabs

GWsumm can be used either from the command line as described in *CLI interface* or as a package to progromatically generate pages called “tabs”.

A *Tab* is a single, configurable page of output, containing some data. Each *Tab* is written in its own HTML page, and can be written to contain any set of data, with any format.

The basic object provided by **:mod:`gwsumm.tabs`** is the *Tab*, which allows embedding of arbitrary HTML text into a standard surrounding HTML framework. The *Tab* also defines the API for other tabs.

Simple *Tab* use

A simple *Tab* can be created in only two steps

```
from gwsumm.tabs import Tab
mytab = Tab('My first tab')
mytab.write_html("This tab doesn't do very much")
```

This will create a directory under the current one,

- `my_first_tab/` containing the HTML for the new tab

The output webpage looks like:

tabs/examples/first.png

The content given to *Tab.write_html* is passed along untouched, so can contain any HTML you like.

Generating websites

The *next page* will guide you through created groups of tabs and combining them to generate a fully-fledged website complete with navigation.

2.1.5 Generating Websites

As we have seen, generating standalone pages is trivial using GWSumm. What would be more useful would be to generate linked sets of pages, aka a website.

Navigation

The key difference between standalone pages and a website is the ability to navigate between them. The *Tab.write_html* method will take care of that for you if you pass it all of the tabs:

```
from gwsumm.tabs import Tab
tab1 = Tab('Tab 1')
tab2 = Tab('Tab 2')
tabs = [tab1, tab2]
tab1.write_html('This is tab 1', tabs=tabs)
tab2.write_html('This is tab 2', tabs=tabs)
```

This will write each tab into its own directory, as before, but the HTML will now contain an *<nav></nav>* block above the banner to allow navigation between the pages.

Tab parents

In the above example, each tab is included as a link in the navigation bar. However, in larger websites with many pages, the navigation can quickly become cluttered and will start to overflow the width of the page. This can be avoided by declaring *~Tab.parent* for sets of tabs:

```
tab1 = Tab('Tab 1')
tab2a = Tab('A', parent='Tab 2')
tab2b = Tab('B', parent=tab2a.parent)
tabs = [tab1, tab2a, tab2b]
tab1.write_html('This is tab 1', tabs=tabs)
tab2a.write_html('This is tab 2A', tabs=tabs)
tab2b.write_html('This is tab 2B', tabs=tabs)
```

Here we have set a *parent* tab for 2A, and used the same for 2B, which creates a dropdown menu in the navigation bar linking to these tabs. 'Tab 2' is never created, but is used only for navigation.

Tab groups

For even larger websites, sets of tabs under a single parent can be further separated into *groups* *<Tab.group>*. For example, to put 2A into group *1* and 2B into group *2*, we can write:

```
tab1 = Tab('Tab 1')
tab2a = Tab('A', parent='Tab 2', group='1')
tab2b = Tab('B', parent=tab2a.parent, group='2')
tabs = [tab1, tab2a, tab2b]
tab1.write_html('This is tab 1', tabs=tabs)
tab2a.write_html('This is tab 2A', tabs=tabs)
tab2b.write_html('This is tab 2B', tabs=tabs)
```

2.1.6 *Tab* modes

In its simplest form, the *Tab* is essentially a blank canvas on which to write whatever you want. However, the original mandate for GWSumm was to provide a framework in which to generate automatic summaries of LIGO data, over a given timescale.

To handle data processing, rather than static HTML generation, each *Tab* has a type, based on its relation to any interval in time

The type of a *Tab* is set automatically when it is created based on the value of the **:attr:`~Tab.mode`** attribute, so you don't need to remember the above objects.

Modes

GWSumm currently support seven different *Tab* modes:

Mode	Enum	Description
`STATIC`	0	No associated time interval
`EVENT`	1	Associated with a single GPS time, normally around an event
`GPS`	2	Simple (arbitrary) GPS `[start, end)` interval
`DAY`	10	One UTC 24-hour day
`WEEK`	11	One 7-day week
`MONTH`	12	One calendar month
`YEAR`	13	One calendar year

Assigning modes

Each *Tab* will be assigned a mode (unless specified as follows, the default mode is `STATIC`). The assignment can be done on a per-tab basis by passing the *~Tab.mode* keyword argument when creating a *Tab*, or globally, by using the **:meth:`gwsumm.mode.set_mode`**. The latter sets the default mode for all subsequent tabs created in this session.

If a **:attr:`~Tab.mode`** is given that associates with a GPS time or times, these must be given via the *~IntervalTab.span* or *~EventTab.gpstime* keyword arguments, otherwise a *TypeError* will be raised. The *span* tuple is the `(GPS start time, GPS end time)`

```
>>> tab = Tab('My first tab', mode='day', span=(0, 100))
>>> print(tab.mode, tab.span)
(10, Segment(0, 100))
>>> tab = Tab('My first tab', mode='EVENT', gpstime=101)
>>> print(tab.mode, tab.gpstime)
(1, LIGOTimeGPS(101,0))
```

2.1.7 Tab API

gwsumm.tabs Package

This module defines the *Tab* API, and all of the built-in tab objects

Functions

`get_tab`(name)	Query the registry for the tab class registered to the given name
`register_tab`(tab[, name, force])	Register a new summary *Tab* to the given `name`

get_tab

register_tab

Classes

`AboutTab`(*args, **kwargs)	Page describing how the containing HTML pages were generated
`AccountingTab`(*args, **kwargs)	Summarise the data recorded by the operating mode channels
`BaseTab`(name[, index, shortname, parent, ...])	The core *Tab* object, defining basic functionality
`DataTab`(*args, **kwargs)	A tab where plots and data summaries are built upon request
`Error404Tab`(*args, **kwargs)	Custom HTTP 404 error page
`EventTab`(*args, **kwargs)	*Tab* defined around a central GPS time
`EventTriggerTab`(*args, **kwargs)	Custom *DataTab* displaying a summary of event trigger generation
`ExternalTab`(*args, **kwargs)	A simple tab to link HTML from an external source
`FscanTab`(*args, **kwargs)	Custom tab displaying a summary of Fscan results.
`GpsTab`(name[, index, shortname, parent, ...])	Stub for GPS-related tabs
`GraceDbTab`(*args, **kwargs)	Custom tab displaying a summary of GraceDb results.
`GuardianTab`(*args, **kwargs)	Summarises the data recorded by an Advanced LIGO Guardian node.
`IntervalTab`(*args, **kwargs)	*Tab* defined within a GPS [start, end) interval
`ParentTab`(*args, **kwargs)	Dummy *Tab* only for navigation
`PlotTab`(*args, **kwargs)	A simple tab to layout some figures in the #main div.
`ProcessedTab`()	Abstract base class to detect necessity to run Tab.process()
`SEIWatchDogTab`(*args, **kwargs)	Summarise the WatchDog trips recorded from the SEI system.
`StampPEMTab`(*args, **kwargs)	Custom tab displaying a summary of StampPEM results.
`StateTab`(*args, **kwargs)	Tab with multiple content pages defined via 'states'
`StaticTab`(name[, index, shortname, parent, ...])	Simple *Tab* with no GPS association
`Tab`(*args, **kwargs)	A Simple HTML tab.
`TabList`([entries])	Custom *list* of *Tab* objects with sorting and parsing
`UrlTab`(*args, **kwargs)	

AboutTab

AccountingTab

BaseTab

DataTab

Error404Tab

EventTab

EventTriggerTab

ExternalTab

FscanTab

GpsTab

GraceDbTab

GuardianTab

IntervalTab

ParentTab

PlotTab

ProcessedTab

SEIWatchDogTab

StampPEMTab

StateTab

StaticTab

Tab

TabList

UrlTab

Class Inheritance Diagram

2.1.8 States

A *SummaryState* defines a sub-set of time over which a ~*gwsumm.tabs.Tab* should be processed. Each *SummaryState* is normally tied to one or more data-quality flags marking times during which each of the LIGO instruments was operating in a certain configuration, or was subject to a known noise interference.

The state registry

GWSumm defines a state 'registry', simply a record of all *SummaryState* objects that have been defined (and registered) so far in a given program. The registry just makes remembering states in complicated programs a little easier.

Any *SummaryState* can be registered with an arbitrary name as follows:

```
>>> from gwsumm.state.registry import register_state
>>> register_state(mystate, 'my state')
```

and can be recovered later:

```
>>> from gwsumm.state.registry import get_state
>>> mystate = get_state('my state')
```

API reference

SummaryState(name[, known, active, ...])	An operating state over which to process a ~*gwsumm.tabs.DataTab*.
get_state(key)	Query the registry for the *SummaryState* registered to the given key
get_states([keys])	Query the registry for a list of states (defaults to all)
register_state(state[, key, force])	Register a new *SummaryState* to the given `key`

SummaryState

get_state

get_states

register_state

2.1.9 Plots

A *Plot* is a representation of an image to be included in the HTML output a tab.

For simple purposes, a *Plot* is just a reference to an existing image file that can be imported into an HTML page via the `<img>` tag.

For more complicated purposes, a number of data plot classes are provided to allow users to generate images on-the-fly. The available classes are:

`TimeSeriesDataPlot`(*args, **kwargs)	DataPlot of some *TimeSeries* data.
`SpectrogramDataPlot`(*args, **kwargs)	DataPlot a Spectrogram
`SegmentDataPlot`(flags, start, end[, state, ...])	Segment plot of one or more *DataQualityFlags <DataQualityFlag>*.
`StateVectorDataPlot`(*args, **kwargs)	DataPlot of some *StateVector* data.
`SpectrumDataPlot`(channels, start, end[, ...])	Spectrum plot for a *SummaryTab*
`TimeSeriesHistogramPlot`(channels, start, end)	HistogramPlot from a Series
`TriggerTimeSeriesDataPlot`(*args, **kwargs)	Custom time-series plot to handle discontiguous *TimeSeries*.
`TriggerHistogramPlot`(*args, **kwargs)	HistogramPlot from a LIGO_LW Table
`TriggerRateDataPlot`(*args, **kwargs)	TimeSeriesDataPlot of trigger rate.

TimeSeriesDataPlot

SpectrogramDataPlot

SegmentDataPlot

StateVectorDataPlot

SpectrumDataPlot

TimeSeriesHistogramPlot

TriggerTimeSeriesDataPlot

TriggerHistogramPlot

TriggerRateDataPlot

2.1.10 gwsumm.mode Module

Job modes

Functions

get_base(date[, mode])	Determine the correct base attribute for the given date and mode.
get_mode([m])	Return the enum for the given mode, defaults to the current mode.
set_mode(m)	Set the current mode.
`unique`(enumeration)	Class decorator for enumerations ensuring unique member values.

get_base

get_mode

set_mode

Classes

Enum(value[, names, module, qualname, type, ...])	Create a collection of name/value pairs.
Mode(value[, names, module, qualname, type, ...])	Enumeration of valid processing 'modes'
OrderedEnum(value[, names, module, ...])	

Mode

OrderedEnum

Class Inheritance Diagram

2.1.11 Full API

gwsumm package

Subpackages

gwsumm.config package

Module contents

Thin wrapper around configparser

class gwsumm.config.**GWSummConfigParser**(**args*, ***kwargs*)

Bases: ConfigParser

OPTCRE = re.compile('(?P<option>[^=\\s][^=]*)\\s*(?P<vi>[=])\\s*(?P<value>.*)$')

finalize()

Finalize this *GWSummConfigParser* by running all the loaders

This method is just a shortcut to run each of the following

load_plugins()	Load all plugin modules as defined in the [plugins] section
load_units()	Load all unit definitions as defined in the [units] section
load_channels()	Load all channel definitions as given in the selfuration
load_states([section])	Read and format a list of *SummaryState* definitions from the given **:class:`~configparser.ConfigParser`**

classmethod from_configparser(*cp*)

Copy an existing **:class:`~configparser.ConfigParser`**.

get_css(*section='html'*)

get_javascript(*section='html'*)

interpolate_section_names(***kwargs*)

Interpolate a specific key in a section name using val

load_channels()

Load all channel definitions as given in the selfuration

Channels are loaded from sections named [channels-...] or those sections whose name is a channel name in itself

load_plugins()

Load all plugin modules as defined in the [plugins] section

load_rcParams(*section='rcParams'*)

Load custom *matplotlib.rcParams* for plots in this analysis

load_states(*section='states'*)

Read and format a list of *SummaryState* definitions from the given **:class:`~configparser.ConfigParser`**

load_units()

Load all unit definitions as defined in the [units] section

nditems(*section*, ***kwargs*)

ndoptions(*section*, ***kwargs*)

optionxform

alias of `str`

read(*filenames*)

Read and parse a filename or an iterable of filenames.

Files that cannot be opened are silently ignored; this is designed so that you can specify an iterable of potential configuration file locations (e.g. current directory, user's home directory, systemwide directory), and all existing configuration files in the iterable will be read. A single filename may also be given.

Return list of successfully read files.

set_date_options(*start*, *end*, *section='DEFAULT'*)

Set datetime options in [DEFAULT] based on the given times

The following options are set

- *gps-start-time* - the integer GPS start time of this job
- *gps-end-time* - the integer GPS end time of this job
- *yyyy* - the four-digit year of the start date
- *mm* - the two-digit month of the start date
- *dd* - the two-digit day-of-month of the start date
- *yyyymm* - the six-digit year and month of the start date
- *yyyymmdd* - the eight-digit year-month-day of the start date
- *duration* - the duration of the job (seconds)

Additionally, if LAL is available, the following extra options are also set

- *leap-seconds* - the number of leap seconds for the start date
- *gps-start-time-noleap* - the leap-corrected integer GPS start time
- *gps-end-time-noleap* - the leap-corrected integer GPS end time

set_ifo_options(*ifo*, *observatory=None*, *section='DEFAULT'*)

Set configurations options in [DEFAULT] based on the given *ifo*

The following options are set

- *IFO* - the two-character interferometer prefix, e.g. `L1`
- ***ifo* - the two-character interferometer prefix in lower-case,** e.g. `l1`
- *SITE* - the single-character site ID, e.g. `L`
- *site* - the single-character site ID,n lower-case e.g. `l`

Additionally, if *observatory* is given, or the *ifo* matches known observatories, the following option is set

- *observatory* - the name of the observatory, e.g. `LIGO Livingston`

gwsumm.data package

Submodules

gwsumm.data.coherence module

Utilities for data handling and display

gwsumm.data.coherence.**add_coherence_component_spectrogram**(*specgram*, *key=None*, *coalesce=True*)

Add a *Coherence spectrogram* to the global memory cache

gwsumm.data.coherence.**complex_percentile**(*array*, *percentile*)

gwsumm.data.coherence.**get_coherence_spectrogram**(*channel_pair*, *segments*, *config=None*, *cache=None*, *query=True*, *nds=None*, *return_=True*, *frametype=None*, *nproc=1*, *datafind_error='raise'*, *return_components=False*, ***fftparams*)

Retrieve the time-series and generate a coherence spectrogram of the two given channels

gwsumm.data.coherence.**get_coherence_spectrograms**(*channel_pairs*, *segments*, *config=None*, *cache=None*, *query=True*, *nds=None*, *return_=True*, *frametype=None*, *nproc=1*, *datafind_error='raise'*, ***fftparams*)

Get coherence spectrograms for multiple channels

gwsumm.data.coherence.**get_coherence_spectrum**(*channel_pair*, *segments*, *config=None*, *cache=None*, *query=True*, *nds=None*, *return_=True*, ***fftparams*)

Retrieve the time-series and generate a coherence spectrogram of the given channel

gwsumm.data.mathutils module

Handle arbitrary mathematical operations applied to data series

gwsumm.data.mathutils.**get_operator**(*opstr*)

gwsumm.data.mathutils.**get_with_math**(*channel*, *segments*, *load_func*, *get_func*, ***ioargs*)

Get data with optional arbitrary math definitions

Parameters

channel
[*str*] name of the meta-channel to create

segments
[*~gwpy.segments.SegmentList*] segments over which to create the new channel

load_func
[*callable*] method to call to load data from disk

get_func
[*callable*] method to call to return channel data

****ioargs**
all other kwargs are passed to the *load_func* and *get_func*

Returns

datalist
[*TimeSeriesList*, or similar] a structured list of data objects, probably either for *TimeSeries* or *Spectrogram*

gwsumm.data.mathutils.**parse_math_definition**(*definition*)

Parse the definition for a channel combination

This method can only handle commutative operations, no fancy stuff with parentheses. Something like `A * B` is fine, but not `(A + B) ^ 2`

All operands, operators, and values should be space-separated.

