MPL Plotter Documentation

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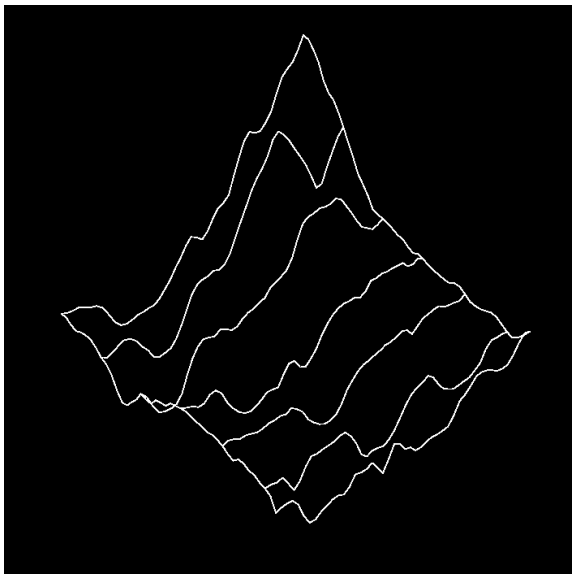

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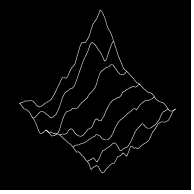

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Making plots for technical documents can be a time sink. MPL Plotter aims to reduce that overhead by allowing you to effortlessly and concisely

- 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 Plotting Methods

class plot

Bases: canvas, guides, framing, text

init()

run()

main()

finish()

class line(*x=None*, *y=None*, *line_width=2*, *color='darkred'*, *cmap='RdBu_r'*, *alpha=None*, *norm=None*, *backend='Qt5Agg'*, *font='serif'*, *font_math='dejavuserif'*, *font_color='black'*, *font_size_increase=0*, *fig=None*, *ax=None*, *figsize=None*, *shape_and_position=111*, *resize_axes=True*, *scale=None*, *aspect=1*, *workspace_color=None*, *workspace_color2=None*, *background_color_figure='white'*, *background_color_plot='white'*, *background_alpha=1*, *style=None*, *light=None*, *dark=None*, *spine_color=None*, *spines_removed=(0, 0, 1, 1)*, *bound_upper_x=None*, *bound_lower_x=None*, *bound_upper_y=None*, *bound_lower_y=None*, *bounds_x=None*, *bounds_y=None*, *pad_demo=False*, *pad_upper_x=0*, *pad_lower_x=0*, *pad_upper_y=0*, *pad_lower_y=0*, *grid=True*, *grid_color='lightgrey'*, *grid_lines='-.'*, *title=None*, *title_size=12*, *title_pad=10*, *title_weight=None*, *title_font=None*, *title_color=None*, *label_x=None*, *label_size_x=12*, *label_pad_x=10*, *label_rotation_x=None*, *label_weight_x=None*, *label_y=None*, *label_size_y=12*, *label_pad_y=10*, *label_rotation_y=None*, *label_weight_y=None*, *tick_number_x=5*, *tick_number_y=5*, *label_coords_x=None*, *label_coords_y=None*, *tick_color=None*, *tick_label_pad=5*, *ticks_where=(1, 1, 0, 0)*, *tick_label_size=10*, *tick_label_size_x=None*, *tick_label_size_y=None*, *tick_bounds_fit=True*, *tick_locations_x=None*, *tick_bounds_x=None*, *tick_locations_y=None*, *tick_bounds_y=None*, *tick_labels_x=None*, *tick_labels_y=None*, *tick_labels_dates_x=False*, *date_format='%Y-%m-%d'*, *tick_label_decimals=1*, *tick_label_decimals_x=None*, *tick_label_decimals_y=None*, *tick_rotation_x=None*, *tick_rotation_y=None*, *tick_labels_where=(1, 1, 0, 0)*, *color_bar=False*, *cb_pad=0.2*, *cb_axis_labelpad=10*, *shrink=0.75*, *extend='neither'*, *cb_title=None*, *cb_orientation='vertical'*, *cb_title_rotation=None*, *cb_title_style='normal'*, *cb_title_size=10*, *cb_title_top_x=0*, *cb_title_top_y=1*, *cb_title_top_pad=None*, *cb_title_side_pad=10*, *cb_title_weight='normal'*, *cb_title_top=True*, *cb_title_side=False*, *cb_vmin=None*, *cb_vmax=None*, *cb_hard_bounds=False*, *cb_outline_width=None*, *cb_tick_number=5*, *cb_ticklabelsize=10*, *cb_tick_label_decimals=None*, *plot_label=None*, *legend=False*, *legend_loc='upper right'*, *legend_bbox_to_anchor=None*, *legend_size=13*, *legend_weight='normal'*, *legend_style='normal'*, *legend_handleheight=None*, *legend_ncol=1*, *show=False*, *zorder=None*, *top=0.93*, *bottom=0.105*, *left=0.165*, *right=0.87*, *hspace=0.2*, *wspace=0.2*, *filename=None*, *dpi=None*, *suppress=True*)

