
fast-plotter Documentation

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To install:

```
pip install fast-plotter
```

Or for development:

```
pip install -e git+https://gitlab.cern.ch/fast-hep/public/fast-plotter.git#egg=fast-  
↪plotter
```

- Free software: Apache Software License 2.0

- Functions to turn binned dataframes in the form produced from [fast-carpenter](#)
- A simple command-line tool to produce plots with decent defaults

1.1 Command-line Usage

The command-line tools are the primary way to use [fast-carpenter](#) and friends at this point. All of the FAST commands provide built-in help by providing the `--help` option.

1.1.1 `fast_plotter`

Take a list of [fast-carpenter](#) output binned dataframe tables and turns these into plots.

To configure how these plots are made, use either the command-line options, or provide these in a [YAML](#) configuration. If an option is provided to both, then the command-line value will take precedence.

```
$ fast_plotter --help
usage: fast_plotter [-h] [-c CONFIG] [-o OUTDIR] [-e EXTENSION] [-w WEIGHTS]
                  [-d DATA] [-s SIGNAL] [--dataset-col DATASET_COL]
                  [-l LUMI] [-y {log,linear}] [--halt-errors]
                  tables [tables ...]

Turn them tables into plots

positional arguments:
  tables                Table files to process

optional arguments:
  -h, --help            show this help message and exit
  -c CONFIG, --config CONFIG
                        YAML config to control common plotting options
```

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```
-o OUTDIR, --outdir OUTDIR
    Output directory to save plots to
-e EXTENSION, --extension EXTENSION
    File extension for images
-w WEIGHTS, --weights WEIGHTS
    comma-separated list of weight schemes to plot things
    for
-d DATA, --data DATA
    Regular expression to identify real data datasets from
    their name
-s SIGNAL, --signal SIGNAL
    Regular expression to identify signal MC datasets from
    their name
--dataset-col DATASET_COL
    Name of column to be used to define multiple-lines for
    1D plots
-l LUMI, --lumi LUMI
    Scale the MC yields by this lumi
-y {log,linear}, --yscale {log,linear}
    Use this scale for the y-axis
--halt-errors
    Stop at the first time an error occurs
```

1.2 The Plotting Config

Use the config file to fine-tune your plots.

Valid options:

Option	Default	Description
<code>data</code>	<code>"data"</code>	Regular expression for values in <code>dataset_col</code> to plot as scatter markers
<code>weights</code>	None	Which weight columns to use for plotting.
<code>yscale</code>	<code>"linear"</code>	Should y-axis be on a linear or a log scale.
<code>lumi</code>	1	Multiply all simulated datasets by this value.
<code>ylabel</code>		Give the Y-axis a title.
<code>legend</code>		Control the legend placement options. A dictionary of kwarg pairs passed directly to <code>matplotlib.pyplot.legend()</code>
<code>limits</code>		Set the axis ranges. Takes a dictionary with <code>x</code> and / or <code>y</code> as the keys, and a list with upper and lower bounds.
<code>annotations</code>		Add text to the plot. Should be a list of text labels, each described by a dictionary containing the text and the position. All other paramers are passed as keyword-argument pairs to <code>matplotlib.pyplot.annotate()</code>

Todo: Describe the `bin_variable_replacements` and `value_replacements` options for the config.

See also:

An example of a plotting config cms_public_tutorial demo repository: https://gitlab.cern.ch/fast-hep/public/fast cms_public_tutorial/blob/master/plot_config.yml

1.3 Example repositories

- A full demo based on the public CMS tutorial using 2012 data: https://gitlab.cern.ch/fast-hep/public/fast_cms_public_tutorial

1.3.1 Related Presentations

1. [IRIS-HEP 4th March 2019](<https://indico.cern.ch/event/802182/contributions/3334624/>)

1.4 fast_plotter package

1.4.1 Submodules

fast_plotter.interval_from_str module

`fast_plotter.interval_from_str.convert_intervals` (*df*, *to*='mid', *level*=[], *column*=[])

`fast_plotter.interval_from_str.convert_intervals_column` (*df*, *to*='mid', *select*=[])

`fast_plotter.interval_from_str.convert_intervals_level` (*df*, *to*='mid', *select*=[])

`fast_plotter.interval_from_str.interval_from_string` (*series*)

fast_plotter.plotting module

class `fast_plotter.plotting.BarColl` (*n_colors*=10, *ax*=None, *fill*=True, *line*=True)

Bases: `fast_plotter.plotting.FillColl`

class `fast_plotter.plotting.FillColl` (*n_colors*=10, *ax*=None, *fill*=True, *line*=True)

Bases: `object`

pre_call (*col*)

`fast_plotter.plotting.actually_plot` (*df*, *x_axis*, *y*, *yerr*, *kind*, *label*, *ax*, *dataset_col*='dataset')

`fast_plotter.plotting.add_annotations` (*annotations*, *ax*)

`fast_plotter.plotting.pad_zero` (*x*, **y_values*)

`fast_plotter.plotting.plot_1d` (*df*, *kind*='line', *yscale*='lin')

`fast_plotter.plotting.plot_1d_many` (*df*, *prefix*="", *data*='data', *signal*=None, *dataset_col*='dataset', *plot_sims*='stack', *plot_data*='sum', *plot_signal*=None, *kind_data*='scatter', *kind_sims*='fill-error-last', *kind_signal*='line', *scale_sims*=None, *summary*='ratio')

`fast_plotter.plotting.plot_all` (*df*, *project_1d*=True, *project_2d*=True, *data*='data', *signal*=None, *dataset_col*='dataset', *yscale*='log', *lumi*=None, *annotations*=[], *dataset_order*='sum-ascending', *continue_errors*=True, *bin_variable_replacements*={}, ***kwargs*)

`fast_plotter.plotting.plot_ratio` (*data*, *sims*, *x*, *y*, *yvar*, *ax*)

fast_plotter.utils module

fast_plotter.utils.**interval_from_string**(*series*)

fast_plotter.utils.**convert_intervals**(*df*, *to*='mid', *level*=[], *column*=[])

CHAPTER 2

Indices and tables

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