Returns

channels
[*list* of *tuple*] a list of 2-tuples containing the name of each channel, and any mathematical operations to be applied to that channel only

operators
[*list* of *callable*] the list of functions that combine one channel and the previous, if *channels* is a list of length `N`, then the *operators* list will have length `N-1`

Examples

```
>>> parse_math_definition('H1:TEST * L1:TEST^2')
([('H1:TEST', None), ('L1:TEST', (<built-in function pow>, 2.0))],
 [<built-in function mul>])
```

gwsumm.data.range module

Get range data

gwsumm.data.range.**get_range**(*channel*, *segments*, *config=None*, *cache=None*, *query=True*, *nds=None*, *return_=True*, *nproc=1*, *datafind_error='raise'*, *frametype=None*, *stride=None*, *fftlength=None*, *overlap=None*, *method=None*, ***rangekwargs*)

Calculate the sensitive distance for a given strain channel

gwsumm.data.range.**get_range_channel**(*channel*, ***rangekwargs*)

Return the meta-channel name used to store range data

gwsumm.data.range.**get_range_spectrogram**(*channel*, *segments*, *config=None*, *cache=None*, *query=True*, *nds=None*, *return_=True*, *nproc=1*, *datafind_error='raise'*, *frametype=None*, *stride=60*, *fftlength=None*, *overlap=None*, *method=None*, ***rangekwargs*)

Estimate the spectral contribution to sensitive distance for a given strain channel

gwsumm.data.range.**get_range_spectrum**(*channel*, *segments*, *config=None*, *cache=None*, *query=True*, *nds=None*, *return_=True*, *nproc=1*, *datafind_error='raise'*, *frametype=None*, *stride=60*, *fftlength=None*, *overlap=None*, *method=None*, *which='all'*, *state=None*, ***rangekwargs*)

Compute percentile spectra of the range integrand from a set of spectrograms

gwsumm.data.spectral module

Get spectrograms and spectra

gwsumm.data.spectral.**add_spectrogram**(*specgram*, *key=None*, *coalesce=True*)

Add a *Spectrogram* to the global memory cache

gwsumm.data.spectral.**apply_transfer_function_series**(*specgram*, *tfunc*)

Multiply a spectrogram by a transfer function *FrequencySeries*

This method interpolates the transfer function onto the frequency vector of the spectrogram, so should work regardless of the inputs

gwsumm.data.spectral.**get_spectrogram**(*channel*, *segments*, *config=None*, *cache=None*, *query=True*, *nds=None*, *format='power'*, *return_=True*, *frametype=None*, *nproc=1*, *datafind_error='raise'*, ***fftparams*)

Retrieve the time-series and generate a spectrogram of the given channel

gwsumm.data.spectral.**get_spectrograms**(*channels*, *segments*, *config=None*, *cache=None*, *query=True*, *nds=None*, *format='power'*, *return_=True*, *frametype=None*, *nproc=1*, *datafind_error='raise'*, ***fftparams*)

Get spectrograms for multiple channels

gwsumm.data.spectral.**get_spectrum**(*channel*, *segments*, *config=None*, *cache=None*, *query=True*, *nds=None*, *format='power'*, *return_=True*, *frametype=None*, *nproc=1*, *datafind_error='raise'*, *state=None*, ***fftparams*)

Retrieve the time-series and generate a spectrum of the given channel

gwsumm.data.spectral.**size_for_spectrogram**(*size*, *stride*, *fftlength*, *overlap*)

gwsumm.data.timeseries module

Utilities for data handling and display

gwsumm.data.timeseries.**add_timeseries**(*timeseries*, *key=None*, *coalesce=True*)

Add a *TimeSeries* to the global memory cache

Parameters

timeseries
[*TimeSeries* or *StateVector*] the data series to add

key
[*str*, optional] the key with which to store these data, defaults to the *~gwpy.timeseries.TimeSeries.name* of the series

coalesce
[*bool*, optional] coalesce contiguous series after adding, defaults to *True*

gwsumm.data.timeseries.**all_adc**(*cache*)

Returns *True* if all cache entries point to GWF file known to contain only ADC channels

This is useful to set *type='adc'* when reading with frameCPP, which can greatly speed things up.

gwsumm.data.timeseries.**exclude_short_trend_segments**(*segments*, *ifo*, *frametype*)

Remove segments from a list shorter than 1 trend sample

gwsumm.data.timeseries.**filter_timeseries**(*ts*, *filt*)

Filter a *TimeSeris* using a function or a ZPK definition.

gwsumm.data.timeseries.**find_best_frames**(*ifo*, *frametype*, *start*, *end*, ***kwargs*)

Find frames for the given type, replacing with a better type if needed

gwsumm.data.timeseries.**find_frame_type**(*channel*)

Find the frametype associated with the given channel

If the input channel has a *frametype* attribute, that will be used, otherwise the frametype will be guessed based on the channel name and any trend options given

gwsumm.data.timeseries.**find_frames**(*ifo*, *frametype*, *gpsstart*, *gpsend*, *config=<GWSummConfigParser()>*, *urltype='file'*, *gaps='warn'*, *onerror='raise'*)

Query the datafind server for GWF files for the given type

Parameters

ifo
[*str*] prefix for the IFO of interest (either one or two characters)

frametype
[*str*] name of the frametype to find

gpsstart
[*int*] GPS start time of the query

gpsend
[*int*] GPS end time of the query

config
[*~ConfigParser.ConfigParser*, optional] configuration with *[datafind]* section containing *server* specification, otherwise taken from the environment

urltype
[*str*, optional] what type of file paths to return, default: *file*

gaps
[*str*, optional] what to do when gaps are detected, one of

- *ignore* : do nothing
- *warn* : display the existence of gaps but carry on
- *raise* : raise an exception

onerror
[*str*, optional] what to do when the *gwdatafind* query itself fails, same options as for `gaps`

Returns

cache
[*list* of *str*] a list of file paths pointing at GWF files matching the request

`gwsumm.data.timeseries.`**`frame_trend_type`**`(`*ifo*, *frametype*`)`

Returns the trend type of based on the given frametype

`gwsumm.data.timeseries.`**`get_channel_type`**`(`*name*`)`

Returns the probable type of this channel, based on the name

Parameters

name
[*str*] the name of the channel

Returns

type
[*str*] one of `'adc'`, `'proc'`, or `'sim'`

`gwsumm.data.timeseries.`**`get_timeseries`**`(`*channel*, *segments*, *config=None*, *cache=None*, *query=True*, *nds=None*, *nproc=1*, *frametype=None*, *statevector=False*, *return_=True*, *datafind_error='raise'*, ***ioargs*`)`

Retrieve data for channel

Parameters

channel
[*str* or *~gwpy.detector.Channel*] the name of the channel you want

segments
[*~gwpy.segments.SegmentList*] the data segments of interest

config
[*~gwsumm.config.GWSummConfigParser*] the configuration for this analysis

cache
[*~glue.lal.Cache* or *list* of *str*] a cache of data files from which to read

query
[*bool*, optional] whether you want to retrieve new data from the source if it hasn't been loaded already

nds
[*bool*, optional] whether to try and use NDS2 for data access, default is to guess based on other arguments and the environment

nproc
[*int*, optional] number of parallel cores to use for file reading, default: 1

frametype
[*str*, optional`] the frametype of the target channels, if not given, this will be guessed based on the channel name(s)

statevector
[*bool*, optional] whether you want to load *~gwpy.timeseries.StateVector* rather than *~gwpy.timeseries.TimeSeries* data

datafind_error
[*str*, optional] what to do in the event of a datafind error, one of

- 'raise' : stop immediately upon error
- 'warn' : print warning and continue as if no frames had been found
- 'ignore' : print nothing and continue with no frames

return_
[*bool*, optional] whether you actually want anything returned to you, or you are just calling this function to load data for use later

****ioargs**
all other keyword arguments are passed to the relevant data reading method (either *~gwpy.timeseries.TimeSeries.read* or *~gwpy.timeseries.TimeSeries.fetch* or state-vector equivalents)

Returns

data
[*~gwpy.timeseries.TimeSeriesList*] a list of *TimeSeries*

gwsumm.data.timeseries.**get_timeseries_dict**(*channels*, *segments*, *config=<GWSummConfigParser()>*, *cache=None*, *query=True*, *nds=None*, *nproc=1*, *frametype=None*, *statevector=False*, *return_=True*, *datafind_error='raise'*, ***ioargs*)

Retrieve the data for a set of channels

Parameters

channels
[*list* of *str* or *~gwpy.detector.Channel*] the channels you want to get

segments
[*~gwpy.segments.SegmentList*] the data segments of interest

config
[*~gwsumm.config.GWSummConfigParser*] the configuration for this analysis

query
[*bool*, optional] whether you want to retrieve new data from the source if it hasn't been loaded already

nds
[*bool*, optional] whether to try and use NDS2 for data access, default is to guess based on other arguments and the environment

nproc
[*int*, optional] number of parallel cores to use for file reading, default: 1

frametype
[*str*, optional`] the frametype of the target channels, if not given, this will be guessed based on the channel name(s)

statevector
[*bool*, optional] whether you want to load *~gwpy.timeseries.StateVector* rather than *~gwpy.timeseries.TimeSeries* data

datafind_error
[*str*, optional] what to do in the event of a datafind error, one of

- 'raise' : stop immediately upon error
- 'warn' : print warning and continue as if no frames had been found
- 'ignore' : print nothing and continue with no frames

return_
[*bool*, optional] whether you actually want anything returned to you, or you are just calling this function to load data for use later

****ioargs**
all other keyword arguments are passed to the relevant data reading method (either *~gwpy.timeseries.TimeSeriesDict.read* or *~gwpy.timeseries.TimeSeriesDict.fetch* or state-vector equivalents)

Returns

datalist
[*dict* of *~gwpy.timeseries.TimeSeriesList*] a set of *(channel, TimeSeriesList)* pairs

gwsumm.data.timeseries.**locate_data**(*channels*, *segments*, *list_class=<class 'gwpy.timeseries.timeseries.TimeSeriesList'>*)

Find and return available (already loaded) data

gwsumm.data.timeseries.**resample_timeseries_dict**(*tsd*, *nproc=1*, ***sampling_dict*)

Resample a *TimeSeriesDict*

Parameters

tsd
[*~gwpy.timeseries.TimeSeriesDict*] the input dict to resample

nproc
[*int*, optional] the number of parallel processes to use

****sampling_dict**
`<name>=<sampling frequency>` pairs defining new sampling frequencies for keys of `tsd`

Returns

resampled
[*~gwpy.timeseries.TimeSeriesDict*] a new dict with the keys from `tsd` and resampled values, if that key was included in `sampling_dict`, or the original value

gwsumm.data.timeseries.**sieve_cache**(*cache*, *ifo=None*, *tag=None*, *segment=None*)

gwsumm.data.utils module

Utilities for data loading and pre-processing

class gwsumm.data.utils.**FftParams**(***kwargs*)

Bases: object

Convenience object to hold signal-processing parameters

dict()

fftlength

method

overlap

scheme

stride

window

gwsumm.data.utils.**get_fftparams**(*channel*, ***defaults*)

gwsumm.data.utils.**make_globalv_key**(*channels*, *fftparams=None*)

Generate a unique key for storing data in a globalv *dict*

Parameters

channels
[*str*, *list*] one or more channels to group in this key

fftparams
[*FftParams*] structured set of signal-processing parameters used to generate the dataset

gwsumm.data.utils.**use_configparser**(*f*)

Decorate a method to use a valid default for 'config'

This is just to allow lazy passing of *config=None*

gwsumm.data.utils.**use_segmentlist**(*f*)

Decorate a method to convert incoming segments into a *SegmentList*

This assumes that the method to be decorated takes a segment list as the second positionsl argument.

Module contents

Methods and classes for loading and pre-processing data

Each of the sub-modules are designed to read or create the data requested only once, with the containers from the *globalv* module used as a storage buffer for each unique data type

gwsumm.html package

Subpackages

gwsumm.html.tests package

Submodules

gwsumm.html.tests.test_bootstrap module

Unit tests for gwsumm.html.bootstrap

gwsumm.html.tests.test_bootstrap.**test_banner**()

gwsumm.html.tests.test_bootstrap.**test_base_map_dropdown**()

gwsumm.html.tests.test_bootstrap.**test_calendar**(*mode*, *datefmt*)

gwsumm.html.tests.test_bootstrap.**test_calendar_no_mode**()

gwsumm.html.tests.test_bootstrap.**test_state_switcher**()

gwsumm.html.tests.test_bootstrap.**test_wrap_content**()

gwsumm.html.tests.test_html5 module

Unit tests for gwsumm.html.html5

gwsumm.html.tests.test_html5.**test_comments_box**()

gwsumm.html.tests.test_html5.**test_dialog_box**(*tmpdir*)

gwsumm.html.tests.test_html5.**test_expand_path**()

gwsumm.html.tests.test_html5.**test_ldvw_qscan_batch**()

gwsumm.html.tests.test_html5.**test_ldvw_qscan_single**()

gwsumm.html.tests.test_html5.**test_load**()

gwsumm.html.tests.test_html5.**test_load_custom**()

gwsumm.html.tests.test_html5.**test_load_state**()

gwsumm.html.tests.test_html5.**test_overlay_canvas**()

gwsumm.html.tests.test_static module

Unit tests for gwsumm.html.static

gwsumm.html.tests.test_static.**test_get_css**()

gwsumm.html.tests.test_static.**test_get_js**()

Module contents

Unit tests for gwsumm.html

Submodules

gwsumm.html.bootstrap module

Helper functions for twitter-bootstrap HTML constructs.

gwsumm.html.bootstrap.**banner**(*title*, *subtitle=None*, *titleclass=None*, *subtitleclass=None*)

Construct a banner heading in bootstrap format

Parameters

title
[*str*] name of page (<h1>)

subtitle
[*str*, optional] description of page (<p>)

titleclass
[*str*, optional] class option for <h1>

subtitleclass
[*str*, optional] class option for <p>

Returns

banner
[*~MarkupPy.markup.page*] markup.py *page* instance

gwsumm.html.bootstrap.**base_map_dropdown**(*this*, *id_=None*, *bases={}*)

Construct a dropdown menu that links to a version of the current page on another server, based on a new base.

gwsumm.html.bootstrap.**calendar**(*date*, *tag='a'*, *class_='nav-link dropdown-toggle'*, *id_='calendar'*, *dateformat=None*, *mode=None*)

Construct a bootstrap-datepicker calendar.

Parameters

date
[**:class:`datetime.datetime`**, **:class:`datetime.date`**] active date for the calendar

tag
[*str*] type of enclosing HTML tag, default: <a>

Returns

calendar
[*list*] a list of three oneliner strings of HTML containing the calendar text and a triggering dropdown

gwsumm.html.bootstrap.**state_switcher**(*states*, *default=0*)

Build a state switch button, including all of the given states, with the default selected by index

gwsumm.html.bootstrap.**wrap_content**(*page*)

Utility to wrap some HTML into the relevant s for the main body of a page in bootstrap format

Parameters

page
[**:class:`~MarkupPy.markup.page`**, *str*] HTML content to be wrapped

span
[*int*] column span of content, default: 'full' (12)

Returns

wrappedpage
[**:class:`~MarkupPy.markup.page`**] A new *page* with the input content wrapped as

```
<div class="container">
</div>
```

gwsumm.html.html5 module

HTML5-specific extensions

gwsumm.html.html5.**comments_box**(*name*, *identifier=None*, *title=None*, *url=None*)

Generate a Disqus comments box

gwsumm.html.html5.**dialog_box**(*content*, *title*, *id_*, *btntxt*)

Generate a dialog box to be loaded modal atop the main page

Parameters

content
[*str*] either raw markdown text or the path to a file containing markdown, this will be rendered in HTML as the contents of the dialog box

title
[*str*] title to display atop the dialog box

id_
[*str*] unique identifier for the dialog box

btntxt
[*str*] text (usually a single character) to appear inside a sticky button that opens the dialog box

Returns

page
[*~MarkupPy.markup.page*] fully rendered HTML containing the dialog box

gwsumm.html.html5.**ldvw_qscan**(*channel*, *time*, *fmin=10*, *fmax='inf'*, *qmin=4*, *qmax=100*)

Generate a Q-scan through LIGO DataViewer Web (LDVW)

gwsumm.html.html5.**load**(*url*, *id_='main'*, *error=False*, *success=None*)

Construct the HTML script required to load a url into the HTML element with the given unique `id_`.

gwsumm.html.html5.**load_state**(*url*)

Construct the HTML script required to load the Tab HTML for a given **:class:`~gwsumm.state.core.SummaryState`**

Parameters

url
[*str*] path (relative to <base>) of HTML to load

id_
[*str*, optional, default: '#main'] 'id' in which to load HTML

Returns

HTML
[*str*] HTML one-liner with script loading

gwsumm.html.html5.**overlay_canvas**()

Generate a dialog box allowing users to select and overlay plots

Returns

page
[*~MarkupPy.markup.page*] fully rendered HTML containing the dialog box

gwsumm.html.static module

HTML <head> helphers

This module mainly declares the resources used by standard on HTML pages

gwsumm.html.static.**get_css**()

Return a *dict* of CSS files to link in the HTML <head>

gwsumm.html.static.**get_js**()

Return a *dict* of javascript files to link in the HTML <head>

Module contents

HTML helpers

HTML output is built upon the markup.py module and primarily formatted to fit the twitter bootstrap library.

gwsumm.plot package

Subpackages

gwsumm.plot.guardian package

Subpackages

gwsumm.plot.guardian.tests package

Submodules

gwsumm.plot.guardian.tests.test_main module

Tests for the *gwsumm.plot.guardian* command-line interface

gwsumm.plot.guardian.tests.test_main.**test_main**(*tmpdir*, *caplog*)

Module contents

Unit tests for gwsumm.plot.guardian

Submodules

gwsumm.plot.guardian.core module

Plots of Guardian data

class gwsumm.plot.guardian.core.**GuardianStatePlot**(**args*, ***kwargs*)

Bases: *SegmentDataPlot*

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'color': None, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'insetlabels': 'inset', 'legend-bbox_to_anchor': (1.0, 1.0), 'legend-borderaxespad': 0, 'legend-fontsize': 12, 'legend-frameon': False, 'legend-handletextpad': 0.5, 'legend-loc': 'upper left', 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'legend_bbox_to_anchor': (1.0, 1.0), 'legend_borderaxespad': 0.0, 'legend_fontsize': 12, 'legend_frameon': False, 'legend_loc': 'upper left', 'linewidth': 0.5, 'mask': None, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'nominalcolor': '#ffb200', 'on-is-bad': False, 'requestcolor': '#0066ff', 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'yscale': 'linear', 'ytick.labelsize': 10}

dict of default plotting kwargs

draw()

Read in all necessary data, and generate the figure.

property ifo

property node

type = 'guardian'

name for DataPlot subclass

Module contents

Submodule for plots of Guardian data

gwsumm.plot.triggers package

Subpackages

gwsumm.plot.triggers.tests package

Submodules

gwsumm.plot.triggers.tests.test_main module

Tests for the *gwsumm.plot.triggers* command-line interface

gwsumm.plot.triggers.tests.test_main.**test_main**(*dqflag*, *tmpdir*, *caplog*)

gwsumm.plot.triggers.tests.test_main.**test_main_invalid_columns**(*capsys*)

gwsumm.plot.triggers.tests.test_main.**test_main_with_cache_and_tiles**(*tmpdir*, *caplog*)

Module contents

Unit tests for gwsumm.plot.triggers

Submodules

gwsumm.plot.triggers.core module

Definitions for event trigger plots

class gwsumm.plot.triggers.core.**TriggerDataPlot**(*channels*, *start*, *end*, *state=None*, *outdir='.'*, *etg=None*, ***kwargs*)

Bases: *TriggerPlotMixin*, *TimeSeriesDataPlot*

Standard event trigger plot

add_loudest_event(*ax*, *table*, *rank*, **columns*, ***kwargs*)

data = 'triggers'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'clim': None, 'cmap': 'YlGnBu', 'color': None, 'colorlabel': None, 'contour.algorithm': 'mpl2014', 'edgecolor': 'face', 'facecolor': None, 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'logcolor': False, 'marker': 'o', 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 's': 20, 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'vmax': None, 'vmin': None, 'x': 'time', 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'y': 'snr', 'yscale': 'linear', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

draw()

Read in all necessary data, and generate the figure.

property pid

Unique identifier for this *TriggerDataPlot*.