Bases: *plot*

plot()

mock()

class scatter(*x=None*, *y=None*, *scatter_size=5*, *scatter_marker='o'*, *scatter_facecolors=None*, *color='C0'*, *cmap='RdBu_r'*, *alpha=None*, *norm=None*, *backend='Qt5Agg'*, *font='serif'*, *font_math='dejavuserif'*, *font_color='black'*, *font_size_increase=0*, *fig=None*, *ax=None*, *figsize=None*, *shape_and_position=111*, *resize_axes=True*, *scale=None*, *aspect=1*, *workspace_color=None*, *workspace_color2=None*, *background_color_figure='white'*, *background_color_plot='white'*, *background_alpha=1*, *style=None*, *light=None*, *dark=None*, *spine_color=None*, *spines_removed=(0, 0, 1, 1)*, *bound_upper_x=None*, *bound_lower_x=None*, *bound_upper_y=None*, *bound_lower_y=None*, *bounds_x=None*, *bounds_y=None*, *pad_demo=False*, *pad_upper_x=0*, *pad_lower_x=0*, *pad_upper_y=0*, *pad_lower_y=0*, *grid=True*, *grid_color='lightgrey'*, *grid_lines='-.'*, *title=None*, *title_size=12*, *title_pad=10*, *title_weight=None*, *title_font=None*, *title_color=None*, *label_x=None*, *label_size_x=12*, *label_pad_x=10*, *label_rotation_x=None*, *label_weight_x=None*, *label_y=None*, *label_size_y=12*, *label_pad_y=10*, *label_rotation_y=None*, *label_weight_y=None*, *tick_number_x=5*, *tick_number_y=5*, *label_coords_x=None*, *label_coords_y=None*, *tick_color=None*, *tick_label_pad=5*, *ticks_where=(1, 1, 0, 0)*, *tick_label_size=10*, *tick_label_size_x=None*, *tick_label_size_y=None*, *tick_bounds_fit=True*, *tick_locations_x=None*, *tick_bounds_x=None*, *tick_locations_y=None*, *tick_bounds_y=None*, *tick_labels_x=None*, *tick_labels_y=None*, *tick_labels_dates_x=False*, *date_format='%Y-%m-%d'*, *tick_label_decimals=1*, *tick_label_decimals_x=None*, *tick_label_decimals_y=None*, *tick_rotation_x=None*, *tick_rotation_y=None*, *tick_labels_where=(1, 1, 0, 0)*, *color_bar=False*, *cb_pad=0.2*, *cb_axis_labelpad=10*, *shrink=0.75*, *extend='neither'*, *cb_title=None*, *cb_orientation='vertical'*, *cb_title_rotation=None*, *cb_title_style='normal'*, *cb_title_size=10*, *cb_title_top_x=0*, *cb_title_top_y=1*, *cb_title_top_pad=None*, *cb_title_side_pad=10*, *cb_title_weight='normal'*, *cb_title_top=True*, *cb_title_side=False*, *cb_vmin=None*, *cb_vmax=None*, *cb_hard_bounds=False*, *cb_outline_width=None*, *cb_tick_number=5*, *cb_ticklabelsize=10*, *cb_tick_label_decimals=None*, *plot_label=None*, *legend=False*, *legend_loc='upper right'*, *legend_bbox_to_anchor=None*, *legend_size=13*, *legend_weight='normal'*, *legend_style='normal'*, *legend_handleheight=None*, *legend_ncol=1*, *show=False*, *zorder=None*, *top=0.93*, *bottom=0.105*, *left=0.165*, *right=0.87*, *hspace=0.2*, *wspace=0.2*, *filename=None*, *dpi=None*, *suppress=True*)

