
Plot Toolkit Documentation

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INTRODUCTION

Plot Toolkit is a set of python functions, classes, and decorators intended to simplify usage of the matplotlib package. Matplotlib provides an excellent framework for rapidly generating plots using python. However, applying strict formatting specifications to these plots requires writing a large amount of code that is difficult to read and difficult to remember. Plot Toolkit's purpose is to allow users to generate plots with strict formatting specifications using matplotlib, without writing large amounts of complex code.

FUNCTIONS

2.1 Formatting

2.1.1 Axes

`plot_toolkit.format.axes.set_xaxis(...)`

Formats an X axis

Arguments:

subplot <matplotlib.axes.AxesSubplot> on which to act

ticks X Axis ticks

tick_kwargs Keyword arguments to be passed to `set_xticks`

ticklabels X Axis tick labels

tick_fp X Axis tick font in form of '##L'

ticklabel_kwargs Keyword arguments to be passed to `set_xticklabels`

label X Axis label

label_fp X Axis label font in form of '##L'

label_kwargs Keyword arguments to be passed to `set_xlabel`

outline Add dark outline to axis

`plot_toolkit.format.axes.set_yaxis(...)`

Formats a Y axis

Arguments:

subplot <matplotlib.axes.AxesSubplot> on which to act

ticks Y Axis ticks

tick_kwargs Keyword arguments to be passed to `set_yticks`

ticklabels Y Axis tick labels

tick_fp Y Axis tick font in form of '##L'

ticklabel_kwargs Keyword arguments to be passed to `set_yticklabels`

label Y Axis label

label_fp Y Axis label font in form of '##L'

label_kwargs Keyword arguments to be passed to `set_ylabel`

outline Add dark outline to axis

`plot_toolkit.format.axes.set_colorbar(...)`

Formats a colorbar

Arguments:

cbar <matplotlib.colorbar.ColorBar> to be acted on

ticks Color bar ticks

ticklabels Color bar tick labels

tick_fp Color bar tick label font in form of '##L'

label Color bar label

label_fp Color bar label font in form of '##L'

2.1.2 Text

`plot_toolkit.format.text.set_text(...)`

Prints text on a figure or subplot

Arguments:

figure_or_subplot <matplotlib.figure.Figure> or <matplotlib.axes.AxesSubplot> on which to act

text Text ('s' also supported)

fp Text font in form of '##L' (default: '11b')

ha Text horizontal alignment (default: 'center')

va Text vertical alignment (default: 'center')

Returns:

text <matplotlib.text.Text>

`plot_toolkit.format.text.set_inset(...)`

Prints text as an inset to a subplot

Arguments:

subplot matplotlib.axes.AxesSubplot on which to act

text Inset text ('s' and 'inset' also supported)

fp Inset text font in form of '##L'

xpos Horizontal position of title in subplot reference frame; proportion (0.0-1.0)

ypos Vertical position of title in subplot reference frame; proportion (0.0-1.0)

x Horizontal position of inset in subplot reference frame; proportion (0.0-1.0); (overrides *xpos*)

y Vertical position of inset in subplot reference frame; proportion (0.0-1.0); (overrides *ypos*)

- Several of these labeling functions can probably be merged analogously to `set_[x,y]axis`

Returns:

text <matplotlib.text.Text>

`plot_toolkit.format.text.set_title(...)`

Prints a title for a figure

Arguments:

figure <matplotlib.figure.Figure> on which to act

text Figure title text ('s' and 'title' also supported)

edge_distance Distance between top of subplots and vertical center of title; proportion (0.0-1.0)

fp Figure title font in form of '##L'

x Horizontal position of title in figure reference frame (0.0-1.0); (override)

y Vertical position of title in figure reference frame (0.0-1.0); (override)

`plot_toolkit.format.text.set_subtitle(...)`

Prints a title above a subplot

Arguments:

subplot <matplotlib.axes.AxesSubplot> on which to act

label Subplot label

fp Subplot label font in form of '##L'

`plot_toolkit.format.text.set_bigxlabel(...)`

Prints a large X axis label shared by multiple subplots

Arguments:

figure <matplotlib.figure.Figure> on which to act

text Figure X axis label text ('s' and 'label' also supported)

edge_distance Distance between bottom of subplots and vertical center of title; proportion (0.0-1.0)

fp Figure X axis label font in form of '##L'

x Horizontal position of title in figure reference frame (0.0-1.0); (override)

y Vertical position of title in figure reference frame (0.0-1.0); (override)