Extends the standard *TimeSeriesDataPlot* pid with the ETG and each of the column names.

type = 'triggers'

name for DataPlot subclass

class gwsumm.plot.triggers.core.**TriggerHistogramPlot**(**args*, ***kwargs*)

Bases: *TriggerPlotMixin*, *TimeSeriesHistogramPlot*

HistogramPlot from a LIGO_LW Table

data = 'triggers'

draw()

Get data and generate the figure.

property pid

type = 'trigger-histogram'

name for DataPlot subclass

class gwsumm.plot.triggers.core.**TriggerPlotMixin**(**args*, ***kwargs*)

Bases: object

Mixin to overwrite *channels* property for trigger plots

We don't need to get channel data for trigger plots.

property allchannels

List of all unique channels for this plot

property pid

class gwsumm.plot.triggers.core.**TriggerRateDataPlot**(**args*, ***kwargs*)

Bases: *TriggerPlotMixin*, *TimeSeriesDataPlot*

TimeSeriesDataPlot of trigger rate.

data = 'triggers'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'column': None, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend-bbox_to_anchor': (1.0, 1.0), 'legend-frameon': False, 'legend-loc': 'upper left', 'legend-markerscale': 3, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'ylabel': 'Rate [Hz]', 'yscale': 'linear', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

draw()

Read in all necessary data, and generate the figure.

property pid

type = 'trigger-rate'

name for DataPlot subclass

class gwsumm.plot.triggers.core.**TriggerTimeSeriesDataPlot**(**args*, ***kwargs*)

Bases: *TimeSeriesDataPlot*

Custom time-series plot to handle discontiguous *TimeSeries*.

data = 'triggers'

draw()

Read in all necessary data, and generate the figure.

type = 'trigger-timeseries'

name for DataPlot subclass

Module contents

Submodule for plots of event triggers

Submodules

gwsumm.plot.builtin module

Definitions for the standard plots

class gwsumm.plot.builtin.**CoherenceSpectrogramDataPlot**(**args*, ***kwargs*)

Bases: *SpectrogramDataPlot*

DataPlot a Spectrogram of the coherence between two channels

data = 'coherence-spectrogram'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'clim': None, 'colorlabel': None, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'format': None, 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'logcolor': False, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'rasterized': True, 'ratio': None, 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'ylabel': 'Frequency [Hz]', 'yscale': 'log', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

type = 'coherence-spectrogram'

name for DataPlot subclass

class gwsumm.plot.builtin.**CoherenceSpectrumDataPlot**(*channels*, *start*, *end*, *state=None*, *outdir='.'*, *tag=None*, *pid=None*, *href=None*, *new=True*, *all_data=False*, *read=True*, *fileformat='png'*, *caption=None*, ***pargs*)

Bases: *SpectrumDataPlot*

Coherence pectrum plot for a *SummaryTab*

data = 'coherence-spectrogram'

defaults = {'alpha': 0.1, 'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'format': None, 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'no-percentiles': False, 'reference-linestyle': '--', 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'log', 'xtick.labelsize': 14.0, 'yscale': 'linear', 'ytick.labelsize': 14.0, 'zorder': 1}

dict of default plotting kwargs

get_channel_groups()

Hi-jacked method to return pairs of channels

For the *CoherenceSpectrumDataPlot* this method is only used in determining how to separate lists of plotting argument given by the user.

type = 'coherence-spectrum'

name for DataPlot subclass

class gwsumm.plot.builtin.**RayleighSpectrogramDataPlot**(**args*, ***kwargs*)

Bases: *SpectrogramDataPlot*

Rayleigh statistic versino of *SpectrogramDataPlot*

data = 'rayleigh-spectrogram'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'clim': [0.25, 4], 'cmap': 'BrBG_r', 'colorlabel': 'Rayleigh statistic', 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'format': 'rayleigh', 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'rasterized': True, 'ratio': None, 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'ylabel': 'Frequency [Hz]', 'yscale': 'log', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

type = 'rayleigh-spectrogram'

name for DataPlot subclass

class gwsumm.plot.builtin.**RayleighSpectrumDataPlot**(*channels*, *start*, *end*, *state=None*, *outdir='.'*, *tag=None*, *pid=None*, *href=None*, *new=True*, *all_data=False*, *read=True*, *fileformat='png'*, *caption=None*, ***pargs*)

Bases: *SpectrumDataPlot*

Rayleigh statistic versino of *SpectrumDataPlot*

data = 'rayleigh-spectrum'

defaults = {'alpha': 0.1, 'format': 'rayleigh', 'no-percentiles': True, 'reference-linestyle': '--', 'xscale': 'log', 'yscale': 'log', 'zorder': 1}

dict of default plotting kwargs

type = 'rayleigh-spectrum'

name for DataPlot subclass

class gwsumm.plot.builtin.**SpectralVarianceDataPlot**(*channels*, **args*, ***kwargs*)

Bases: *SpectrumDataPlot*

SpectralVariance histogram plot for a *DataTab*

data = 'spectrogram'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'format': None, 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'log': True, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'nbins': 100, 'no-percentiles': False, 'reference-linestyle': '--', 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'log', 'xtick.labelsize': 14.0, 'yscale': 'log', 'ytick.labelsize': 14.0, 'zorder': 1}

dict of default plotting kwargs

parse_variance_kwargs()

type = 'variance'

name for DataPlot subclass

class gwsumm.plot.builtin.**SpectrogramDataPlot**(**args*, ***kwargs*)

Bases: *TimeSeriesDataPlot*

DataPlot a Spectrogram

data = 'spectrogram'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'format': None, 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'rasterized': True, 'ratio': None, 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'ylabel': 'Frequency [Hz]', 'yscale': 'log', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

draw()

Read in all necessary data, and generate the figure.

get_ratio(*specgrams*)

property pid

type = 'spectrogram'

name for DataPlot subclass

class gwsumm.plot.builtin.**SpectrumDataPlot**(*channels*, *start*, *end*, *state=None*, *outdir='.'*, *tag=None*, *pid=None*, *href=None*, *new=True*, *all_data=False*, *read=True*, *fileformat='png'*, *caption=None*, ***pargs*)

Bases: *DataPlot*

Spectrum plot for a *SummaryTab*

data = 'spectrum'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'format': None, 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'no-percentiles': False, 'reference-linestyle': '--', 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'log', 'xtick.labelsize': 14.0, 'yscale': 'log', 'ytick.labelsize': 14.0, 'zorder': 1}

dict of default plotting kwargs

draw()

Process all data and generate the output file for this *SummaryPlot*.

This function should be provided by all sub-classes, and should take no arguments.

parse_references(*prefix='reference(\\d+)?\\Z'*)

Parse parameters for displaying one or more reference traces

type = 'spectrum'

name for DataPlot subclass

class gwsumm.plot.builtin.**TimeSeriesDataPlot**(**args*, ***kwargs*)

Bases: *DataLabelSvgMixin*, *DataPlot*

DataPlot of some *TimeSeries* data.

add_future_shade(*gps=None*, *facecolor='gray'*, *alpha=0.1*, ***kwargs*)

Shade those parts of the figure that display times in the future

add_state_segments(*ax*, *visible=None*, ***kwargs*)

Add an *Axes* below the given `ax` displaying the *SummaryState* for this *TimeSeriesDataPlot*.

Parameters

ax
[*Axes*] the set of *Axes* below which to display the state segments.

visible
[*bool*, optional] whether or not to display the axes, or just make space for them, default is *None*, meaning a dynamic choice based on the state

****kwargs**
other keyword arguments will be passed to the **:meth:`~gwpy.plot.Plot.add_segments_bar`** method.

data = 'timeseries'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'yscale': 'linear', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

draw(*outputfile=None*)

Read in all necessary data, and generate the figure.

init_plot(**args*, ***kwargs*)

Initialise the Figure and Axes objects for this *TimeSeriesDataPlot*.

type = 'timeseries'

name for DataPlot subclass

class gwsumm.plot.builtin.**TimeSeriesHistogram2dDataPlot**(**args*, ***kwargs*)

Bases: *TimeSeriesHistogramPlot*

DataPlot of the 2D histogram of two *TimeSeries*.

data = 'timeseries'

defaults = {'alpha': None, 'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'bins': 100, 'bottom': 1e-300, 'cmap': 'inferno_r', 'contour.algorithm': 'mpl2014', 'edgecolors': 'None', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'grid': 'both', 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'histtype': 'stepfilled', 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'log': True, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'normed': True, 'rwidth': 1, 'savefig.transparent': True, 'shading': 'flat', 'svg.fonttype': 'none', 'text.parse_math': True, 'xtick.labelsize': 14.0, 'ylabel': 'Rate [Hz]', 'yscale': 'linear', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

draw(*outputfile=None*)

Get data and generate the figure.

parse_hist_kwargs(***defaults*)

parse_pcmesh_kwargs(***defaults*)

type = 'histogram2d'

name for DataPlot subclass

class gwsumm.plot.builtin.**TimeSeriesHistogramPlot**(*channels*, *start*, *end*, *state=None*, *outdir='.'*, *tag=None*, *pid=None*, *href=None*, *new=True*, *all_data=False*, *read=True*, *fileformat='png'*, *caption=None*, ***pargs*)

Bases: *DataPlot*

HistogramPlot from a Series

data = 'timeseries'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'bottom': 1e-300, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'histtype': 'stepfilled', 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'log': True, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'rwidth': 1, 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xtick.labelsize': 14.0, 'ylabel': 'Rate [Hz]', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

draw(*outputfile=None*)

Get data and generate the figure.

init_plot(*geometry=None*, ***kwargs*)

Initialise the Figure and Axes objects for this *TimeSeriesDataPlot*.

parse_plot_kwargs(***defaults*)

Pop keyword arguments for *Axes.plot* from the *pargs* for this Plot

type = 'histogram'

name for DataPlot subclass

gwsumm.plot.builtin.**undo_demodulation**(*spec*, *channel*, *limits=None*)

gwsumm.plot.core module

Parse, define, and geenrate plots as requests through the configuration for GWSumm

class gwsumm.plot.core.**DataPlot**(*channels*, *start*, *end*, *state=None*, *outdir='.'*, *tag=None*, *pid=None*, *href=None*, *new=True*, *all_data=False*, *read=True*, *fileformat='png'*, *caption=None*, ***pargs*)

Bases: *SummaryPlot*

A *SummaryPlot* from instrumental data.

Parameters

channels
[*list*] a list of channel names that define the data sources for this *DataPlot*

start
[*float*] GPS start time of this *DataPlot*.

end
[*float*] GPS end time of this *DataPlot*.

tag
[*str*] a descriptive tag for this *DataPlot*, used as part of the output file name

outdir
[*str*] output directory path for this *DataPlot*, defaults to the current directory

href
[*str*] custom URL for this plot to link towards.

****kwargs**
all other keyword arguments to be passed to this plot's **:meth:`process`** method.

Notes

All sub-classes of this object must provide the following methods

:meth:`add_data_source`	routine for appending data sources to the plot

DRAW_PARAMS = ['weights', 'extent', 'linewidth', 'stacked', 'norm', 'cmap', 'rasterized', 'vmax', 'vmin', 'rwidth', 'color', 'normed', 'label', 'interpolation', 'zorder', 'histtype', 'aspect', 'bottom', 'log', 'linestyle', 'orientation', 'logbins', 'imshow', 'bins', 's', 'align', 'alpha', 'density', 'marker', 'origin', 'cumulative', 'range']

list of parameters parsed for *plot()* calls

add_channel(*channel*)

add_hvlines()

Add horizontal and vertical lines to this *DataPlot*

These should be defined in the configuration via the *hline* and *vline* keys.

property allchannels

List of all unique channels for this plot

apply_parameters(**axes*, ***pargs*)

property channels

List of data-source **:class:`Channels <~gwpy.detector.channel.Channel>`** for this *DataPlot*.

Type
:class:`~gwpy.detector.channel.ChannelList`

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xtick.labelsize': 14.0, 'ytick.labelsize': 14.0}

dict of default plotting kwargs

draw()

Process all data and generate the output file for this *SummaryPlot*.

This function should be provided by all sub-classes, and should take no arguments.

property end

finalize(*outputfile=None*, *close=True*, ***savekwargs*)

Save the plot to disk and close.

classmethod from_ini(*config*, *section*, *start*, *end*, *channels=None*, ***kwargs*)

Define a new *DataPlot*.

get_channel_groups()

Find and group (mean, min, max) sets of channels for plotting.

Returns

groups
[*list* of *tuple*] list of (channelname, channellist) tuples giving core channel name and an ordered list of channels. Ordering in preference of 'rms', 'mean', 'min', 'max'.

Notes

This method used to return an *OrderedDict*, but was changed to return a *list* of *tuple* to enable plotting a channel multiple times on a plot, for whatever reason.

property href

HTML <img> href attribute for this *SummaryPlot*.

property ifos

Interferometer set for this *DataPlot*

init_plot(*data=[]*, *FigureClass=<class 'gwpy.plot.plot.Plot'>*, *geometry=(1, 1)*, *projection='rectilinear'*, *sharex=True*, *sharey=True*, ***kwargs*)

Initialise the Figure and Axes objects for this *DataPlot*.

property logx

property logy

property outputfile

Output file for this *DataPlot*.

parse_legend_kwargs(***defaults*)

Pop the legend arguments from the *pargs* for this *Plot*

parse_list(*prefix*, ***defaults*)

Parse a list of something from parameters

This enables listing `hline`s (for example) in the config as

[plot-blah] hline = 100 hline-linestyle = '–' hline-color = 'red' hline2 = 200 hline2-linestyle = '–' hline2-color = 'blue'

Returns an *OrderedDict* with keys matching the primary parsed value, and values as everything else, e.g.

{100: {'linestyle': '–', 'color': 'red'},
200: {'linestyle': '–', 'color': 'blue'},}

parse_plot_kwargs(***defaults*)

Pop keyword arguments for *Axes.plot* from the *pargs* for this Plot

parse_rcParams(*params*)

Parse matplotlib rcParams settings from a dict of plot params

property pid

process(*outputfile=None*, *close=True*)

property span

The GPS [start, stop) interval for this *DataPlot*.

property start

property state

~*gwsumm.state.SummaryState* defining validity of this *DataPlot*.

property tag

File tag for this *DataPlot*.

type = 'data'

name for DataPlot subclass

class gwsumm.plot.core.**SummaryPlot**(*href=None*, *src=None*, *new=True*, *caption=''*)

Bases: object

An image to displayed in GWSumm HTML output.

Parameters

href
[*str*, optional] The IMG URL for this *SummaryPlot*.

new
[*bool*, optional] *bool* flag whether this is a new plot to be processed (*True*), of that the output already exists on disk (*False*).

Notes

This *class* is a stub, designed to make creating detailed *SummaryPlot* classes easier.

property caption

HTML <fancybox plot> title attribute for this *SummaryPlot*.

classmethod from_ini(**args*, ***kwargs*)

Define a new *SummaryPlot* from a an INI-format *ConfigParser* section.

property href

HTML <img> href attribute for this *SummaryPlot*.

property new

Flag whether this is a new plot or, already exists.

Set new=False to skip actually processing this *SummaryPlot*, and just link to the outputfile.

property src

type = None

gwsumm.plot.mixins module

class gwsumm.plot.mixins.**DataLabelSvgMixin**(**args*, ***kwargs*)

Bases: *SvgMixin*

draw_svg(*outputfile*)

class gwsumm.plot.mixins.**SegmentLabelSvgMixin**(**args*, ***kwargs*)

Bases: *SvgMixin*

draw_svg(*outputfile*)

class gwsumm.plot.mixins.**SvgMixin**(**args*, ***kwargs*)

Bases: object

abstract draw_svg(*outputfile*)

finalize(*outputfile=None*, *close=True*, ***savekwargs*)

finalize_svg(*tree*, *outputfile*, *script=None*)

gwsumm.plot.noisebudget module

Extensions to the spectrum plot for noise budgets

class gwsumm.plot.noisebudget.**NoiseBudgetPlot**(*channels*, *start*, *end*, *state=None*, *outdir='.'*, *tag=None*, *pid=None*, *href=None*, *new=True*, *all_data=False*, *read=True*, *fileformat='png'*, *caption=None*, ***pargs*)

Bases: *SpectrumDataPlot*

Plot of a noise budget ASD

data = 'spectrum'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'format': 'asd', 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'no-percentiles': False, 'reference-linestyle': '--', 'residual-color': 'grey', 'residual-label': 'Residual', 'residual-linestyle': ':', 'savefig.transparent': True, 'sum-color': 'black', 'sum-label': 'Sum of noises', 'sum-linestyle': '--', 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'log', 'xtick.labelsize': 14.0, 'yscale': 'log', 'ytick.labelsize': 14.0, 'zorder': 1}

dict of default plotting kwargs

parse_residual_params(***defaults*)

parse_sum_params(***defaults*)

type = 'noise-budget'

name for DataPlot subclass

class gwsumm.plot.noisebudget.**RelativeNoiseBudgetPlot**(*channels*, *start*, *end*, *state=None*, *outdir='.'*, *tag=None*, *pid=None*, *href=None*, *new=True*, *all_data=False*, *read=True*, *fileformat='png'*, *caption=None*, ***pargs*)

Bases: *SpectrumDataPlot*

Spectrum plot for a *SummaryTab*

data = 'spectrum'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'format': 'asd', 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'no-percentiles': False, 'reference-linestyle': '--', 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'log', 'xtick.labelsize': 14.0, 'yscale': 'log', 'ytick.labelsize': 14.0, 'zorder': 1}

dict of default plotting kwargs

type = 'noise-budget-ratio'

name for DataPlot subclass

gwsumm.plot.range module

Definitions for range plots

class gwsumm.plot.range.**GWpyTimeVolumeDataPlot**(**args*, ***kwargs*)

Bases: *RangePlotMixin*, *SimpleTimeVolumeDataPlot*

TimeVolumeDataPlot where the range is calculated on-the-fly

type = 'strain-time-volume'

name for DataPlot subclass

class gwsumm.plot.range.**RangeCumulativeHistogramPlot**(**args*, ***kwargs*)

Bases: *RangePlotMixin*, *TimeSeriesHistogramPlot*

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'bottom': 1e-300, 'contour.algorithm': 'mpl2014', 'cumulative': True, 'density': True, 'fftlength': 8, 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'fmin': 10, 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'histtype': 'stepfilled', 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'log': False, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'overlap': 4, 'range': (1, 'max'), 'rwidth': 1, 'savefig.transparent': True, 'snr': 8.0, 'stride': 60.0, 'svg.fonttype': 'none', 'text.parse_math': True, 'xlabel': 'Angle-averaged range [Mpc]', 'xtick.labelsize': 14.0, 'ylabel': 'Cumulative time duration', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

type = 'range-cumulative-histogram'

name for DataPlot subclass

class gwsumm.plot.range.**RangeCumulativeSpectrumDataPlot**(**args*, ***kwargs*)

Bases: *RangePlotMixin*, *SpectrumDataPlot*

data = 'spectrum'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'fftlength': 8, 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'fmin': 10, 'font.sans-serif': ['Roboto'], 'format': None, 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'no-percentiles': False, 'overlap': 4, 'reference-linestyle': '--', 'savefig.transparent': True, 'snr': 8.0, 'stride': 60.0, 'svg.fonttype': 'none', 'text.parse_math': True, 'xlabel': 'Frequency [Hz]', 'xscale': 'log', 'xtick.labelsize': 14.0, 'ylabel': 'Cumulative fraction of range [%]', 'ylim': [0, 100], 'yscale': 'linear', 'ytick.labelsize': 14.0, 'ytickmarks': [0, 20, 40, 60, 80, 100], 'yticks': [0, 20, 40, 60, 80, 100], 'zorder': 1}

dict of default plotting kwargs

type = 'cumulative-range-spectrum'

name for DataPlot subclass

class gwsumm.plot.range.**RangeDataHistogramPlot**(**args*, ***kwargs*)