Bases: *plot*

plot()

mock()

class heatmap(*x=None*, *y=None*, *z=None*, *heatmap_normvariant='SymLog'*, *color=None*, *cmap='RdBu_r'*, *alpha=None*, *norm=None*, *backend='Qt5Agg'*, *font='serif'*, *font_math='dejavuserif'*, *font_color='black'*, *font_size_increase=0*, *fig=None*, *ax=None*, *figsize=None*, *shape_and_position=111*, *resize_axes=True*, *scale=None*, *aspect=1*, *workspace_color=None*, *workspace_color2=None*, *background_color_figure='white'*, *background_color_plot='white'*, *background_alpha=1*, *style=None*, *light=None*, *dark=None*, *spine_color=None*, *spines_removed=(0, 0, 1, 1)*, *bound_upper_x=None*, *bound_lower_x=None*, *bound_upper_y=None*, *bound_lower_y=None*, *bounds_x=None*, *bounds_y=None*, *pad_demo=False*, *pad_upper_x=0*, *pad_lower_x=0*, *pad_upper_y=0*, *pad_lower_y=0*, *grid=True*, *grid_color='lightgrey'*, *grid_lines='-.'*, *title=None*, *title_size=12*, *title_pad=10*, *title_weight=None*, *title_font=None*, *title_color=None*, *label_x=None*, *label_size_x=12*, *label_pad_x=10*, *label_rotation_x=None*, *label_weight_x=None*, *label_y=None*, *label_size_y=12*, *label_pad_y=10*, *label_rotation_y=None*, *label_weight_y=None*, *tick_number_x=5*, *tick_number_y=5*, *label_coords_x=None*, *label_coords_y=None*, *tick_color=None*, *tick_label_pad=5*, *ticks_where=(1, 1, 0, 0)*, *tick_label_size=10*, *tick_label_size_x=None*, *tick_label_size_y=None*, *tick_bounds_fit=True*, *tick_locations_x=None*, *tick_bounds_x=None*, *tick_locations_y=None*, *tick_bounds_y=None*, *tick_labels_x=None*, *tick_labels_y=None*, *tick_labels_dates_x=False*, *date_format='%Y-%m-%d'*, *tick_label_decimals=1*, *tick_label_decimals_x=None*, *tick_label_decimals_y=None*, *tick_rotation_x=None*, *tick_rotation_y=None*, *tick_labels_where=(1, 1, 0, 0)*, *color_bar=False*, *cb_pad=0.2*, *cb_axis_labelpad=10*, *shrink=0.75*, *extend='neither'*, *cb_title=None*, *cb_orientation='vertical'*, *cb_title_rotation=None*, *cb_title_style='normal'*, *cb_title_size=10*, *cb_title_top_x=0*, *cb_title_top_y=1*, *cb_title_top_pad=None*, *cb_title_side_pad=10*, *cb_title_weight='normal'*, *cb_title_top=True*, *cb_title_side=False*, *cb_vmin=None*, *cb_vmax=None*, *cb_hard_bounds=False*, *cb_outline_width=None*, *cb_tick_number=5*, *cb_ticklabelsize=10*, *cb_tick_label_decimals=None*, *plot_label=None*, *legend=False*, *legend_loc='upper right'*, *legend_bbox_to_anchor=None*, *legend_size=13*, *legend_weight='normal'*, *legend_style='normal'*, *legend_handleheight=None*, *legend_ncol=1*, *show=False*, *zorder=None*, *top=0.93*, *bottom=0.105*, *left=0.165*, *right=0.87*, *hspace=0.2*, *wspace=0.2*, *filename=None*, *dpi=None*, *suppress=True*)

Bases: *plot*

plot()

mock()