Returns:

text <matplotlib.text.Text>

`plot_toolkit.format.text.set_bigylabel(...)`

Prints a large Y axis label shared by multiple subplots

Arguments:

figure <matplotlib.figure.Figure> on which to act

text Figure Y axis label text ('s' and 'label' also supported)

fp Figure Y axis label font in form of '##L'

edge_distance Distance between furthest left of subplots and horizontal center of title; proportion (0.0-1.0)

x Horizontal position of label in figure reference frame; proportion (0.0-1.0); (override)

y Vertical position of label in figure reference frame; proportion (0.0-1.0); (override)

Returns:

text <matplotlib.text.Text>

2.1.3 Legend

`plot_toolkit.format.legend.set_legend(...)`

Draws and formats a legend on *subplot*

By default includes all series, or accepts manual lists of *handles* and *labels* for plotted series

Arguments:

subplot <matplotlib.axes.AxesSubplot> on which to act

handles List of handles for plotted series (e.g. <matplotlib.lines.Line2D>)

labels List of labels for plotted series

fp Legend font in form of ‘##L’

loc Legend location

kwargs Keyword arguments to be passed to subplot.legend

Returns:

legend matplotlib.legend.Legend

2.2 Auxiliary

2.2.1 General

`plot_toolkit.auxiliary.abs_listdir(...)`

Arguments:

directory directory whose contents to list

Yields:

file Full path to each file

`plot_toolkit.auxiliary.hsl_to_rgb(...)`

Arguments:

h hue (0.0 - 1.0)

s saturation (0.0 - 1.0)

l luminescence (0.0 - 1.0)

Returns:

rgb Numpy array of equivalent red, green, blue

`plot_toolkit.auxiliary.rgb_to_hsl(...)`

Arguments:

r red (0.0 - 1.0)

g green (0.0 - 1.0)

b blue (0.0 - 1.0)

Returns:

hsl Numpy array of equivalent hue, saturation, luminescence

`plot_toolkit.auxiliary.pad_zero(...)`

Arguments:

ticks List or numpy array of ticks

Returns:

tick_labels Tick labels, each with the same number of trailing zeros

2.2.2 Matplotlib

`plot_toolkit.auxiliary.get_edges(...)`

Arguments:

figure <matplotlib.figure.Figure> on which to act

Returns:

edges Dictionary; keys are 'x' and 'y', values are numpy arrays with dimensions (axis, min...max)

`plot_toolkit.auxiliary.gen_font(...)`

Arguments:

fp String of form '##L' in which '##' is the font size and 'L' is 'r' for regular or 'b' for bold

Returns:

fp <matplotlib.font_manager.FontProperties> object to given specifications

`plot_toolkit.auxiliary.gen_contour_levels(...)`

Arguments:

I Intensity

cutoff Proportion of data below minimum level (0.0-1.0)

include_negative Return levels for negative intensity as well as positive

Returns:

levels Numpy array of levels

`plot_toolkit.auxiliary.gen_cmap(...)`

Returns colormap that is *color* over all values

Not useful for heatmaps; useful for countours

Arguments:

color Tuple, list, or numpy array of red, green, and blue (0.0-1.0); Alternatively, string of named matplotlib color

Returns:

cmap <matplotlib.colors.LinearSegmentedColormap>

`plot_toolkit.auxiliary.gen_figure_subplots(...)`

Generates figure and subplots according to selected format.

Arguments:

format String of form 'L##' in which 'L' is 'l' for landscape or 'p' for portrait and '##' is the number of subplots

fig_w Figure width

fig_h Figure height

sub_w Subplot width

sub_h Subplot height

mar_t Top margin

mar_r Right margin

mar_w Horizontal margin between subplots

mar_h Vertical margin between subplots

Returns:

figure matplotlib.figure.Figure

subplots OrderedDict of <matplotlib.axes.AxesSubplot> (1-indexed)

DECORATORS

3.1 Figure_Output

class `plot_toolkit.Figure_Output.Figure_Output(...)`

Decorator class to help functions that generate plots save figures more easily

Arguments:

outfile Output file name or `<matplotlib.backends.backend_pdf.PdfPages>` object

Behavior:

Calls decorated function, which should return a `matplotlib.figure.Figure` object.

If *outfile* is a string ending in `'png'`, saves figure as a png file.

If *outfile* is a string ending in `'pdf'`, saves figure as a pdf file using `PdfPages`

If *outfile* is a `PdfPages` object, appends figure to that object as a page

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