Bases: *RangePlotMixin*, *TimeSeriesHistogramPlot*

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'bottom': 1e-300, 'contour.algorithm': 'mpl2014', 'fftlength': 8, 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'fmin': 10, 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'histtype': 'stepfilled', 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'log': True, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'overlap': 4, 'rwidth': 1, 'savefig.transparent': True, 'snr': 8.0, 'stride': 60.0, 'svg.fonttype': 'none', 'text.parse_math': True, 'xlabel': 'Sensitive distance [Mpc]', 'xtick.labelsize': 14.0, 'ylabel': 'Rate [Hz]', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

type = 'range-histogram'

name for DataPlot subclass

class gwsumm.plot.range.**RangeDataPlot**(**args*, ***kwargs*)

Bases: *RangePlotMixin*, *TimeSeriesDataPlot*

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'fftlength': 8, 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'fmin': 10, 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'overlap': 4, 'savefig.transparent': True, 'snr': 8.0, 'stride': 60.0, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'ylabel': 'Sensitive distance [Mpc]', 'yscale': 'linear', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

type = 'range'

name for DataPlot subclass

class gwsumm.plot.range.**RangePlotMixin**(**args*, ***kwargs*)

Bases: object

data = 'spectrogram'

defaults = {'fftlength': 8, 'fmin': 10, 'overlap': 4, 'snr': 8.0, 'stride': 60.0}

draw()

Read in all necessary data and generate a figure

class gwsumm.plot.range.**RangeSpectrogramDataPlot**(**args*, ***kwargs*)

Bases: *RangePlotMixin*, *SpectrogramDataPlot*

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'cmap': 'inferno', 'contour.algorithm': 'mpl2014', 'fftlength': 8, 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'fmin': 10, 'font.sans-serif': ['Roboto'], 'format': None, 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'norm': 'linear', 'overlap': 4, 'rasterized': True, 'ratio': None, 'savefig.transparent': True, 'snr': 8.0, 'stride': 60.0, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'ylabel': 'Frequency [Hz]', 'yscale': 'log', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

type = 'range-spectrogram'

name for DataPlot subclass

class gwsumm.plot.range.**RangeSpectrumDataPlot**(**args*, ***kwargs*)

Bases: *RangePlotMixin*, *SpectrumDataPlot*

data = 'spectrum'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'fftlength': 8, 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'fmin': 10, 'font.sans-serif': ['Roboto'], 'format': None, 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'no-percentiles': False, 'overlap': 4, 'reference-linestyle': '--', 'savefig.transparent': True, 'snr': 8.0, 'stride': 60.0, 'svg.fonttype': 'none', 'text.parse_math': True, 'xlabel': 'Frequency [Hz]', 'xscale': 'log', 'xtick.labelsize': 14.0, 'yscale': 'linear', 'ytick.labelsize': 14.0, 'zorder': 1}

dict of default plotting kwargs

type = 'range-spectrum'

name for DataPlot subclass

class gwsumm.plot.range.SimpleTimeVolumeDataPlot(*sources*, **args*, ***kwargs*)

Bases: *SegmentDataPlot*

Time-series of the time-volume searched by an interferometer

DRAW_PARAMS = ['weights', 'extent', 'linewidth', 'stacked', 'norm', 'cmap', 'rasterized', 'vmax', 'vmin', 'rwidth', 'color', 'normed', 'label', 'interpolation', 'zorder', 'histtype', 'aspect', 'bottom', 'log', 'linestyle', 'orientation', 'logbins', 'imshow', 'bins', 's', 'align', 'alpha', 'density', 'marker', 'origin', 'cumulative', 'range']

list of parameters parsed for *plot()* calls

static calculate_time_volume(*segments*, *range*)

combined_time_volume(*allsegments*, *allranges*)

data = 'timeseries'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'yscale': 'linear', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

draw(*outputfile=None*)

Generate the figure for this plot

classmethod from_ini(**args*, ***kwargs*)

Define a new *DataPlot*.

parse_plot_kwargs(***defaults*)

Pop keyword arguments for *Axes.plot* from the *pargs* for this Plot

property pid

File pid for this *DataPlot*.

type = 'time-volume'

name for DataPlot subclass

gwsumm.plot.registry module

Registry for GWSumm output plot types

All plot types should be registered for easy identification from the configuration INI files

gwsumm.plot.registry.**get_plot**(*name*)

Query the registry for the plot class registered to the given name

gwsumm.plot.registry.**register_plot**(*plot*, *name=None*, *force=False*)

Register a new summary *Plot* to the given `name`

Parameters

name
[*str*] unique descriptive name for this type of plot, must not contain any spaces, e.g. 'time-series'

plotclass
[*type*] defining Class for this plot type

force
[*bool*] overwrite existing registration for this type

Raises

ValueError
if name is already registered and `force` not given as *True*

gwsumm.plot.segments module

Definitions for the standard plots

class gwsumm.plot.segments.**DutyDataPlot**(*flags*, *start*, *end*, *state=None*, *outdir='.'*, *bins=None*, ***kwargs*)

Bases: *SegmentDataPlot*

DataPlot of the duty-factor for a *SegmentList*

calculate_duty_factor(*segments*, *bins=None*, *cumulative=False*, *normalized=None*)

data = 'segments'

defaults = {'alpha': 0.8, 'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'contour.algorithm': 'mpl2014', 'cumulative': False, 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'normalized': None, 'savefig.transparent': True, 'sep': False, 'side_by_side': False, 'stacked': False, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'ylabel': 'Duty factor [%]', 'ylim': (0, 100), 'yscale': 'linear', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

draw(*outputfile=None*)

Read in all necessary data, and generate the figure.

get_bins()

Work out the correct histogram binning for this *DutyDataPlot*

parse_plot_kwargs(**args*, ***kwargs*)

Pop keyword arguments for *Axes.plot* from the *pargs* for this Plot

property pid

File pid for this *DataPlot*.

type = 'duty'

name for DataPlot subclass

class gwsumm.plot.segments.**NetworkDutyBarPlot**(*flags*, *start*, *end*, *state=None*, *outdir='.'*, ***kwargs*)

Bases: *SegmentBarPlot*

Special case of the *SegmentPiePlot* for network duty factors.

NETWORK_COLOR = {'G1': '#222222', 'H1': '#ee0000', 'I1': '#b0dd8b', 'K1': '#ffb200', 'L1': '#4ba6ff', 'V1': '#9b59b6'}

NETWORK_NAME = {0: 'no', 1: 'single', 2: 'double', 3: 'triple', 4: 'quadruple', 5: 'quintuple', 6: 'sextuple'}

defaults = {'alpha': 0.6, 'scale': 'percent', 'title': 'Network duty factor', 'ylabel': 'Duty factor [%]'}

dict of default plotting kwargs

draw()

Process all data and generate the output file for this *SummaryPlot*.

This function should be provided by all sub-classes, and should take no arguments.

type = 'network-duty-segment-bar'

name for DataPlot subclass

class gwsumm.plot.segments.**NetworkDutyPiePlot**(*flags*, *start*, *end*, *state=None*, *outdir='.'*, ***kwargs*)

Bases: *SegmentPiePlot*

Special case of the *SegmentPiePlot* for network duty factors

NETWORK_COLOR = {'G1': '#222222', 'H1': '#ee0000', 'I1': '#b0dd8b', 'K1': '#ffb200', 'L1': '#4ba6ff', 'V1': '#9b59b6', 'double': (0.0, 0.4, 1.0), 'no': 'black', 'quadruple': (1.0, 0.4, 0.0), 'single': (1.0, 0.7, 0.0), 'triple': 'pink'}

NETWORK_NAME = {0: 'no', 1: 'single', 2: 'double', 3: 'triple', 4: 'quadruple', 5: 'quintuple', 6: 'sextuple'}

defaults = {'legend-bbox_to_anchor': (0.8, 0.5), 'legend-fontsize': 24, 'legend-frameon': False, 'legend-loc': 'center left', 'wedge-edgecolor': 'white', 'wedge-width': 0.55}

dict of default plotting kwargs

draw()

Process all data and generate the output file for this *SummaryPlot*.

This function should be provided by all sub-classes, and should take no arguments.

type = 'network-duty-pie'

name for DataPlot subclass

class gwsumm.plot.segments.**ODCDataPlot**(**args*, ***kwargs*)

Bases: *SegmentLabelSvgMixin*, *StateVectorDataPlot*

Custom *StateVectorDataPlot* for ODCs with bitmasks

data = 'odc'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'color': None, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'in_mask_color': (0.0, 0.4, 1.0), 'insetlabels': 'inset', 'legend-bbox_to_anchor': (1.01, 1), 'legend-borderaxespad': 0.0, 'legend-fontsize': 10, 'legend-frameon': False, 'legend-handletextpad': 0.5, 'legend-loc': 'upper left', 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mask': None, 'masked_off_color': 'red', 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'no_summary_bit': False, 'on-is-bad': False, 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'unmasked_off_color': (1.0, 0.7, 0.0), 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'yscale': 'linear', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

draw()

Read in all necessary data, and generate the figure.

get_bitmask_channels()

property pid

type = 'odc'

name for DataPlot subclass

class gwsumm.plot.segments.**SegmentBarPlot**(*flags*, *start*, *end*, *state=None*, *outdir='.'*, ***kwargs*)

Bases: BarPlot, *SegmentDataPlot*

SCALE_UNIT = {'percent': '%', 1: 'seconds', 3600: 'hours', 60: 'minutes', None: 'seconds'}

defaults = {'alpha': 0.6, 'color': '#33cc33', 'edgecolor': 'green', 'scale': 'percent'}

dict of default plotting kwargs

draw(*outputfile=None*)

Process all data and generate the output file for this *SummaryPlot*.

This function should be provided by all sub-classes, and should take no arguments.

type = 'segment-bar'

name for DataPlot subclass

class gwsumm.plot.segments.**SegmentDataPlot**(*flags*, *start*, *end*, *state=None*, *outdir='.'*, ***kwargs*)

Bases: *SegmentLabelSvgMixin*, *TimeSeriesDataPlot*

Segment plot of one or more *DataQualityFlags* <*DataQualityFlag*>.

DRAW_PARAMS = ['weights', 'extent', 'linewidth', 'stacked', 'norm', 'cmap', 'rasterized', 'vmax', 'vmin', 'rwidth', 'color', 'normed', 'label', 'interpolation', 'zorder', 'histtype', 'aspect', 'bottom', 'log', 'linestyle', 'orientation', 'logbins', 'imshow', 'bins', 's', 'align', 'alpha', 'density', 'marker', 'origin', 'cumulative', 'range', 'known', 'height', 'y', 'facecolor', 'edgecolor']

list of parameters parsed for *plot()* calls

add_flag(*f*)

add_legend(*ax*, *colors*, ***kwargs*)

property allflags

data = 'segments'

```
defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'],
'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3,
4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0,
'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'color': None,
'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize':
'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'],
'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'insetlabels': 'inset',
'legend-bbox_to_anchor': (1.0, 1.0), 'legend-borderaxespad': 0, 'legend-fontsize':
12, 'legend-frameon': False, 'legend-handletextpad': 0.5, 'legend-loc': 'upper
left', 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize':
10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mask': None,
'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset':
'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf':
'Roboto', 'mathtext.tt': 'Roboto Slab', 'on-is-bad': False, 'savefig.transparent':
True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps',
'xtick.labelsize': 14.0, 'yscale': 'linear', 'ytick.labelsize': 14.0}
```

dict of default plotting kwargs

draw()

Read in all necessary data, and generate the figure.

property flags

classmethod from_ini(*config*, *section*, *start*, *end*, *flags=None*, *state='all'*, ***kwargs*)

Define a new *DataPlot*.

get_channel_groups(**args*, ***kwargs*)

Find and group (mean, min, max) sets of channels for plotting.

Returns

groups
[*list* of *tuple*] list of (channelname, channellist) tuples giving core channel name and an ordered list of channels. Ordering in preference of 'rms', 'mean', 'min', 'max'.

Notes

This method used to return an *OrderedDict*, but was changed to return a *list* of *tuple* to enable plotting a channel multiple times on a plot, for whatever reason.

get_segment_color()

Parse the configured `pargs` and determine the colors for active and valid segments.

property ifos

Interferometer set for this *SegmentDataPlot*

init_plot(*projection='segments'*, ***kwargs*)

Initialise the Figure and Axes objects for this *TimeSeriesDataPlot*.

property padding

parse_plot_kwargs(**args*, ***kwargs*)

Pop keyword arguments for *Axes.plot* from the *pargs* for this Plot

property pid

File pid for this *DataPlot*.

type = 'segments'

name for DataPlot subclass

class gwsumm.plot.segments.**SegmentHistogramPlot**(*flags*, *start*, *end*, *state=None*, *outdir='.'*, ***kwargs*)

Bases: *TimeSeriesHistogramPlot*, *SegmentDataPlot*

Histogram of segment duration

data = 'segments'

defaults = {'bottom': 0, 'histtype': 'stepfilled', 'log': False, 'rwidth': 1, 'ylabel': 'Number of segments'}

dict of default plotting kwargs

draw(*outputfile=None*)

Get data and generate the figure.

parse_plot_kwargs(***defaults*)

Pop keyword arguments for *Axes.plot* from the *pargs* for this Plot

type = 'segment-histogram'

name for DataPlot subclass

class gwsumm.plot.segments.**SegmentPiePlot**(*flags*, *start*, *end*, *state=None*, *outdir='.'*, ***kwargs*)

Bases: PiePlot, *SegmentDataPlot*

defaults = {'legend-bbox_to_anchor': (0.8, 0.5), 'legend-fontsize': 14, 'legend-frameon': False, 'legend-loc': 'center left', 'wedge-edgecolor': 'white', 'wedge-width': 0.55}

dict of default plotting kwargs

draw(*outputfile=None*)

Process all data and generate the output file for this *SummaryPlot*.

This function should be provided by all sub-classes, and should take no arguments.

parse_plot_kwargs(***defaults*)

Pop keyword arguments for *Axes.plot* from the *pargs* for this Plot

parse_wedge_kwargs(*defaults={}*)

type = 'segment-pie'

name for DataPlot subclass

class gwsumm.plot.segments.**StateVectorDataPlot**(**args*, ***kwargs*)

Bases: *TimeSeriesDataPlot*

DataPlot of some *StateVector* data.

While technically a sub-class of the *TimeSeriesDataPlot*, for data access and processing reasons, the output shadows that of the *SegmentDataPlot* more closely.

DRAW_PARAMS = ['weights', 'extent', 'linewidth', 'stacked', 'norm', 'cmap', 'rasterized', 'vmax', 'vmin', 'rwidth', 'color', 'normed', 'label', 'interpolation', 'zorder', 'histtype', 'aspect', 'bottom', 'log', 'linestyle', 'orientation', 'logbins', 'imshow', 'bins', 's', 'align', 'alpha', 'density', 'marker', 'origin', 'cumulative', 'range', 'known', 'height', 'y', 'facecolor', 'edgecolor']

list of parameters parsed for *plot()* calls

data = 'statevector'

defaults = {'animation.convert_args': ['-layers', 'OptimizePlus'], 'axes.axisbelow': False, 'axes.edgecolor': 'gray', 'axes.formatter.limits': [-3, 4], 'axes.formatter.use_mathtext': True, 'axes.grid': True, 'axes.labelpad': 5.0, 'axes.labelsize': 18.0, 'axes.titlesize': 22.0, 'color': None, 'contour.algorithm': 'mpl2014', 'figure.figsize': [12.0, 6.0], 'figure.labelsize': 'large', 'figure.labelweight': 'normal', 'font.sans-serif': ['Roboto'], 'grid.alpha': 0.5, 'grid.linewidth': 0.5, 'insetlabels': 'inset', 'legend-bbox_to_anchor': (1.0, 1.0), 'legend-borderaxespad': 0, 'legend-fontsize': 12, 'legend-frameon': False, 'legend-handletextpad': 0.5, 'legend-loc': 'upper left', 'legend.edgecolor': 'inherit', 'legend.fancybox': False, 'legend.fontsize': 10.0, 'legend.handlelength': 1.0, 'legend.numpoints': 2, 'mask': None, 'mathtext.bf': 'Roboto', 'mathtext.cal': 'Calligraffiti', 'mathtext.fontset': 'custom', 'mathtext.it': 'Roboto:italic', 'mathtext.rm': 'Roboto', 'mathtext.sf': 'Roboto', 'mathtext.tt': 'Roboto Slab', 'on-is-bad': False, 'savefig.transparent': True, 'svg.fonttype': 'none', 'text.parse_math': True, 'xscale': 'auto-gps', 'xtick.labelsize': 14.0, 'yscale': 'linear', 'ytick.labelsize': 14.0}

dict of default plotting kwargs

draw()

Read in all necessary data, and generate the figure.

property flag

List of flags generated for this *StateVectorDataPlot*.

get_segment_color()

Parse the configured `pargs` and determine the colors for active and valid segments.

init_plot(**args*, ***kwargs*)

Initialise the Figure and Axes objects for this *TimeSeriesDataPlot*.

parse_plot_kwargs(**args*, ***kwargs*)

Pop keyword arguments for *Axes.plot* from the *pargs* for this Plot

property pid

type = 'statevector'

name for DataPlot subclass

gwsumm.plot.segments.**common_limits**(*datasets*, *default_min=0*, *default_max=0*)

Find the global maxima and minima of a list of datasets.

Parameters

datasets
[*iterable*] list (or any other iterable) of data arrays to analyse.

default_min
[*float*, optional] fall-back minimum value if datasets are all empty.

default_max
[*float*, optional] fall-back maximum value if datasets are all empty.

Returns

(min, max)
[*float*] 2-tuple of common minimum and maximum over all datasets.

gwsumm.plot.segments.**tint_hex**(**args*, ***kwargs*)

gwsumm.plot.sei module

SummaryTab for seismic watchdog monitoring

class gwsumm.plot.sei.**SeiWatchDogPlot**(*gpstime*, *chamber*, *sensor*, *config*, *outfile*, *ifo=None*, *duration=30*, *nds=False*, *datacache=None*)

Bases: *DataPlot*

Plot a specific SEI WatchDog trip

data = 'watchdog'

draw()

Process all data and generate the output file for this *SummaryPlot*.

This function should be provided by all sub-classes, and should take no arguments.

property outputfile

Output file for this *DataPlot*.

type = 'watchdog'

name for DataPlot subclass

gwsumm.plot.utils module

Utilies for GWSumm plotting

gwsumm.plot.utils.**get_column_label**(*column*)

gwsumm.plot.utils.**get_column_string**(*column*)

Format the string columnName (e.g. xml table column) into latex format for an axis label.

Parameters

column
[*str*] string to format

Examples

```
>>> get_column_string('snr')
'SNR'
>>> get_column_string('bank_chisq_dof')
r'Bank $\chi^2$ DOF'
```

gwsumm.plot.utils.**hash**(*string*, *num=6*)

Generate an N-character hash string based using string to initialise

Parameters

string
[*str*] the initialisation string

num
[*int*, optional] the length of the hash to produce

Returns

hash
[*str*] the new hash

Examples

```
>>> from gwsumm.plot.utils import hash
>>> print(hash("I love gravitational waves"))
80c897
```

Module contents

A *Plot* is a representation of an image to be included in the HTML output a tab.

For simple purposes, a *Plot* is just a reference to an existing image file that can be imported into an HTML page via the <img> tag.