class quiver(*x=None*, *y=None*, *u=None*, *v=None*, *quiver_rule=None*, *quiver_custom_rule=None*, *quiver_vector_width=0.01*, *quiver_vector_min_shaft=2*, *quiver_vector_length_threshold=0.1*, *color=None*, *cmap='RdBu_r'*, *alpha=None*, *norm=None*, *backend='Qt5Agg'*, *font='serif'*, *font_math='dejavuserif'*, *font_color='black'*, *font_size_increase=0*, *fig=None*, *ax=None*, *figsize=None*, *shape_and_position=111*, *resize_axes=True*, *scale=None*, *aspect=1*, *workspace_color=None*, *workspace_color2=None*, *background_color_figure='white'*, *background_color_plot='white'*, *background_alpha=1*, *style=None*, *light=None*, *dark=None*, *spine_color=None*, *spines_removed=(0, 0, 1, 1)*, *bound_upper_x=None*, *bound_lower_x=None*, *bound_upper_y=None*, *bound_lower_y=None*, *bounds_x=None*, *bounds_y=None*, *pad_demo=False*, *pad_upper_x=0*, *pad_lower_x=0*, *pad_upper_y=0*, *pad_lower_y=0*, *grid=True*, *grid_color='lightgrey'*, *grid_lines='-.'*, *title=None*, *title_size=12*, *title_pad=10*, *title_weight=None*, *title_font=None*, *title_color=None*, *label_x=None*, *label_size_x=12*, *label_pad_x=10*, *label_rotation_x=None*, *label_weight_x=None*, *label_y=None*, *label_size_y=12*, *label_pad_y=10*, *label_rotation_y=None*, *label_weight_y=None*, *tick_number_x=5*, *tick_number_y=5*, *label_coords_x=None*, *label_coords_y=None*, *tick_color=None*, *tick_label_pad=5*, *ticks_where=(1, 1, 0, 0)*, *tick_label_size=10*, *tick_label_size_x=None*, *tick_label_size_y=None*, *tick_bounds_fit=True*, *tick_locations_x=None*, *tick_bounds_x=None*, *tick_locations_y=None*, *tick_bounds_y=None*, *tick_labels_x=None*, *tick_labels_y=None*, *tick_labels_dates_x=False*, *date_format='%Y-%m-%d'*, *tick_label_decimals=1*, *tick_label_decimals_x=None*, *tick_label_decimals_y=None*, *tick_rotation_x=None*, *tick_rotation_y=None*, *tick_labels_where=(1, 1, 0, 0)*, *color_bar=False*, *cb_pad=0.2*, *cb_axis_labelpad=10*, *shrink=0.75*, *extend='neither'*, *cb_title=None*, *cb_orientation='vertical'*, *cb_title_rotation=None*, *cb_title_style='normal'*, *cb_title_size=10*, *cb_title_top_x=0*, *cb_title_top_y=1*, *cb_title_top_pad=None*, *cb_title_side_pad=10*, *cb_title_weight='normal'*, *cb_title_top=True*, *cb_title_side=False*, *cb_vmin=None*, *cb_vmax=None*, *cb_hard_bounds=False*, *cb_outline_width=None*, *cb_tick_number=5*, *cb_ticklabelsize=10*, *cb_tick_label_decimals=None*, *plot_label=None*, *legend=False*, *legend_loc='upper right'*, *legend_bbox_to_anchor=None*, *legend_size=13*, *legend_weight='normal'*, *legend_style='normal'*, *legend_handleheight=None*, *legend_ncol=1*, *show=False*, *zorder=None*, *top=0.93*, *bottom=0.105*, *left=0.165*, *right=0.87*, *hspace=0.2*, *wspace=0.2*, *filename=None*, *dpi=None*, *suppress=True*)

Bases: *plot*

plot()

mock()

method_rule()

class streamline(*x=None*, *y=None*, *u=None*, *v=None*, *streamline_line_width=1*, *streamline_line_density=2*, *color=None*, *cmap='RdBu_r'*, *alpha=None*, *norm=None*, *backend='Qt5Agg'*, *font='serif'*, *font_math='dejavuserif'*, *font_color='black'*, *font_size_increase=0*, *fig=None*, *ax=None*, *figsize=None*, *shape_and_position=111*, *resize_axes=True*, *scale=None*, *aspect=1*, *workspace_color=None*, *workspace_color2=None*, *background_color_figure='white'*, *background_color_plot='white'*, *background_alpha=1*, *style=None*, *light=None*, *dark=None*, *spine_color=None*, *spines_removed=(0, 0, 1, 1)*, *bound_upper_x=None*, *bound_lower_x=None*, *bound_upper_y=None*, *bound_lower_y=None*, *bounds_x=None*, *bounds_y=None*, *pad_demo=False*, *pad_upper_x=0*, *pad_lower_x=0*, *pad_upper_y=0*, *pad_lower_y=0*, *grid=True*, *grid_color='lightgrey'*, *grid_lines='-.'*, *title=None*, *title_size=12*, *title_pad=10*, *title_weight=None*, *title_font=None*, *title_color=None*, *label_x=None*, *label_size_x=12*, *label_pad_x=10*, *label_rotation_x=None*, *label_weight_x=None*, *label_y=None*, *label_size_y=12*, *label_pad_y=10*, *label_rotation_y=None*, *label_weight_y=None*, *tick_number_x=5*, *tick_number_y=5*, *label_coords_x=None*, *label_coords_y=None*, *tick_color=None*, *tick_label_pad=5*, *ticks_where=(1, 1, 0, 0)*, *tick_label_size=10*, *tick_label_size_x=None*, *tick_label_size_y=None*, *tick_bounds_fit=True*, *tick_locations_x=None*, *tick_bounds_x=None*, *tick_locations_y=None*, *tick_bounds_y=None*, *tick_labels_x=None*, *tick_labels_y=None*, *tick_labels_dates_x=False*, *date_format='%Y-%m-%d'*, *tick_label_decimals=1*, *tick_label_decimals_x=None*, *tick_label_decimals_y=None*, *tick_rotation_x=None*, *tick_rotation_y=None*, *tick_labels_where=(1, 1, 0, 0)*, *color_bar=False*, *cb_pad=0.2*, *cb_axis_labelpad=10*, *shrink=0.75*, *extend='neither'*, *cb_title=None*, *cb_orientation='vertical'*, *cb_title_rotation=None*, *cb_title_style='normal'*, *cb_title_size=10*, *cb_title_top_x=0*, *cb_title_top_y=1*, *cb_title_top_pad=None*, *cb_title_side_pad=10*, *cb_title_weight='normal'*, *cb_title_top=True*, *cb_title_side=False*, *cb_vmin=None*, *cb_vmax=None*, *cb_hard_bounds=False*, *cb_outline_width=None*, *cb_tick_number=5*, *cb_ticklabelsize=10*, *cb_tick_label_decimals=None*, *plot_label=None*, *legend=False*, *legend_loc='upper right'*, *legend_bbox_to_anchor=None*, *legend_size=13*, *legend_weight='normal'*, *legend_style='normal'*, *legend_handleheight=None*, *legend_ncol=1*, *show=False*, *zorder=None*, *top=0.93*, *bottom=0.105*, *left=0.165*, *right=0.87*, *hspace=0.2*, *wspace=0.2*, *filename=None*, *dpi=None*, *suppress=True*)

