MPL Plotter Documentation

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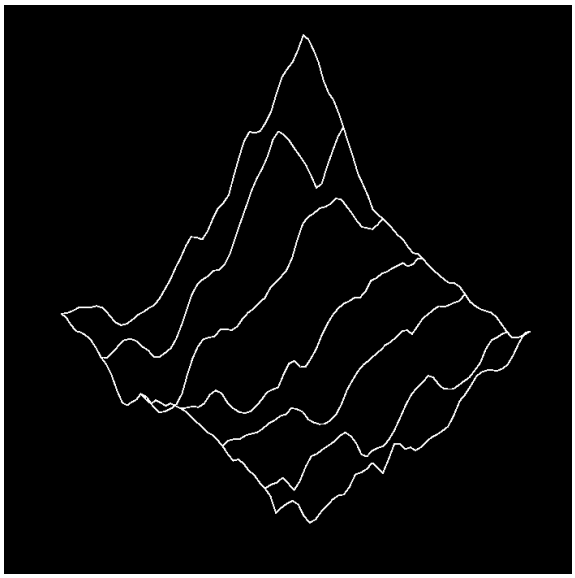

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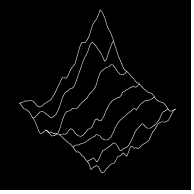

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Making plots for technical documents can be a time sink. MPL Plotter aims to reduce that overhead by allowing you to effortlessly and concisely

- Generate publication quality figures with a single call
- Compare data by plotting different curves in a single plot
- Visualize different kinds of data in figures with many plots

It is opinionated but built with flexibility in mind, which practically means that no default can't be changed, and any and all further customization with Matplotlib is compatible. From ticks to legends to extra axes to whatever suits your needs. There's two ways to use MPL Plotter:

- Calls to the 2D and 3D plotting functions
- Using presets, either those shipped with the library, or custom ones

It does the job for me and I expand it when it can't. Hope you find some use in it!

CHAPTER

ONE

2D

1.1 Composition: `comparison`

`comparison` (*x*, *y*, *f=None*, *show=False*, *autocolor=True*, *top=None*, *bottom=None*, *left=None*, *right=None*, *wspace=None*, *hspace=None*, ***kwargs*)

Data Input

The table below displays the supported numerical input combinations, where:

- array: List or NumPy array with numerical values
- […]: List containing …
- result: <curves>

Table 1.1: Valid input combinations.

`x`	`y`	Result	Notes
array	array	1	
array	[array, array]	2	Both `y` share a single `x`
[array, array]	[array, array]	2	Both `x` share a single `y`
[n*[array]]	[n*[array]]	n	Each `y` has an `x`

Argument Classification

Arguments are internally classified as **figure**, **plural** and **curve** arguments, namely:

- Figure

  Select few arguments which may be input only once in the plotting process, so as to avoid conflicts. Ieg: passing `grid=True` twice (`plt.grid(...)`) will result in no grid being drawn. These are removed from the keyword arguments and used in the last *comparison* call.

- Plural

Arguments passed with any of the keywords accepted by all 2D plotters -that is, any keyword which does **not** start with the name of its plotting class-, in plural tense. These must be **lists** of length equal to the **number of curves**. Each element in the list is the value of the keyword argument for each curve (eg: passing `colors=['red', 'green', 'blue']` to a 3-curve plot will set the color of the curves to 'red', 'green' and 'blue'.

- Curve

  Curve-specific parameters (`color`, `line_width`, `plot_label`)

Defaults

The limits of the plot will be adjusted to the upper and lower limits of all ``x``s and ``y``s.

Parameters

- **x** (*list of list or list of np.ndarray*) – Domains.
- **y** (*list of list or list of np.ndarray*) – Values.
- **f** (*list of plot*) – Functions used to plot y(x)
- **autocolor** (*bool*) – Whether to automatically assign different colors to each curve
- **show** (*bool*) – plt.show() after plotting (thereby finishing the plot)
- **top** (*float*) – plt.subplots_adjust parameter
- **bottom** (*float*) – plt.subplots_adjust parameter
- **left** (*float*) – plt.subplots_adjust parameter
- **right** (*float*) – plt.subplots_adjust parameter
- **wspace** (*float*) – plt.subplots_adjust parameter
- **hspace** (*float*) – plt.subplots_adjust parameter
- **kwargs** – MPL Plotter plotting class keyword arguments for further customization

1.2 Composition: `panes`

panes (*x*, *y*, *f=None*, *fig=None*, *shape=None*, *figsize=None*, *show=False*, *rows=1*, *top=None*, *bottom=None*, *left=None*, *right=None*, *wspace=None*, *hspace=None*, ***kwargs*)

Data Input

The table below displays the supported numerical input combinations, where:

- array: List or NumPy array with numerical values
- […]: List containing …
- result: <curves>

Table 1.2: Valid input combinations.

x	y	Result	Notes
array	array	11	
array	[array, array]	12	Both y share x
[n*[array]]	[n*[array]]	1n	Each y has an x
array	[array, array]	21	Both y share x
[array, array]	[array, array]	21	Each y has an x
array	[n*[array], n*[array]]	2n	All curves in all (2) panes share a single x
[array, array]	[n*[array], n*[array]]	2n	All curves in each pane share an x
[n*[array], n*[array]]	[n*[array], n*[array]]	2n	All curves in all (2) panes have their own x
[n*[array], … up to m]	[n*[array], … up to m]	mn	All curves in all panes have their own x

Argument Classification

Arguments are internally classified as **figure**, **legend**, **plural** and **curve** arguments, namely:

- Figure arguments

  Arguments which may be input only once in the plotting process, so as to avoid conflicts (eg: passing `grid=True` twice (`plt.grid(...)`) will result in no grid being drawn). These are removed from the keyword arguments and applied in the last `comparison` call.