For more complicated purposes, a number of data plot classes are provided to allow users to generate images on-the-fly. The available classes are:

`TimeSeriesDataPlot`(*args, **kwargs)	DataPlot of some *TimeSeries* data.
`SpectrogramDataPlot`(*args, **kwargs)	DataPlot a Spectrogram
`SegmentDataPlot`(flags, start, end[, state, ...])	Segment plot of one or more *DataQualityFlags <DataQualityFlag>*.
`StateVectorDataPlot`(*args, **kwargs)	DataPlot of some *StateVector* data.
`SpectrumDataPlot`(channels, start, end[, ...])	Spectrum plot for a *SummaryTab*
`TimeSeriesHistogramPlot`(channels, start, end)	HistogramPlot from a Series
`TriggerTimeSeriesDataPlot`(*args, **kwargs)	Custom time-series plot to handle discontiguous *TimeSeries*.
`TriggerHistogramPlot`(*args, **kwargs)	HistogramPlot from a LIGO_LW Table
`TriggerRateDataPlot`(*args, **kwargs)	TimeSeriesDataPlot of trigger rate.

gwsumm.state package

Submodules

gwsumm.state.all module

Definition of the 'All' state.

This is a special *SummaryState* that has valid and active segments spanning the full analysis interval.

`gwsumm.state.all.`**`generate_all_state`**(*start*, *end*, *register=True*, ***kwargs*)

Build a new *SummaryState* for the given [start, end) interval.

Parameters

start
[*~gwpy.time.LIGOTimeGPS*, float] the GPS start time of the current analysis

end
[*~gwpy.time.LIGOTimeGPS*, float] the GPS end time of the current analysis

register
[*bool*, optional] should the new *SummaryState* be registered, default *True*

****kwargs**
other keyword arguments passed to the *SummaryState* constructor

Returns

allstate
[*SummaryState*] the newly created 'All' *SummaryState*

gwsumm.state.core module

Definition of the *SummaryState* class.

class gwsumm.state.core.**SummaryState**(*name*, *known=[]*, *active=[]*, *description=None*, *definition=None*, *hours=None*, *key=None*, *filename=None*, *url=None*)

Bases: DataQualityFlag

An operating state over which to process a ~*gwsumm.tabs.DataTab*.

Parameters

name
[*str*] name for this state

known
[~*gwpy.segments.SegmentList*, optional] list of known segments

active
[~*gwpy.segments.SegmentList*, optional] list of active segments

description
[*str*, optional] text describing what this state means

definition
[*str*, optional] logical combination of flags that define known and active segments for this state (see **:attr:`documentation <SummaryState.definition>`** for details)

key
[*str*, optional] registry key for this state, defaults to **:attr:`~SummaryState.name`**

MATH_DEFINITION = re.compile('(<|<=|=|>=|>|==|!=)')

copy()
Build an exact copy of this flag.

Returns

flag2
[*DataQualityFlag*] a copy of the original flag, but with a fresh memory address.

property definition
The combination of data-quality flags that define this *SummaryState*

For example:

```
>>> state = SummaryState(definition='L1:DMT-SCIENCE:1')
```

would define a *SummaryState* based on the validity and activity of the single flag `'L1:DMT-SCIENCE:1'` (the science-mode flag for the LIGO Livingston Observatory interferometer). Similarly:

```
>>> state = SummaryState(
        definition='L1:DMT-SCIENCE:1&!L1:DMT-LIGHTDIP_10_PERCENT:1')
```

would define a *SummaryState* as active when the `'L1:DMT-SCIENCE:1'` flag was active and the `'L1:DMT-LIGHTDIP_10_PERCENT:1'` flag was not active.

The following logical identifiers are acceptable:

&	Union (i.e. flag1 **and** flag2 must be active)
|	Intersection (i.e. flag1 **or** flag2 must be active)
&!	One-sided difference (i.e. flag1 is active and flag2 **is not**active)
!=	Two-sided difference (i.e. flag1 is active and flag2 is not **OR**flag2 is active and flag2 is not)

Type
str

property end

GPS end time of this state's validity

fetch(*config=<GWSummConfigParser()>*, *segmentcache=None*, *segdb_error='raise'*, *datacache=None*, *datafind_error='raise'*, *nproc=1*, *nds=None*, ***kwargs*)

Finalise this state by fetching its defining segments, either from global memory, or from the segment database

classmethod from_ini(*config*, *section*)

Create a new *SummaryState* from a section in a *ConfigParser*.

Parameters

config
[**:class:`~gwsumm.config.GWConfigParser`**] customised configuration parser containing given section

section
[*str*] name of section to parse

Returns

SummaryState
a new state, with attributes set from the options in the configuration

property key

The registry key for this *SummaryState*.

Type
str

property name

Name of this state

property start

GPS start time of this state's validity.

property tag

File tag for images generated using this state

gwsumm.state.registry module

Registry for *states* <*SummaryState*>.

`gwsumm.state.registry.`**`get_state`**(*key*)

Query the registry for the *SummaryState* registered to the given key

Parameters

key
[*str*] registered key of desired *SummaryState*. This may not match the ~*SummaryState.name* attribute` if the state was registered with a different key.

Returns

state
[*SummaryState*] the *SummaryState* registered with the given key

Raises

ValueError:
if the `key` doesn't map to a registered *SummaryState*

`gwsumm.state.registry.`**`get_states`**(*keys={}*)

Query the registry for a list of states (defaults to all)

Parameters

keys
[*set* of *str*] the set of state keys to query in the registry

Returns

states
[*dict*] a *dict* of (`key`, *SummaryState*) pairs

Raises

ValueError:
if any of the `keys` doesn't map to a registered *SummaryState*

`gwsumm.state.registry.`**`register_state`**(*state*, *key=None*, *force=False*)

Register a new *SummaryState* to the given `key`

Parameters

state
[*SummaryState*] defining Class for this state type.

key
[*str*, optional] unique descriptive name for the *SummaryState* to be registered. If `key=None`, the **:attr:`~SummaryState.key`** attribute of the given state will be used.

force
[*bool*] overwrite existing registration for this key

Raises

ValueError
if key is already registered and `force` not given as *True*

Module contents

A *SummaryState* defines a sub-set of time over which a *~gwsumm.tabs.Tab* should be processed. Each *SummaryState* is normally tied to one or more data-quality flags marking times during which each of the LIGO instruments was operating in a certain configuration, or was subject to a known noise interference.

The state registry

GWSumm defines a state 'registry', simply a record of all *SummaryState* objects that have been defined (and registered) so far in a given program. The registry just makes remembering states in complicated programs a little easier.

Any *SummaryState* can be registered with an arbitrary name as follows:

```
>>> from gwsumm.state.registry import register_state
>>> register_state(mystate, 'my state')
```

and can be recovered later:

```
>>> from gwsumm.state.registry import get_state
>>> mystate = get_state('my state')
```

API reference

SummaryState(name[, known, active, ...])	An operating state over which to process a *~gwsumm.tabs.DataTab*.
get_state(key)	Query the registry for the *SummaryState* registered to the given key
get_states([keys])	Query the registry for a list of states (defaults to all)
register_state(state[, key, force])	Register a new *SummaryState* to the given `key`

class gwsumm.state.**SummaryState**(*name*, *known=[]*, *active=[]*, *description=None*, *definition=None*, *hours=None*, *key=None*, *filename=None*, *url=None*)

Bases: DataQualityFlag

An operating state over which to process a *~gwsumm.tabs.DataTab*.

Parameters

name
[*str*] name for this state

known
[*~gwpy.segments.SegmentList*, optional] list of known segments

active
[*~gwpy.segments.SegmentList*, optional] list of active segments

description
[*str*, optional] text describing what this state means

definition
[*str*, optional] logical combination of flags that define known and active segments for this state (see **:attr:`documentation <SummaryState.definition>`** for details)

key
[*str*, optional] registry key for this state, defaults to **:attr:`~SummaryState.name`**

MATH_DEFINITION = re.compile('(<|<=|=|>=|>|==|!=)')

copy()
Build an exact copy of this flag.

Returns

flag2
[*DataQualityFlag*] a copy of the original flag, but with a fresh memory address.

property definition
The combination of data-quality flags that define this *SummaryState*

For example:

```
>>> state = SummaryState(definition='L1:DMT-SCIENCE:1')
```

would define a *SummaryState* based on the validity and activity of the single flag `'L1:DMT-SCIENCE:1'` (the science-mode flag for the LIGO Livingston Observatory interferometer). Similarly:

```
>>> state = SummaryState(
        definition='L1:DMT-SCIENCE:1&!L1:DMT-LIGHTDIP_10_PERCENT:1')
```

would define a *SummaryState* as active when the `'L1:DMT-SCIENCE:1'` flag was active and the `'L1:DMT-LIGHTDIP_10_PERCENT:1'` flag was not active.

The following logical identifiers are acceptable:

&	Union (i.e. flag1 **and** flag2 must be active)
|	Intersection (i.e. flag1 **or** flag2 must be active)
&!	One-sided difference (i.e. flag1 is active and flag2 **is not**active)
!=	Two-sided difference (i.e. flag1 is active and flag2 is not **OR**flag2 is active and flag2 is not)

Type
str

property end
GPS end time of this state's validity

fetch(*config=<GWSummConfigParser()>*, *segmentcache=None*, *segdb_error='raise'*, *datacache=None*, *datafind_error='raise'*, *nproc=1*, *nds=None*, ***kwargs*)
Finalise this state by fetching its defining segments, either from global memory, or from the segment database

classmethod from_ini(*config*, *section*)
Create a new *SummaryState* from a section in a *ConfigParser*.

Parameters

config
[**:class:`~gwsumm.config.GWConfigParser`**] customised configuration parser containing given section

section
[*str*] name of section to parse

Returns

SummaryState
a new state, with attributes set from the options in the configuration

property key

The registry key for this *SummaryState*.

Type
str

property name

Name of this state

property start

GPS start time of this state's validity.

property tag

File tag for images generated using this state

gwsumm.state.**generate_all_state**(*start*, *end*, *register=True*, ***kwargs*)

Build a new *SummaryState* for the given [start, end) interval.

Parameters

start
[*~gwpy.time.LIGOTimeGPS*, float] the GPS start time of the current analysis

end
[*~gwpy.time.LIGOTimeGPS*, float] the GPS end time of the current analysis

register
[*bool*, optional] should the new *SummaryState* be registered, default *True*

****kwargs**
other keyword arguments passed to the *SummaryState* constructor

Returns

allstate
[*SummaryState*] the newly created 'All' *SummaryState*

gwsumm.state.**get_state**(*key*)

Query the registry for the *SummaryState* registered to the given key

Parameters

key
[*str*] registered key of desired *SummaryState*. This may not match the *~SummaryState.name* attribute` if the state was registered with a different key.

Returns

state
[*SummaryState*] the *SummaryState* registered with the given key

Raises

ValueError:
if the `key` doesn't map to a registered *SummaryState*

gwsumm.state.**get_states**(*keys={}*)

Query the registry for a list of states (defaults to all)

Parameters

keys
[*set* of *str*] the set of state keys to query in the registry

Returns

states
[*dict*] a *dict* of (`key`, *SummaryState*) pairs

Raises

ValueError:
if any of the `keys` doesn't map to a registered *SummaryState*

gwsumm.state.**register_state**(*state*, *key=None*, *force=False*)

Register a new *SummaryState* to the given `key`

Parameters

state
[*SummaryState*] defining Class for this state type.

key
[*str*, optional] unique descriptive name for the *SummaryState* to be registered. If `key=None`, the **:attr:`~SummaryState.key`** attribute of the given state will be used.

force
[*bool*] overwrite existing registration for this key

Raises

ValueError
if key is already registered and `force` not given as *True*

gwsumm.tabs package

Submodules

gwsumm.tabs.builtin module

This module defines a number of *Tab* subclasses.

The *builtin* classes provide interfaces for simple operations including

- *ExternalTab*: embedding an existing webpage
- *PlotTab*: scaffolding a collection of existing images
- *StateTab*: scaffolding plots split into a number of states, with a button to switch between states in the HTML

class gwsumm.tabs.builtin.**ExternalTab**(**args*, ***kwargs*)

Bases: *Tab*

A simple tab to link HTML from an external source

Parameters

name
[*str*] name of this tab (required)

url
[*str*] URL of the external content to be linked into this tab.

index
[*str*] HTML file in which to write. By default each tab is written to an index.html file in its own directory. Use **:attr:`~Tab.index`** to find out the default index, if not given.

shortname
[*str*] shorter name for this tab to use in the navigation bar. By default the regular name is used

parent
[**:class:`~gwsumm.tabs.Tab`**] parent of this tab. This is used to position this tab in the navigation bar.

children
[*list*] list of child **:class:`Tabs <~gwsumm.tabs.Tab>`** of this one. This is used to position this tab in the navigation bar.

group
[*str*] name of containing group for this tab in the navigation bar dropdown menu. This is only relevant if this tab has a parent.

path
[*str*] base output directory for this tab (should be the same directory for all tabs in this run).

classmethod from_ini(*cp*, *section*, **args*, ***kwargs*)

Configure a new *ExternalTab* from a *ConfigParser* section

Parameters

cp
[**:class:`~gwsumm.config.ConfigParser`**] configuration to parse.

section
[*str*] name of section to read

See also:

:obj:`Tab.from_ini`
for documentation of the standard configuration options

Notes

On top of the standard configuration options, the *ExternalTab* can be configured with the `url` option, specifying the URL of the external content to be included:

```
[tab-external]
name = External data
type = external
url = https://www.example.org/index.html
```

html_content(*content*)

Build the #main div for this tab.

Parameters

content
[*str*, *~MarkupPy.markup.page*] HTML content to be wrapped

Returns

#main
[*~MarkupPy.markup.page*] A new *page* with the input content wrapped as

`type = 'external'`

`property url`

`write_html`(***kwargs*)

Write the HTML page for this tab.

See also:

:obj:`gwsumm.tabs.Tab.write_html`
for details of all valid keyword

:obj:`arguments`

`class gwsumm.tabs.builtin.PlotTab`(**args*, ***kwargs*)

Bases: *Tab*

A simple tab to layout some figures in the #main div.

Parameters

name
[*str*] name of this tab (required)

plots
[*list*, optional] list of plots to display on this tab. More plots can be added at any time via **:meth:`PlotTab.add_plot`**

layout
[*int*, *list*, optional] the number of plots to display in each row, or a list of numbers to define each row individually. If the number of plots defined by the layout is less than the total number of plots, the layout for the final row will be repeated as necessary.

For example `layout=[1, 2, 3]` will display a single plot on the top row, two plots on the second, and 3 plots on each row thereafter.

foreword
[*~MarkupPy.markup.page*, *str*, optional] content to include in the #main HTML before the plots

afterword
[*~MarkupPy.markup.page*, *str*, optional] content to include in the #main HTML after the plots

index
[*str*, optional] HTML file in which to write. By default each tab is written to an index.html file in its own directory. Use **:attr:`~Tab.index`** to find out the default index, if not given.

shortname
[*str*, optional] shorter name for this tab to use in the navigation bar. By default the regular name is used

parent
[**:class:`~gwsumm.tabs.Tab`**, optional] parent of this tab. This is used to position this tab in the navigation bar.

children
[*list*, optional] list of child **:class:`Tabs <~gwsumm.tabs.Tab>`** of this one. This is used to position this tab in the navigation bar.

group
[*str*, optional] name of containing group for this tab in the navigation bar dropdown menu. This is only relevant if this tab has a parent.

path
[*str*, optional,] base output directory for this tab (should be the same directory for all tabs in this run).

`add_plot`(*plot*)

Add a plot to this tab.

Parameters

plot
[*str*, **:class:`~gwsumm.plot.SummaryPlot`**] either the URL of a plot to embed, or a formatted *SummaryPlot* object.

`property afterword`

HTML content to be included after the plots

`property foreword`

HTML content to be included before the plots

`classmethod from_ini`(*cp*, *section*, **args*, ***kwargs*)

Define a new tab from a **:class:`~gwsumm.config.GWConfigParser`**

Parameters

cp
[**:class:`~ConfigParser.GWConfigParser`**] customised configuration parser containing given section

section
[*str*] name of section to parse

Returns

tab
[*PlotTab*] a new tab defined from the configuration

`html_content`(*content*)

Build the #main div for this tab.

Parameters

content
[*str*, *~MarkupPy.markup.page*] HTML content to be wrapped

Returns

#main
[*~MarkupPy.markup.page*] A new *page* with the input content wrapped as

property layout

List of how many plots to display on each row in the output.

By default this is 1 if the tab contains only 1 or 3 plots, or 2 if otherwise. The final number given in the list will be repeated as necessary.

Type
list of *ints* <*int*>

scaffold_plots(*plots=None*, *state=None*, *layout=None*, *aclass='fancybox'*, ***fbkw*)

Build a grid of plots using bootstrap's scaffolding.

Returns

page
[**:class:`~MarkupPy.markup.page`**] formatted markup with grid of plots

set_layout(*layout*)

Set the plot scaffolding layout for this tab

Parameters

l
[*int*, *list* of *int*] the desired scaffold layout, one of

- an *int*, indicating the number of plots on every row, or
- a *list*, indicating the number of plots on each row, with the final *int* repeated for any remaining rows; each entry should be an *int* or a pair of *int* indicating the number of plots on this row AND the desired the scaling of this row, see the examples…

Examples

To layout 2 plots on each row

```
>>> tab.set_layout(2)
```

or

```
>>> tab.set_layout([2])
```

To layout 2 plots on the first row, and 3 on all other rows

```
>>> tab.set_layout((2, 3))
```

To layout 2 plots on the first row, and 1 on the second row BUT have it the same size as plots on a 2-plot row

```
>>> tab.set_layout((2, (1, 2))
```

type = 'plots'

write_html(*foreword=None*, *afterword=None*, ***kwargs*)

Write the HTML page for this tab.

Parameters

foreword
[*str*, **:class:`~MarkupPy.markup.page`**, optional] content to place above the plot grid, defaults to **:attr:`PlotTab.foreword`**

afterword
[*str*, **:class:`~MarkupPy.markup.page`**, optional] content to place below the plot grid, defaults to **:attr:`PlotTab.afterword`**

****kwargs**
other keyword arguments to be passed through **:meth:`~Tab.write_html`**

See also:

:obj:`gwsumm.tabs.Tab.write_html`
for details of all valid unnamed keyword arguments

`class gwsumm.tabs.builtin.StateTab(*args, **kwargs)`

Bases: *PlotTab*

Tab with multiple content pages defined via 'states'

Each state is printed to its own HTML file which is loaded via javascript upon request into the #main div of the index for the tab.

Parameters

name
[*str*] name of this tab (required)

states
[*list*] a list of states for this tab. Each state can take any form, but must be castable to a *str* in order to be printed.

plots
[*list*] list of plots to display on this tab. More plots can be added at any time via **:meth:`PlotTab.add_plot`**

layout
[*int*, *list*] the number of plots to display in each row, or a list of numbers to define each row individually. If the number of plots defined by the layout is less than the total number of plots, the layout for the final row will be repeated as necessary.

For example `layout=[1, 2, 3]` will display a single plot on the top row, two plots on the second, and 3 plots on each row thereafter.

index
[*str*] HTML file in which to write. By default each tab is written to an index.html file in its own directory. Use **:attr:`~Tab.index`** to find out the default index, if not given.

shortname
[*str*] shorter name for this tab to use in the navigation bar. By default the regular name is used

parent
[**:class:`~gwsumm.tabs.Tab`**] parent of this tab. This is used to position this tab in the navigation bar.

children
[*list*] list of child **:class:`Tabs <~gwsumm.tabs.Tab>`** of this one. This is used to position this tab in the navigation bar.

group
[*str*] name of containing group for this tab in the navigation bar dropdown menu. This is only relevant if this tab has a parent.

path
[*str*] base output directory for this tab (should be the same directory for all tabs in this run).

`add_state`(*state*, *default=False*)

Add a *SummaryState* to this tab

Parameters

state
[*str*, **:class:`~gwsumm.state.SummaryState`**] either the name of a state, or a *SummaryState*.

register
[*bool*, default: *False*] automatically register all new states

`property defaultstate`

`property frames`

`classmethod from_ini`(*cp*, *section*, **args*, ***kwargs*)

Define a new tab from a **:class:`~gwsumm.config.GWConfigParser`**

Parameters

cp
[**:class:`~ConfigParser.GWConfigParser`**] customised configuration parser containing given section

section
[*str*] name of section to parse

Returns

tab
[*PlotTab*] a new tab defined from the configuration

`static html_content`(*frame*)

Build the #main div for this tab.

In this construction, the is empty, with a javascript hook to load the given frame into the div when ready.

`html_navbar`(*help_=None*, ***kwargs*)

Build the navigation bar for this *Tab*.

The navigation bar will consist of a switch for this page linked to other interferometer servers, followed by the navbar brand, then the full dropdown-based navigation menus configured for the given `tabs` and their descendents.

Parameters

help_
[*str*, **:class:`~MarkupPy.markup.page`**] content for upper-right of navbar

ifo
[*str*, optional] prefix for this IFO.

ifomap
[*dict*, optional] *dict* of (ifo, {base url}) pairs to map to summary pages for other IFOs.

tabs
[*list*, optional] list of parent tabs (each with a list of children) to include in the navigation bar.

Returns

page
[*~MarkupPy.markup.page*] a markup page containing the navigation bar.

`property states`

The set of **:class:`states <gwsumm.state.SummaryState>`** over whos times this tab's data will be processed.

The set of states will be linked in the given order with a switch on the far-right of the HTML navigation bar.

`type = 'state'`

`write_html`(*title=None*, *subtitle=None*, *tabs=[]*, *ifo=None*, *ifomap={}*, *help_=None*, *css={'font-awesome': 'https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.5.1/css/fontawesome.min.css', 'font-awesome-solid': 'https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.5.1/css/solid.min.css', 'gwbootstrap': 'https://cdn.jsdelivr.net/npm/gwbootstrap@1.3.6/lib/gwbootstrap.min.css'}*, *js={'bootstrap': 'https://cdn.jsdelivr.net/npm/bootstrap@5.3.3/dist/js/bootstrap.bundle.min.js', 'datepicker': 'https://cdnjs.cloudflare.com/ajax/libs/bootstrap-datepicker/1.9.0/js/bootstrap-datepicker.min.js', 'fancybox': 'https://cdn.jsdelivr.net/npm/@fancyapps/ui@5.0/dist/fancybox/fancybox.umd.js', 'gwbootstrap': 'https://cdn.jsdelivr.net/npm/gwbootstrap@1.3.6/lib/gwbootstrap-extra.min.js', 'jquery': 'https://code.jquery.com/jquery-3.7.1.min.js', 'jquery-ui': 'https://code.jquery.com/ui/1.13.2/jquery-ui.min.js', 'moment': 'https://cdnjs.cloudflare.com/ajax/libs/moment.js/2.30.1/moment.min.js'}*, *about=None*, *footer=None*, ***inargs*)

Write the HTML page for this state Tab.

Parameters

maincontent
[*str*, **:class:`~MarkupPy.markup.page`**] simple string content, or a structured *page* of markup to embed as the content of the #main div.

title
[*str*, optional, default: {parent.name}] level 1 heading for this *Tab*.

subtitle
[*str*, optional, default: {self.name}] level 2 heading for this *Tab*.

tabs: `list`, optional
list of top-level tabs (with children) to populate navbar

ifo
[*str*, optional] prefix for this IFO.

ifomap
[*dict*, optional] *dict* of (ifo, {base url}) pairs to map to summary pages for other IFOs.

help_
[*str*, **:class:`~MarkupPy.markup.page`**, optional] non-menu content for navigation bar, defaults to calendar

css
[*list*, optional] list of resolvable URLs for CSS files. See *gwsumm.html.static.CSS* for the default list.

js
[*list*, optional] list of resolvable URLs for javascript files. See *gwumm.html.JS* for the default list.

about
[*str*, optional] href for the 'About' page

footer
[*str*, *~MarkupPy.markup.page*] user-defined content for the footer (placed below everything else)

****inargs**
other keyword arguments to pass to the **:meth:`~Tab.build_inner_html`** method

write_state_html(*state*, *pre=None*, *post=None*, *plots=True*)

Write the frame HTML for the specific state of this tab

Parameters

state
[*~gwsumm.state.SummaryState*] *SummaryState* over which to generate inner HTML

gwsumm.tabs.core module

This module defines the core *Tab* object.

The basic Tab allows for simple embedding of arbitrary text inside a standardised HTML interface. Most real-world applications will use a sub-class of *Tab* to create more complex HTML output.

The *Tab* class comes in three flavours:

- 'static', no specific GPS time reference
- 'interval', displaying data in a given GPS [start, stop) interval
- 'event', displaying data around a specific central GPS time

The flavour is dynamically set when each instance is created based on the *mode* keyword, or the presence of *span*, *start and `end*, or *gpstime* keyword arguments.

class gwsumm.tabs.core.**BaseTab**(*name*, *index=None*, *shortname=None*, *parent=None*, *children=[]*, *group=None*, *notes=None*, *overlay=None*, *path='.'*, *mode=None*, *hidden=False*)

Bases: object

The core *Tab* object, defining basic functionality

add_child(*tab*)

Add a child to this *SummaryTab*

Parameters

tab
[*SummaryTab*] child tab to record

property children

List of child tabs for this *Tab*

If this tab is given children, it cannot also have a parent, as it will define its own dropdown menu in the HTML navigation bar, linking to itself and its children.

Type
list of *tabs <Tab>*

classmethod from_ini(*cp*, *section*, **args*, ***kwargs*)

Define a new tab from a *~gwsumm.config.GWConfigParser*

Parameters

cp
[*~gwsumm.config.GWConfigParser*] customised configuration parser containing given section

section
[*str*] name of section to parse

***args, **kwargs**
other positional and keyword arguments to pass to the class constructor (*__init__*)

Returns

tab
[*Tab*] a new tab defined from the configuration

Notes

This method parses the following configuration options

`name`	Full name for this *Tab*
`shortname`	Short name for this tab
`parent`	Short name of the parent page for this *Tab*
`group`	Dropdown group for this *Tab* in the navigation bar
`notes`	Release notes for this *Tab*
`overlay`	Boolean switch to enable plot overlay for this *Tab*
`index`	The HTML path (relative to the *~Tab.path*) for this tab

Sub-classes should parse their own configuration values and then pass these as `*args` and `**kwargs` to this method via *super*:

```
class MyTab(Tab):
    [...]
    def from_ini(cls, cp, section)
        """Define a new `MyTab`.
        """
        foo = cp.get(section, 'foo')
        bar = cp.get(section, 'bar')
        return super(MyTab, cls).from_ini(cp, section, foo, bar=bar)
```

get_child(*name*)

Find a child tab of this *SummaryTab* by name

Parameters

name
[*str*] string identifier of child tab to use in search

Returns

child
[*SummaryTab*] the child tab found by name

Raises

RuntimeError
if no child tab can be found matching the given `name`

`property group`

Dropdown group for this *Tab* in the navigation bar

Type
str

`property href`

HTML href (relative to the *~Tab.path*) for this tab

This attribute is just a convenience to clean-up the *~Tab.index* for a given tab, by removing index.htmls. hierarchy.

Type
str

`html_banner`(*title=None*, *subtitle=None*)

Build the HTML headline banner for this tab.

Parameters

title
[*str*] title for this page

subtitle
[*str*] sub-title for this page

Returns

banner
[*~MarkupPy.markup.page*] formatter markup page for the banner

`static html_content`(*content*)

Build the #main div for this tab.

Parameters

content
[*str*, *~MarkupPy.markup.page*] HTML content to be wrapped

Returns

#main
[*~MarkupPy.markup.page*] A new *page* with the input content wrapped as

`html_navbar`(*help_=None*, *calendar=[]*, *tabs=[]*, *ifo=None*, *ifomap={}*, ***kwargs*)

Build the navigation bar for this tab.

Parameters

help_
[*str*, *~MarkupPy.markup.page*] content to place on the upper-right side of the navbar

calendar
[*list*, optional] datepicker calendar objects for navigation

tabs
[*list*, optional] list of parent tabs (each with a list of children) to include in the navigation bar.

ifo
[*str*, optional] prefix for this IFO.

ifomap
[*dict*, optional] *dict* of (ifo, {base url}) pairs to map to summary pages for other IFOs.

****kwargs**
other keyword arguments to pass to **:meth:`gwsumm.html.navbar`**

Returns

page
[*~MarkupPy.markup.page*] a markup page containing the navigation bar.

`property index`

The HTML path (relative to the *~Tab.path*) for this tab

`property mode`

The date-time mode of this tab.

Type
int

See also:

:obj:`gwsumm.mode`
for details on the modes

`property name`

Full name for this *Tab*

Type
str

`property notes`

Release notes for this *Tab*

`property overlay`

Boolean switch to enable plot overlay for this *Tab*

`property parent`

Short name of the parent page for this *Tab*

A given tab can either be a parent for a set of child tabs, or can have a parent, it cannot be both. In this system, the *parent* attribute defines the heading under which this tab will be linked in the HTML navigation bar.

Type
str

`set_parent(p)`

Set the parent *Tab* for this tab

Parameters

p
[*Tab*] the parent tab for this one

`property shortname`

Short name for this tab

This will be displayed in the navigation bar.

Type
str

property shorttitle

Page title for this tab

property title

Page title for this tab

write_html(*maincontent*, *title=None*, *subtitle=None*, *tabs=[]*, *ifo=None*, *ifomap={}*, *help_=None*, *base=None*, *css=None*, *js=None*, *about=None*, *footer=None*, *issues=True*, ***inargs*)

Write the HTML page for this *Tab*.

Parameters

maincontent
[*str*, *~MarkupPy.markup.page*] simple string content, or a structured *page* of markup to embed as the content of the #main div.

title
[*str*, optional, default: {parent.name}] level 1 heading for this *Tab*.

subtitle
[*str*, optional, default: {self.name}] level 2 heading for this *Tab*.

tabs: `list`, optional
list of top-level tabs (with children) to populate navbar

ifo
[*str*, optional] prefix for this IFO.

ifomap
[*dict*, optional] *dict* of (ifo, {base url}) pairs to map to summary pages for other IFOs.

help_
[*str*, *~MarkupPy.markup.page*, optional] non-menu content for navigation bar

css
[*list*, optional] list of resolvable URLs for CSS files. See *gwsumm.html.CSS* for the default list.

js
[*list*, optional] list of resolvable URLs for javascript files. See *gwumm.html.JS* for the default list.

about
[*str*, optional] href for the 'About' page

footer
[*str*, *~MarkupPy.markup.page*] external link, if applicable (linked from an icon in the footer)

issues
[*bool* or *str*, default: *True*] print link to github.com issue tracker for this package

****inargs**
other keyword arguments to pass to the **:meth:`~Tab.build_inner_html`** method

class gwsumm.tabs.core.**Tab**(**args*, ***kwargs*)

Bases: *BaseTab*

A Simple HTML tab.

This *class* provides a mechanism to generate a full-formatted HTML page including banner, navigation-bar, content, and a footer, without the user worrying too much about the details.

For example:

```
>>> # import Tab and make a new one with a given title and HTML file
>>> from gwsumm.tabs import Tab
>>> tab = Tab('My new tab', 'mytab.html')
>>> # write the Tab to disk with some simple content
>>> tab.write_html('This is my content', brand='Brand name')
```

Parameters

name
[*str*] name of this tab (required)

index
[*str*] HTML file in which to write. By default each tab is written to an index.html file in its own directory. Use *~Tab.index* to find out the default index, if not given.

shortname
[*str*] shorter name for this tab to use in the navigation bar. By default the regular name is used

parent
[*~gwsumm.tabs.Tab*] parent of this tab. This is used to position this tab in the navigation bar.

children
[*list*] list of child *Tabs* <*~gwsumm.tabs.Tab*> of this one. This is used to position this tab in the navigation bar.

group
[*str*] name of containing group for this tab in the navigation bar dropdown menu. This is only relevant if this tab has a parent.

path
[*str*] base output directory for this tab (should be the same directory for all tabs in this run)

Notes

A *Tab* cannot have both a *~Tab.parent* and *~tab.Children*. This is a limitation imposed by the twitter bootstrap navigation bar implementation, which does not allow nested dropdown menus. In order to collect child tabs in a given place, assign them all the same *~Tab.group*.

type = 'basic'

class gwsumm.tabs.core.**TabList**(*entries=[]*)

Bases: list

Custom *list* of *Tab* objects with sorting and parsing

classmethod from_ini(*config*, *tag='tab[_-]'*, *match=[]*, *path='.'*, *plotdir='plots'*)

get_hierarchy()

sort(*key=None*, *reverse=False*)

Sort this *TabList* in place

gwsumm.tabs.data module

This module defines tabs for generating plots from data on-the-fly.

This module also provides the *ProcessedTab* mixin, which should be used to declare that a tab has a *process()* method that should be executed as part of a workflow, see the `gw_summary` executable as an example.

class gwsumm.tabs.data.**DataTab**(**args*, ***kwargs*)

Bases: *ProcessedTab*, *StateTab*

A tab where plots and data summaries are built upon request

This is the 'default' tab for the command-line gw_summary executable.

All `*args` and `**kwargs` are passed up-stream to the base class constructor, excepting the following:

Parameters

name
[*str*] name of this tab (required)

start
[*LIGOTimeGPS*, *str*] start time of this *DataTab*, anything that can be parsed by *~gwpy.time.to_gps* is fine

end
[*LIGOTimeGPS*, *str*] end time of this *DataTab*, format as for *start*

states
[*list* of *states* <*gwsumm.state.SummaryState*>] the *list* of states (*~gwsumm.state.SummaryState*) over which this *DataTab* should be processed. More states can be added later (but before running **:meth:`~DataTab.process`**) via **:meth:`~DataTab.add_state`**.

ismeta
[*bool*, optional, default: *False*] indicates that this tab only contains data already by others and so doesn't need to be processed.

noplots
[*bool*, optional, default: *False*] indicates that this tab only exists to trigger data access, and shouldn't actually generate any figures

****kwargs**
other keyword arguments

See also:

:obj:`gwsumm.tabs.StateTab`
for details on the other keyword arguments (`**kwargs`) accepted by the constructor for the *DataTab*.

finalize_states(*config=<configparser.ConfigParser object>*, *segdb_error='raise'*, ***kwargs*)

Fetch the segments for each state for this *SummaryTab*

classmethod from_ini(*cp*, *section*, *plotdir='plots'*, ***kwargs*)

Define a new *SummaryTab* from the given section of the *ConfigParser*.

Parameters

cp
[**:class:`~gwsumm.config.GWConfigParser`**] customised configuration parser containing given section

section
[*str*] name of section to parse

plotdir
[*str*, optional, default: `'plots'`] output path for plots, relative to current directory

Returns

tab
[*DataTab*] a new *DataTab* defined from the configuration

`get_channels`(**types*, ***kwargs*)

Return the *set* of data channels required for plots of the given `types`.

Parameters

***types**
[*list* of *str*] *list* of plot data type strings whose channel sets to return

new
[*bool*, default: *True*] only include plots whose 'new' attribute is True

Returns

channels
[*list*] an alphabetically-sorted *list* of channels

`get_flags`(**types*, ***kwargs*)

Return the *set* of data-quality flags required for plots of the given `types`.

Parameters

***types**
[*list* of *str*] *list* of plot type strings whose flag sets to return

Returns

flags
[*list*] an alphabetically-sorted *list* of flags

`get_triggers`(**types*, ***kwargs*)

Return the *set* of data-quality flags required for plots of the given `types`.

Parameters

***types**
[*list* of *str*] *list* of plot type strings whose flag sets to return

Returns

flags
[*list*] an alphabetically-sorted *list* of flags

`html_content`(*frame*)

Build the #main div for this tab.

In this construction, the is empty, with a javascript hook to load the given frame into the div when ready.

`static print_segments`(*flag*, *table=False*, *caption=None*)

Print the contents of a *SegmentList* in HTML

process(*config=<configparser.ConfigParser object>*, *nproc=1*, ***stateargs*)

Process data for this tab

Parameters

config
[*ConfigParser.ConfigParser*, optional] job configuration to pass to $DataTab.finalize_states$

****stateargs**
all other keyword arguments are passed directly onto the **:meth:`~DataTab.process_state`** method.

process_state(*state*, *nds=None*, *nproc=1*, *config=<GWSummConfigParser()>*, *datacache=None*, *trigcache=None*, *segmentcache=None*, *segdb_error='raise'*, *datafind_error='raise'*)

Process data for this tab in a given state

Parameters

state
[*~gwsumm.state.SummaryState*] the state to process. Can give *None* to process ALLSTATE with no plots, useful to load all data for other states

nds
[*bool*, optional] *True* to use NDS to read data, otherwise read from frames. Use *None* to read from frames if possible, otherwise using NDS.

nproc
[*int*, optional] number of parallel cores to use when reading data and making plots, default: 1

config
[*ConfigParser*, optional] configuration for this analysis

datacache
[*~glue.lal.Cache*, optional] *Cache* of files from which to read time-series data

trigcache
[*~glue.lal.Cache*, optional] *Cache* of files from which to read event triggers

segmentcache
[*~glue.lal.Cache*, optional] *Cache* of files from which to read segments

segdb_error
[*str*, optional] if `'raise'`: raise exceptions when the segment database reports exceptions, if `'warn''`, print warnings but continue, otherwise ``'ignore'` them completely and carry on.

type = 'data'

write_html(**args*, ***kwargs*)

Write the HTML page for this state Tab.