- Legend arguments

  These are `plot_label/s`, which to avoid redundancy are applied in the last `comparison`. This is done only if the number of curves is the same across all panes, and equal to the number of provided `plot_labels`.

- Plural arguments

  Arguments passed with any of the keywords accepted by all 2D plotters -that is, any keyword which does **not** start with the name of its plotting class-, in plural tense. These must be **lists** of length equal to the **number of panes**. Each element in the list is the value of the keyword argument for each pane (eg: `tick_labels_x=[1, 2, 3]` will set the tick labels of the x axes to 1, 2 and 3 respectively in a 3-pane plot).

- Curve arguments

Arguments passed as plurals to the comparison function. These are once more **lists** containing the value of a keyword argument, passed in plural, for each curve following the convention shown above for data input, such that passing `colors=[['red', 'blue'], ['green', 'red']]` to a plot containing 2 panes with 2 curves each will color the curves in the first pane red and blue, and those in the second green and red.

Parameters

- **x** (*list of list or list of np.ndarray or np.ndarray*) – Data
- **y** (*list of list or list of np.ndarray or np.ndarray*) – Data
- **f** (*list of function or list of plot*) – List of plotting functions to use for each curve
- **fig** (*matplotlib.figure.Figure*) – Figure object on which to plot
- **figsize** (*tuple of float*) – Figure size
- **show** (*bool*) – Whether to plt.show() after plotting (thereby finishing the plot)
- **rows** (*int*) – Number of rows
- **top** (*float*) – plt.subplots_adjust parameter
- **bottom** (*float*) – plt.subplots_adjust parameter
- **left** (*float*) – plt.subplots_adjust parameter
- **right** (*float*) – plt.subplots_adjust parameter
- **wspace** (*float*) – plt.subplots_adjust parameter
- **hspace** (*float*) – plt.subplots_adjust parameter
- **kwargs** – MPL Plotter plotting class keyword arguments for further customization

1.3 Placeholders

class MockData

Bases: `object`

filled_julia(*xyz_2d=False*, *xyz_3d=False*, *df=False*)

spirograph()

sinewave()

waterdrop()

boltzman(*x*, *xmid*, *tau*)

Evaluate the boltzman function with midpoint xmid and time constant tau over x

CHAPTER

TWO

3D

2.1 Placeholders

class MockData

Bases: object

waterdrop3d()

random3d()

hill()

CHAPTER

THREE

PRESETS

3.1 Preset

class preset (*plotter=None*, *dim=None*, *_dict=None*)

Bases: `object`

Preset object class

save (*file*)

Save MPL Plotter preset in TOML format

classmethod load (*file*)

Load MPL Plotter preset from TOML file

class two_d (*preset*)

Bases: `object`

2D preset plotting methods

class line (*x=None*, *y=None*, ***kwargs*)

Bases: `line`

class scatter (*x=None*, *y=None*, ***kwargs*)

Bases: `scatter`

class heatmap (*x=None*, *y=None*, *z=None*, ***kwargs*)

Bases: `heatmap`

class quiver (*x=None*, *y=None*, *u=None*, *v=None*, ***kwargs*)

Bases: `quiver`

class streamline (*x=None*, *y=None*, *u=None*, *v=None*, ***kwargs*)

Bases: `streamline`

class fill_area (*x=None*, *y=None*, *z=None*, ***kwargs*)

Bases: `fill_area`

class three_d(*preset*)

Bases: `object`

3D preset plotting methods

class line(*x=None*, *y=None*, *z=None*, ***kwargs*)

Bases: `line`

class scatter(*x=None*, *y=None*, *z=None*, ***kwargs*)

Bases: `scatter`

class surface(*x=None*, *y=None*, *z=None*, ***kwargs*)

Bases: `surface`

3.2 Precision

3.3 Publication

CHAPTER

FOUR

COLORS

4.1 Color Maps

custom(*red*, *green*, *blue*, *name='coolheat'*, *n=1024*)

Parameters

- **red** – List of (red fraction, y0, y1) tuples
- **green** – List of (red fraction, y0, y1)
- **blue** – List of (red fraction, y0, y1)
- **name** – Colormap name
- **n** – RBG quantization levels

Returns
Colormap

mapstack(*maps*, *fractions=None*, *ranges=None*)

Create a colormap stacking an arbitrary number of conventional Matplotlib colormaps.

Parameters

- **maps** (*list of str*) – List of colormap NAMES
- **fractions** (*list of float*) – For each original colormap, the fraction it'll take of the merged colormap. [0<fr_0<1, …]
- **ranges** (*list of tuple*) – For each original colormap, the range taken. [(0=<min<1, 0<max<=1)_0, …]

Returns
mpl.colors.LinearSegmentedColormap

4.2 Color Schemes

colorscheme_one()

4.3 Methods

complementary(*color*, *fmt='hex'*)

Return complementary of [R, G, B] or hex color.

Parameters

fmt (*string*) – Output format: 'hex' or 'rgb'.

delta(*color*, *factor*, *fmt='hex'*)

Darker or lighten the input color by a percentage of <factor> ([-1, 1]) of the color spectrum (0-255).

Parameters

- **fmt** (*string*) – Output format: 'hex' or 'rgb'.
- **factor** (*float*) – [-1, 1] Measure in which the color will be modified.

PYTHON MODULE INDEX

INDEX

R

S

T

W