Parameters

maincontent
[*str*, **:class:`~MarkupPy.markup.page`**] simple string content, or a structured *page* of markup to embed as the content of the #main div.

title
[*str*, optional, default: {parent.name}] level 1 heading for this *Tab*.

subtitle
[*str*, optional, default: {self.name}] level 2 heading for this *Tab*.

tabs: `list`, optional
list of top-level tabs (with children) to populate navbar

ifo
[*str*, optional] prefix for this IFO.

ifomap
[*dict*, optional] *dict* of (ifo, {base url}) pairs to map to summary pages for other IFOs.

help_
[*str*, **:class:`~MarkupPy.markup.page`**, optional] non-menu content for navigation bar, defaults to calendar

css
[*list*, optional] list of resolvable URLs for CSS files. See *gwsumm.html.static.CSS* for the default list.

js
[*list*, optional] list of resolvable URLs for javascript files. See *gwumm.html.JS* for the default list.

about
[*str*, optional] href for the 'About' page

footer
[*str*, *~MarkupPy.markup.page*] user-defined content for the footer (placed below everything else)

****inargs**
other keyword arguments to pass to the **:meth:`~Tab.build_inner_html`** method

write_state_html(*state*)
Write the '#main' HTML content for this tab.

For now, this function just links all the plots in a 2-column format.

write_state_information(*state*)

write_state_placeholder(*state*)
Write a placeholder '#main' content for this tab

class gwsumm.tabs.data.**ProcessedTab**
Bases: object

Abstract base class to detect necessity to run Tab.process()

process()
This method must be overridden by all subclasses

type = '_processed'

gwsumm.tabs.etg module

Custom *SummaryTab* for the output of an ETG.

class gwsumm.tabs.etg.**EventTriggerTab**(**args*, ***kwargs*)

Bases: DataTab

Custom *DataTab* displaying a summary of event trigger generation

Parameters

name
[*str*] name of this tab (required)

start
[*LIGOTimeGPS*, *str*] start time of this *DataTab*, anything that can be parsed by *~gwpy.time.to_gps* is fine

end
[*LIGOTimeGPS*, *str*] end time of this *DataTab*, format as for *start*

channel
[*str*] name of the channel of interest

etg
[*str*, optional] name of this event trigger generator (ETG), defaults to the name of this *EventTriggerTab*

states
[*list* of *states* <*gwsumm.state.SummaryState*>] the *list* of states (*~gwsumm.state.SummaryState*) over which this *DataTab* should be processed. More states can be added later (but before running **:meth:`~DataTab.process`**) via **:meth:`~DataTab.add_state`**.

table
[*type*, *str*, optional] LIGO_LW *~glue.ligolw.table.Table* class to use for this ETG, e.g. use *~glue.ligolw.lsctables.SnglBurstTable* for Omicron, or *~glue.ligolw.lsctables.SnglInspiralTable* for CBC

cache
[*~glue.lal.Cache*, *str*, optional] *Cache* object, or path to a LAL-format cache file on disk, from which to read the event triggers. If no cache is given, the *gwtrigfind* module will be used to automatically locate the trigger files.

url
[*str*, optional] URL for linking to more details results for this tab.

****kwargs**
all other keyword arguments accepted by the *DataTab*

See also:

:obj:`gwsumm.tabs.DataTab`
for details on the other keyword arguments (**`**kwargs`**) accepted by the constructor for this *EventTriggerTab*.

finalize_states(*config=None*, ***kwargs*)

Fetch the segments for each state for this *SummaryTab*

classmethod from_ini(*config*, *section*, ***kwargs*)

Define a new *EventTriggerTab* from a *ConfigParser*.

Parameters

cp
[**:class:`~gwsumm.config.GWConfigParser`**] customised configuration parser containing given section

section
[*str*] name of section to parse

***args, ****kwargs**
other positional and keyword arguments to pass to the class constructor (*__init__*)

See also:

:obj:`DataTab.from_ini`
the parent parsing method that handles parsing plot defintions, amongst other things

Notes

In addition to those attributes parsed by the parent *DataTab.from_ini* method, this method will parse the following attributes from a *ConfigParser*:

```
.. autosummary::
```

~EventTriggerTab.channel ~EventTriggerTab.etg ~EventTriggerTab.url ~EventTriggerTab.cache ~EventTriggerTab.table

Additionally, the loudest events table is configured by giving the following options

———————— ———————————————— *loudest* the number of events to include in the table *loudest-rank* the statistic to use in sorting the table *loudest-dt* the minimum time separation for unique events *loudest-columns* the columns to print in the table *loudest-labels* the labels for each of the given columns ———————— ————————————————

process(**args*, ***kwargs*)

Process data for this tab

Parameters

config
[*ConfigParser.ConfigParser*, optional] job configuration to pass to $DataTab.finalize_states$

****stateargs**
all other keyword arguments are passed directly onto the **:meth:`~DataTab.process_state`** method.

process_state(*state*, **args*, ***kwargs*)

Process data for this tab in a given state

Parameters

state
[*~gwsumm.state.SummaryState*] the state to process. Can give *None* to process ALLSTATE with no plots, useful to load all data for other states

nds
[*bool*, optional] *True* to use NDS to read data, otherwise read from frames. Use *None* to read from frames if possible, otherwise using NDS.

nproc
[*int*, optional] number of parallel cores to use when reading data and making plots, default: 1

config
[*ConfigParser*, optional] configuration for this analysis

datacache
[*~glue.lal.Cache*, optional] *Cache* of files from which to read time-series data

trigcache
[*~glue.lal.Cache*, optional] *Cache* of files from which to read event triggers

segmentcache
[*~glue.lal.Cache*, optional] *Cache* of files from which to read segments

segdb_error
[*str*, optional] if `'raise'`: raise exceptions when the segment database reports exceptions, if `'warn''`, print warnings but continue, otherwise ``'ignore'` them completely and carry on.

`type = 'triggers'`

`write_state_html`(*state*, *pre=None*)

Write the '#main' HTML content for this *EventTriggerTab*.

gwsumm.tabs.fscan module

Custom *SummaryTab* for the output of the FScan algorithm.

`class gwsumm.tabs.fscan.FscanTab`(**args*, ***kwargs*)

Bases: *DataTab*

Custom tab displaying a summary of Fscan results.

`classmethod from_ini`(*config*, *section*, ***kwargs*)

Define a new *FscanTab* from a *ConfigParser*.

`process`(*config=<GWSummConfigParser()>*, ***kwargs*)

Process data for this tab

Parameters

config
[*ConfigParser.ConfigParser*, optional] job configuration to pass to $DataTab.finalize_states$

****stateargs**
all other keyword arguments are passed directly onto the **:meth:`~DataTab.process_state`** method.

`type = 'fscan'`

`write_state_html`(*state*)

Write the '#main' HTML content for this *FscanTab*.

gwsumm.tabs.gracedb module

Custom *SummaryTab* to display events queried from the Gravitational-wave Candidate Event Database (GraceDb)

class gwsumm.tabs.gracedb.**GraceDbTab**(**args*, ***kwargs*)

Bases: *DataTab*

Custom tab displaying a summary of GraceDb results.

classmethod from_ini(*config*, *section*, ***kwargs*)

Define a new *GraceDbTab* from a *ConfigParser*.

process(*config=<GWSummConfigParser()>*, ***kwargs*)

Process data for this tab

Parameters

config
[*ConfigParser.ConfigParser*, optional] job configuration to pass to $DataTab.finalize_states$

****stateargs**
all other keyword arguments are passed directly onto the **:meth:`~DataTab.process_state`** method.

process_state(*state*, ***kwargs*)

Process data for this tab in a given state

Parameters

state
[*~gwsumm.state.SummaryState*] the state to process. Can give *None* to process ALLSTATE with no plots, useful to load all data for other states

nds
[*bool*, optional] *True* to use NDS to read data, otherwise read from frames. Use *None* to read from frames if possible, otherwise using NDS.

nproc
[*int*, optional] number of parallel cores to use when reading data and making plots, default: 1

config
[*ConfigParser*, optional] configuration for this analysis

datacache
[*~glue.lal.Cache*, optional] *Cache* of files from which to read time-series data

trigcache
[*~glue.lal.Cache*, optional] *Cache* of files from which to read event triggers

segmentcache
[*~glue.lal.Cache*, optional] *Cache* of files from which to read segments

segdb_error
[*str*, optional] if `'raise'`: raise exceptions when the segment database reports exceptions, if `'warn''`, print warnings but continue, otherwise ``'ignore'` them completely and carry on.

type = 'gracedb'

write_state_html(*state*)

Write the '#main' HTML content for this *GraceDbTab*.

gwsumm.tabs.guardian module

Definition of the *GuardianTab*

class gwsumm.tabs.guardian.**GuardianTab**(**args*, ***kwargs*)

Bases: *DataTab*

Summarises the data recorded by an Advanced LIGO Guardian node.

Each guardian node controls and monitors state transitions for a specific subsystem of the Advanced LIGO interferometer. The *GuardianTab* summarises those data with a state segments plot, a transitions summary table, and a detailed list of transitions and segments for each listed state.

classmethod from_ini(*config*, *section*, *plotdir='plots'*, ***kwargs*)

Define a new *GuardianTab*.

process(*nds=None*, *nproc=1*, *config=<GWSummConfigParser()>*, *datacache=None*, *segmentcache=[]*, *datafind_error='raise'*, ***kwargs*)

Process data for the given state.

type = 'guardian'

write_state_html(*state*)

Write the HTML for the given state of this *GuardianTab*

gwsumm.tabs.management module

Definition of the *AccountingTab*

class gwsumm.tabs.management.**AccountingTab**(**args*, ***kwargs*)

Bases: *DataTab*

Summarise the data recorded by the operating mode channels

classmethod from_ini(*config*, *section*, *plotdir='plots'*, ***kwargs*)

Define a new *SummaryTab* from the given section of the *ConfigParser*.

Parameters

cp
[**:class:`~gwsumm.config.GWConfigParser`**] customised configuration parser containing given section

section
[*str*] name of section to parse

plotdir
[*str*, optional, default: `'plots'`] output path for plots, relative to current directory

Returns

tab
[*DataTab*] a new *DataTab* defined from the configuration

process(*nds=None*, *nproc=1*, *config=<GWSummConfigParser()>*, *datacache=None*, *datafind_error='raise'*, ***kwargs*)

Process time accounting data

type = 'accounting'

write_state_html(*state*)

Write the HTML for the given state of this *GuardianTab*

gwsumm.tabs.misc module

This module defines some utility *Tab* subclasses, including HTTP error handlers.

class gwsumm.tabs.misc.**AboutTab**(**args*, ***kwargs*)

Bases: *Tab*

Page describing how the containing HTML pages were generated

type = 'about'

write_html(*config=[]*, *prog=None*, ***kwargs*)

Write the HTML page for this *Tab*.

Parameters

maincontent
[*str*, *~MarkupPy.markup.page*] simple string content, or a structured *page* of markup to embed as the content of the #main div.

title
[*str*, optional, default: {parent.name}] level 1 heading for this *Tab*.

subtitle
[*str*, optional, default: {self.name}] level 2 heading for this *Tab*.

tabs: `list`, optional
list of top-level tabs (with children) to populate navbar

ifo
[*str*, optional] prefix for this IFO.

ifomap
[*dict*, optional] *dict* of (ifo, {base url}) pairs to map to summary pages for other IFOs.

help_
[*str*, *~MarkupPy.markup.page*, optional] non-menu content for navigation bar

css
[*list*, optional] list of resolvable URLs for CSS files. See *gwsumm.html.CSS* for the default list.

js
[*list*, optional] list of resolvable URLs for javascript files. See *gwumm.html.JS* for the default list.

about
[*str*, optional] href for the 'About' page

footer
[*str*, *~MarkupPy.markup.page*] external link, if applicable (linked from an icon in the footer)

issues
[*bool* or *str*, default: *True*] print link to github.com issue tracker for this package

****inargs**
other keyword arguments to pass to the **:meth:`~Tab.build_inner_html`** method

class gwsumm.tabs.misc.**Error404Tab**(**args*, ***kwargs*)

Bases: *Tab*

Custom HTTP 404 error page

type = '404'

write_html(*config=[]*, *top=None*, ***kwargs*)

Write the HTML page for this *Tab*.

Parameters

maincontent
[*str*, *~MarkupPy.markup.page*] simple string content, or a structured *page* of markup to embed as the content of the #main div.

title
[*str*, optional, default: {parent.name}] level 1 heading for this *Tab*.

subtitle
[*str*, optional, default: {self.name}] level 2 heading for this *Tab*.

tabs: `list`, optional
list of top-level tabs (with children) to populate navbar

ifo
[*str*, optional] prefix for this IFO.

ifomap
[*dict*, optional] *dict* of (ifo, {base url}) pairs to map to summary pages for other IFOs.

help_
[*str*, *~MarkupPy.markup.page*, optional] non-menu content for navigation bar

css
[*list*, optional] list of resolvable URLs for CSS files. See *gwsumm.html.CSS* for the default list.

js
[*list*, optional] list of resolvable URLs for javascript files. See *gwumm.html.JS* for the default list.

about
[*str*, optional] href for the 'About' page

footer
[*str*, *~MarkupPy.markup.page*] external link, if applicable (linked from an icon in the footer)

issues
[*bool* or *str*, default: *True*] print link to github.com issue tracker for this package

****inargs**
other keyword arguments to pass to the **:meth:`~Tab.build_inner_html`** method

gwsumm.tabs.registry module

Registry for GWSumm data tabs.

All Tabs should be registered for easy identification from the configuration INI files

gwsumm.tabs.registry.**get_tab**(*name*)

Query the registry for the tab class registered to the given name

gwsumm.tabs.registry.**register_tab**(*tab*, *name=None*, *force=False*)

Register a new summary *Tab* to the given `name`

Parameters

tab
[*type*] defining Class for this tab type.

name
[*str*, optional] unique descriptive name for this type of tab, must not contain any spaces, e.g. 'hveto'. If `name=None`, the *Tab.type* class attribute of the given tab will be used.

force
[*bool*] overwrite existing registration for this type

Raises

ValueError
if name is already registered and `force` not given as *True*

gwsumm.tabs.sei module

SummaryTab for seismic watchdog monitoring

class gwsumm.tabs.sei.**SEIWatchDogTab**(**args*, ***kwargs*)

Bases: *DataTab*

Summarise the WatchDog trips recorded from the SEI system.

classmethod from_ini(*config*, *section*, *plotdir='plots'*, ***kwargs*)

Define a new *SEIWatchDogTab*.

process(*nds=None*, *nproc=1*, *config=<GWSummConfigParser()>*, *datacache=None*, *trigcache=None*, *datafind_error='raise'*, ***kwargs*)

Process data for the given state.

type = 'seismic-watchdog'

window = 5

write_state_html(*state*)

Build HTML summary of watchdog trips

gwsumm.tabs.stamp module

Custom *SummaryTab* for the output of the FScan algorithm.

class gwsumm.tabs.stamp.**StampPEMTab**(**args*, ***kwargs*)

Bases: *DataTab*

Custom tab displaying a summary of StampPEM results.

classmethod from_ini(*config*, *section*, ***kwargs*)

Define a new *StampPEMTab* from a *ConfigParser*.

process(*config=<GWSummConfigParser()>*, ***kwargs*)

Process data for this tab

Parameters

config
[*ConfigParser.ConfigParser*, optional] job configuration to pass to $DataTab.finalize_states$

****stateargs**
all other keyword arguments are passed directly onto the **:meth:`~DataTab.process_state`** method.

type = 'stamp'

write_state_html(*state*)

Write the '#main' HTML content for this *StampPEMTab*.

Module contents

This module defines the *Tab* API, and all of the built-in tab objects

gwsumm.tests package

Submodules

gwsumm.tests.common module

Compatibility module

gwsumm.tests.common.**empty_globalv_CHANNELS**(*f*)

gwsumm.tests.test_archive module

Tests for *gwsumm.archive*

gwsumm.tests.test_archive.**create**(*data*, ***metadata*)

gwsumm.tests.test_archive.**empty_globalv**()

gwsumm.tests.test_archive.**test_archive_load_table**()

gwsumm.tests.test_archive.**test_read_archive**()

gwsumm.tests.test_archive.**test_write_archive**(*delete=True*)

gwsumm.tests.test_batch module

Tests for the *gwsumm.batch* command-line interface

gwsumm.tests.test_batch.**test_main**(*krb*, *x509*, *tmpdir*, *caplog*)

gwsumm.tests.test_batch.**test_main_invalid_modes**(*capsys*)

gwsumm.tests.test_batch.**test_main_loop_over_modes**(*tmpdir*, *caplog*, *mode*)

gwsumm.tests.test_channels module

Test suite

gwsumm.tests.test_channels.**teardown_module**()

Undo any set_mode() operations from this module

gwsumm.tests.test_channels.**test_get_channel**()

Test **:func:`gwsumm.channels.get_channel`**

gwsumm.tests.test_channels.**test_get_channel_trend**()

Test get_channel for trends

get_channel should query for the trend and the underlying raw channel

gwsumm.tests.test_channels.**test_get_channels**()

gwsumm.tests.test_channels.**test_split**(*cstr*, *clist*)

gwsumm.tests.test_channels.**test_split_combination**(*cstr*, *clist*)

gwsumm.tests.test_channels.**test_update_missing_channel_params**()

gwsumm.tests.test_config module

Tests for **:mod:`gwsumm.config`**

class gwsumm.tests.test_config.**TestGWSummConfigParser**

Bases: object

PARSER

alias of *GWSummConfigParser*

classmethod cnfg()

classmethod new()

test_configdir()

test_finalize()

test_from_configparser(*cnfg*)

test_get_css()

test_get_javascript()

test_init()

test_interpolate_section_names(*cnfg*)

test_load_channels()

test_load_plugins(*cnfg*)

test_load_rcParams()

test_load_states()

test_load_units(*cnfg*)

test_nditems(*cnfg*)

test_ndoptions(*cnfg*)

test_read()

test_set_date_options()

test_set_ifo_options(*ifo*, *obs*, *exp*)

gwsumm.tests.test_config.**assert_configparser_equal**(*a*, *b*)

gwsumm.tests.test_data module

Tests for *gwsumm.data*

class gwsumm.tests.test_data.**TestData**

Bases: object

Tests for **:mod:`gwsumm.data`**:

classmethod setup_class()

classmethod teardown_class()

test_add_timeseries()

test_find_frame_type()

test_get_channel_type()

test_get_coherence_spectrogram()

test_get_coherence_spectrum()

test_get_fftparams()

test_get_spectrogram()

test_get_spectrum()

test_get_timeseries()

test_make_globalv_key()

test_parse_math_definition(*definition*, *math*)

gwsumm.tests.test_data.**download**(*remote*, *target=None*)

Download a file

gwsumm.tests.test_mode module

Test suite for the mode module

gwsumm.tests.test_mode.**teardown_module**()

Undo any set_mode() operations from this module

gwsumm.tests.test_mode.**test_get_base**(*m*, *basestr*)

gwsumm.tests.test_mode.**test_get_mode**()

gwsumm.tests.test_mode.**test_set_mode**()

gwsumm.tests.test_plot module

Tests for *gwsumm.plot*

class gwsumm.tests.test_plot.**TestDataPlot**

Bases: *TestSummaryPlot*

DEFAULT_ARGS = [['X1:TEST-CHANNEL', 'Y1:TEST-CHANNEL2'], 0, 100]

TYPE = 'data'

test_add_channel()

test_allchannels(*plot*)

test_apply_parameters(*plot*)

test_channels(*plot*)

test_end(*plot*)

test_finalize(*plot*)

test_from_ini()

test_get_channel_groups()

test_href(*plot*)

test_ifos(*plot*)

test_init()

test_outputfile(*plot*)

test_parse_legend_kwargs(*plot*)

test_parse_plot_kwargs(*plot*)

test_parse_plot_kwargs_labels(*plot*, *usetex*, *result*)

test_parse_rcParams(*plot*)

test_span(*plot*)

test_start(*plot*)

test_state(*plot*)

test_tag(*plot*)

class gwsumm.tests.test_plot.**TestSummaryPlot**

Bases: object

DEFAULT_ARGS = []

DEFAULT_KWARGS = {}

TYPE = None

classmethod create(**args*, ***kwargs*)

classmethod plot()

classmethod setup_class()

test_eq(*plot*)

test_href(*plot*, *url*, *href*)

test_init()

test_new(*plot*, *isnew*, *new*)

test_repr(*plot*)

test_src(*plot*)

test_str(*plot*)

gwsumm.tests.test_plot.**test_get_column_label**(*column*, *label*)

gwsumm.tests.test_plot.**test_get_plot**(*name*, *plot*)

gwsumm.tests.test_plot.**test_registry_plot**()

gwsumm.tests.test_tabs module

Tests for *gwsumm.tabs*

class gwsumm.tests.test_tabs.**TestExternalTab**

Bases: *TestTab*

DEFAULT_ARGS = ['Test', '//test.com']

TYPE = 'external'

test_init()

class gwsumm.tests.test_tabs.**TestPlotTab**

Bases: *TestTab*

TYPE = 'plots'

test_add_plot()

test_init()

test_layout()

class gwsumm.tests.test_tabs.**TestTab**

Bases: object

DEFAULT_ARGS = ['Test']

TYPE = 'basic'

create(**args*, ***kwargs*)

classmethod setup_class()

test_index()

test_init()

test_shortname()

gwsumm.tests.test_tabs.**test_get_tab**(*name*, *tab*)

gwsumm.tests.test_tabs.**test_register_tab**()

gwsumm.tests.test_utils module

Tests for *gwsumm.utils*

gwsumm.tests.test_utils.**test_elapsed_time**()

gwsumm.tests.test_utils.**test_get_default_ifo**(*ifo*, *host*)

gwsumm.tests.test_utils.**test_get_odc_bitmask**(*chan*, *mask*)

gwsumm.tests.test_utils.**test_mkdir**()

gwsumm.tests.test_utils.**test_nat_sorted**()

gwsumm.tests.test_utils.**test_safe_eval**(*value*, *out*)

gwsumm.tests.test_utils.**test_safe_eval_2**()

gwsumm.tests.test_utils.**test_vprint**(*capsys*)

Module contents

Test suite

Submodules

gwsumm.archive module

This module handles HDF archiving of data.

In production for LIGO, the LIGO Summary Pages (LSP) Service runs at regular intervals (about every 10 minutes), so an HDF5 file is used to archive the data read and produced from one instance so that the next instance doesn't have to re-read and re-produce the same data.

All data products are stored just using the 'standard' gwpy *.write()* method for that object.

gwsumm.archive.**archive_table**(*table*, *key*, *parent*)

Add a table to the given HDF5 group

> **Warning:** If the input `table` is empty, it will not be archived

Parameters

table
[*~astropy.table.Table*] the data to archive

key
[*str*] the path (relative to `parent`) at which to store the table

parent
[*h5py.Group*] the h5py group in which to add this dataset

gwsumm.archive.**find_daily_archives**(*start*, *end*, *ifo*, *tag*, *basedir='.'*)

Find the daily archives spanning the given GPS [start, end) interval

Parameters

start
[*float*, *~datetime.datetime*, *~astropy.time.Time*, *str*] start time of the archive file to find, any object that can be converted into a *LIGOTimeGPS*, *~astropy.time.Time*, or *~datetime.datetime* is acceptable

end
[*float*, *~datetime.datetime*, *~astropy.time.Time*, *str*] end time of the archive file to find, any object that can be converted into a *LIGOTimeGPS*, *~astropy.time.Time*, or *~datetime.datetime* is acceptable

ifo
[*str*] interferometer string, ex. 'H1'

tag
[*str*] tag string for the archive file

basedir
[*path-like*, optional] base path to archive files, default: '.'

Returns

archives
[*list*] list of matching archive files

Notes

This will only search the day directories with the format *YYYYMMDD*

gwsumm.archive.**load_table**(*dataset*)

Read table from the given HDF5 group

The *EventTable* is read, stored in the memory archive, then returned

Parameters

dataset
[*h5py.Dataset*] n-dimensional table to load from hdf5

Returns

table
[~*gwpy.table.EventTable*] the table of events loaded from hdf5

gwsumm.archive.**read_data_archive**(*sourcefile*, *rm_source_on_fail=True*)

Read archived data from an HDF5 archive source

This method reads all found data into the data containers defined by the *gwsumm.globalv* module, then returns nothing.

Parameters

sourcefile
[*str*] path to source HDF5 file

rm_source_on_fail
[*bool*, optional] remove the source HDF5 file if there was an OSError when opening the file

gwsumm.archive.**segments_from_array**(*array*)

Convert a 2-dimensional *numpy.ndarray* to a *SegmentList*

Parameters

array
[*float numpy.ndarray*] input numpy array to convert into a segment list

Returns

out
[~*gwpy.segments.SegmentList*] output segment list

gwsumm.archive.**segments_to_array**(*segmentlist*)

Convert a *SegmentList* to a 2-dimensional *numpy.ndarray*

Parameters

segmentlist
[*~gwpy.segments.SegmentList*] input segment list to convert

Returns

out
[*float numpy.ndarray*] output segment list as a numpy array

gwsumm.archive.**write_data_archive**(*outfile*, *channels=True*, *timeseries=True*, *spectrogram=True*, *segments=True*, *triggers=True*)

Build and save an HDF archive of data processed in this job.

Parameters

outfile
[*str*] path to target HDF5 file

timeseries
[*bool*, optional] include *TimeSeries* data in archive

spectrogram
[*bool*, optional] include *Spectrogram* data in archive

segments
[*bool*, optional] include *DataQualityFlag* data in archive

triggers
[*bool*, optional] include *EventTable* data in archive

gwsumm.batch module

Pipeline generator for the Gravitational-wave interferometer summary information system (*gwsumm*)

This module constructs a directed acyclic graph (DAG) that defines a workflow to be submitted via the HTCondor scheduler.

class gwsumm.batch.**GWHelpFormatter**(**args*, ***kwargs*)

Bases: HelpFormatter

class gwsumm.batch.**GWSummaryDAGNode**(*job*)

Bases: CondorDAGNode

get_cmd_line()

Return the full command line that will be used when this node is run by DAGman.

class gwsumm.batch.**GWSummaryJob**(*universe*, *tag='gw_summary'*, *subdir=None*, *logdir=None*, ***cmds*)

Bases: CondorDAGJob

Job representing a configurable instance of gw_summary.

add_opt(*opt*, *value=''*)

Add a command line option to the executable. The order that the arguments will be appended to the command line is not guaranteed, but they will always be added before any command line arguments. The name of the option is prefixed with double hyphen and the program is expected to parse it with getopt_long(). @param opt: command line option to add. @param value: value to pass to the option (None for no argument).

get_command()

logtag = '$(cluster)-$(process)'

set_command(*command*)

write_sub_file()

Write a submit file for this Condor job.

gwsumm.batch.**create_parser**()

Create a command-line parser for this entry point

gwsumm.batch.**main**(*args=None*)

Run the command-line Omega scan tool in batch mode

gwsumm.channels module

Utilities for channel access

gwsumm.channels.**get_channel**(*channel*, *find_parent=True*, *timeout=5*)

Find (or create) a **:class:`~gwpy.detector.Channel`**.

If `channel` has already been created, the cached copy will be returned, otherwise a new *~gwpy.detector.Channel* object will be created.

Parameters

channel
[*str*] name of new channel

find_parent
[*bool*, optional, default: *True*] query for raw version of trend channel (trends not in CIS)

timeout
[*float*, optional, default: *5*] number of seconds to wait before connection times out

Returns

Channel
[**:class:`~gwpy.detector.Channel`**] new channel.

gwsumm.channels.**get_channels**(*channels*, ***kwargs*)

Find (or create) multiple channels calling get_channel()

Parameters

channels
[*list*] list of channels as *str* or *~gwpy.detector.Channel* objects

****kwargs**
keyword arguments applied to each channel in the list

Returns

ChannelList
[*~gwpy.detector.ChannelList*] a list of channels

See also:

:obj:`get_channel`

gwsumm.channels.**split**(*channelstring*)

Split a comma-separated list of channels that may, or may not contain NDS2 channel types as well

Parameters

channelstring
[*str*] comma-separated string of channels

Returns

out
[*list*] list of strings for each channel

gwsumm.channels.**split_combination**(*channelstring*)

Split a math-combination of channels

Parameters

channelstring
[*str*]

Returns

ChannelList
[*~gwpy.detector.ChannelList*]

gwsumm.channels.**update_channel_params**()

Update the *globalv.CHANNELS* list based on internal parameter changes

This is required to update *Channel.type* based on *Channel.frametype*, and similar.

gwsumm.channels.**update_missing_channel_params**(*channel*, ***kwargs*)

Update empty channel parameters using the given input

This method will only set parameters in the channel if the target parameter is *None*.

Parameters

channel
[*~gwpy.detector.Channel*] channel to update

****kwargs**
(key, value) pairs to set

Returns

target
[*~gwpy.detector.Channel*] the channel after updating parameters

gwsumm.globalv module

Set of global memory variables for GWSumm package

gwsumm.io module

Input/output utilities

gwsumm.io.**read_frequencyseries**(*filename*)

Read a ~*gwpy.frequencyseries.FrequencySeries* from a file

IF using HDF5, the filename can be given as a combined filename/path, i.e. `test.hdf5/path/to/dataset`.

Parameters

filename
[*str*] path of file to read

Returns

series
[~*gwpy.frequencyseries.FrequencySeries*] the data as read

Raises

astropy.io.registry.IORegistryError
if the input format cannot be identified or is not registered

gwsumm.mode module

Job modes

class gwsumm.mode.**Mode**(*value*, *names=None*, ***, *module=None*, *qualname=None*, *type=None*, *start=1*, *boundary=None*)

Bases: *OrderedEnum*

Enumeration of valid processing 'modes'

Each mode provides an association with a particular GPS interval

day = 10

dir_format()

event = 1

gps = 2

is_calendar()

month = 12

static = 0

week = 11

year = 13

class gwsumm.mode.**OrderedEnum**(*value*, *names=None*, ***, *module=None*, *qualname=None*, *type=None*, *start=1*, *boundary=None*)

Bases: Enum

gwsumm.mode.**get_base**(*date*, *mode=None*)

Determine the correct base attribute for the given date and mode.

Parameters

date
[**:class:`datetime.datetime`**] formatted date

mode
[*int*, *str*] enumerated interger code (or name) for the required mode

Returns

base
[*str*] the recommended base URL to have a correctly linked calendar

gwsumm.mode.**get_mode**(*m=None*)

Return the enum for the given mode, defaults to the current mode.

gwsumm.mode.**set_mode**(*m*)

Set the current mode.

gwsumm.segments module

Utilities for segment handling and display

gwsumm.segments.**format_padding**(*flags*, *padding*)

Format an arbitrary collection of paddings into a *dict*

gwsumm.segments.**get_segments**(*flag*, *validity=None*, *config=<configparser.ConfigParser object>*, *cache=None*, *query=True*, *return_=True*, *coalesce=True*, *padding=None*, *ignore_undefined=False*, *segdb_error='raise'*, *url=None*, ***read_kw*)

Retrieve the segments for a given flag

Segments will be loaded from global memory if already defined, otherwise they will be loaded from the given **:class:`~glue.lal.Cache`**, or finally from the segment database

Parameters

flag
[*str*, *list*] either the name of one flag, or a list of names

validity
[*~gwpy.segments.SegmentList*] the segments over which to search for other segments

query
[*bool*, optional, default: *True*] actually execute a read/query operation (if needed), otherwise just retrieve segments that have already been cached

config
[*~configparser.ConfigParser*, optional] the configuration for your analysis, if you have one. If present the `[segment-database]` section will be queried for the following options

- `gps-start-time`, and `gps-end-time`, if `validity` is not given
- `url` (the remote hostname for the segment database) if the `url` keyword is not given

cache
[**:class:`glue.lal.Cache`**, optional] a cache of files from which to read segments, otherwise segments will be downloaded from the segment database

coalesce
[*bool*, optional, default: *True*] coalesce all segmentlists before returning, otherwise just return segments as they were downloaded/read

padding
[*tuple*, or *dict* of *tuples*, optional] *(start, end)* padding with which to pad segments that are downloaded/read

ignore_undefined
[*bool*, optional, default: *False*] Special case needed for network calculation compound flags so that when this is True, DataQualityFlag.known values are set to the same value as `validity`

segdb_error
[*str*, optional, default: `'raise'`] how to handle errors returned from the segment database, one of

- `'raise'` (default) : raise the exception as normal
- `'warn'` : print the exception as a warning, but return no segments
- `'ignore'` : silently ignore the error and return no segments

url
[*str*, optional] the remote hostname for the target segment database

return_
[*bool*, optional, default: *True*] internal flag to enable (True) or disable (False) actually returning anything. This is useful if you want to download/read segments now but not use them until later (e.g. plotting)

****read_kw**
[*dict*, optional] additional keyword arguments to *~gwpy.segments.DataQualityDict.read* or *~gwpy.segments.DataQualityFlag.read*

Returns

flag
[*~gwpy.segments.DataQualityFlag*] the flag object representing segments for the given single flag, OR

flagdict
[*~gwpy.segments.DataQualityDict*] the dict of *~gwpy.segments.DataQualityFlag* objects for multiple flags, if `flag` is given as a *list*, OR

None
if `return_=False`

`gwsumm.segments.`**`not_equal`**`(`*a*, *b*, *f*`)`

`gwsumm.segments.`**`split_compound_flag`**`(`*compound*`)`

Parse the configuration for this state.

Returns

flags
[*tuple*] a 2-tuple containing lists of flags defining required ON and OFF segments respectively for this state

gwsumm.triggers module

Read and store transient event triggers

gwsumm.triggers.**add_triggers**(*table*, *key*, *segments=None*)

Add a *EventTable* to the global memory cache

gwsumm.triggers.**get_etg_read_kwargs**(*etg*, *config=None*, *exclude=['columns']*)

Read keyword arguments to pass to the trigger reader for a given etg

gwsumm.triggers.**get_etg_table**(*etg*)

Find which table should be used for the given etg

Parameters

etg
[*str*] name of Event Trigger Generator for which to query

Returns

table
[*type*, subclass of *~ligo.lw.table.Table*] LIGO_LW table registered to the given ETG

Raises

KeyError
if the ETG is not registered

gwsumm.triggers.**get_time_column**(*table*, *etg*)

Get the time column name for this table

gwsumm.triggers.**get_times**(*table*, *etg*)

Get the time data for this table

See also:

:obj:`get_time_column`

gwsumm.triggers.**get_triggers**(*channel*, *etg*, *segments*, *config=<GWSummConfigParser()>*, *cache=None*, *columns=None*, *format=None*, *query=True*, *nproc=1*, *ligolwtable=None*, *filter=None*, *timecolumn=None*, *verbose=False*, *return_=True*)

Read a table of transient event triggers for a given channel.

gwsumm.triggers.**keep_in_segments**(*table*, *segmentlist*, *etg=None*)

Return a view of the table containing only those rows in the segmentlist

gwsumm.triggers.**read_cache**(*cache*, *segments*, *etg*, *nproc=1*, *timecolumn=None*, ***kwargs*)

Read a table of events from a cache

This function is mainly meant for use from the *get_triggers* method

Parameters

cache
[**:class:`glue.lal.Cache`**] the formatted list of files to read

segments
[*~gwpy.segments.SegmentList*] the list of segments to read

etg
[*str*] the name of the trigger generator that created the files

nproc
[*int*, optional] the number of parallel processes to use when reading

****kwargs**
other keyword arguments are passed to the *EventTable.read* or *{tableclass}.read* methods

Returns

table
[*~gwpy.table.EventTable*, *None*] a table of events, or *None* if the cache has no overlap with the segments

gwsumm.units module

Extra units for GW data processing

gwsumm.utils module

Utilities for GWSumm

`gwsumm.utils.elapsed_time()`
Return the time (seconds) since this job started

`gwsumm.utils.get_default_ifo(fqdn='build-24124212-project-416166-gwsumm')`
Find the default interferometer prefix (IFO) for the given host

Parameters

fqdn
[*str*] the fully-qualified domain name (FQDN) of the host on which you wish to find the default IFO

Returns

IFO
[*str*] the upper-case X1-style prefix for the default IFO, if found, e.g. *L1*

Raises

ValueError
if not default interferometer prefix can be parsed

`gwsumm.utils.get_odc_bitmask(odcchannel)`

`gwsumm.utils.mkdir(*paths)`
Conditional mkdir operation, for convenience

`gwsumm.utils.nat_sorted(iterable, key=None)`
Sorted a list in the way that humans expect.

Parameters

iterable
[*iterable*] iterable to sort

key
[*callable*] sorting key

Returns

lsorted
[*list*] sorted() version of input `l`

`gwsumm.utils.safe_eval`(*val*, *strict=False*, *globals_=None*, *locals_=None*)

Evaluate the given string as a line of python, if possible

If the **:meth:`eval`** fails, a *str* is returned instead, unless *strict=True* is given.

Parameters

val
[*str*] input text to evaluate

strict
[*bool*, optional, default: *False*] raise an exception when the *eval* call fails (*True*) otherwise return the input as a *str* (*False*, default)

globals_
[*dict*, optional] dict of global variables to pass to *eval*, defaults to current *globals*

locals_
[*dict*, optional] dict of local variables to pass to *eval*, defaults to current *locals*

Note: Note the trailing underscore on the *globals_* and *locals_* kwargs, this is required to not clash with the builtin *globals* and *locals* methods`.

Raises

ValueError
if the input string is considered unsafe to evaluate, normally meaning it contains something that might interact with the filesystem (e.g. *os.path* calls)

NameError
SyntaxError
if the input cannot be evaluated, and *strict=True* is given

See also:

:obj:`eval`
for more documentation on the underlying evaluation method

`gwsumm.utils.vprint`(*message*, *verbose=True*, *stream=<_io.TextIOWrapper name='<stdout>' mode='w' encoding='utf-8'>*, *profile=True*)

Prints the given message to the stream.

Parameters

message
[*str*] string to print

verbose
[*bool*, optional, default: *True*] flag to print or not, default: print

stream
[*file*, optional, default: *stdout*] file object stream in which to print, default: stdout

profile
[*bool*, optional, default: *True*] flag to print timestamp for debugging and profiling purposes

Module contents

Gravitational-wave interferometer summary information system

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