Bases: *plot*

plot()

mock()

method_rule()

class fill_area(*x=None*, *y=None*, *z=None*, *fill_area_between=False*, *fill_area_below=False*, *fill_area_above=False*, *color=None*, *cmap='RdBu_r'*, *alpha=None*, *norm=None*, *backend='Qt5Agg'*, *font='serif'*, *font_math='dejavuserif'*, *font_color='black'*, *font_size_increase=0*, *fig=None*, *ax=None*, *figsize=None*, *shape_and_position=111*, *resize_axes=True*, *scale=None*, *aspect=1*, *workspace_color=None*, *workspace_color2=None*, *background_color_figure='white'*, *background_color_plot='white'*, *background_alpha=1*, *style=None*, *light=None*, *dark=None*, *spine_color=None*, *spines_removed=(0, 0, 1, 1)*, *bound_upper_x=None*, *bound_lower_x=None*, *bound_upper_y=None*, *bound_lower_y=None*, *bounds_x=None*, *bounds_y=None*, *pad_demo=False*, *pad_upper_x=0*, *pad_lower_x=0*, *pad_upper_y=0*, *pad_lower_y=0*, *grid=True*, *grid_color='lightgrey'*, *grid_lines='-.'*, *title=None*, *title_size=12*, *title_pad=10*, *title_weight=None*, *title_font=None*, *title_color=None*, *label_x=None*, *label_size_x=12*, *label_pad_x=10*, *label_rotation_x=None*, *label_weight_x=None*, *label_y=None*, *label_size_y=12*, *label_pad_y=10*, *label_rotation_y=None*, *label_weight_y=None*, *tick_number_x=5*, *tick_number_y=5*, *label_coords_x=None*, *label_coords_y=None*, *tick_color=None*, *tick_label_pad=5*, *ticks_where=(1, 1, 0, 0)*, *tick_label_size=10*, *tick_label_size_x=None*, *tick_label_size_y=None*, *tick_bounds_fit=True*, *tick_locations_x=None*, *tick_bounds_x=None*, *tick_locations_y=None*, *tick_bounds_y=None*, *tick_labels_x=None*, *tick_labels_y=None*, *tick_labels_dates_x=False*, *date_format='%Y-%m-%d'*, *tick_label_decimals=1*, *tick_label_decimals_x=None*, *tick_label_decimals_y=None*, *tick_rotation_x=None*, *tick_rotation_y=None*, *tick_labels_where=(1, 1, 0, 0)*, *color_bar=False*, *cb_pad=0.2*, *cb_axis_labelpad=10*, *shrink=0.75*, *extend='neither'*, *cb_title=None*, *cb_orientation='vertical'*, *cb_title_rotation=None*, *cb_title_style='normal'*, *cb_title_size=10*, *cb_title_top_x=0*, *cb_title_top_y=1*, *cb_title_top_pad=None*, *cb_title_side_pad=10*, *cb_title_weight='normal'*, *cb_title_top=True*, *cb_title_side=False*, *cb_vmin=None*, *cb_vmax=None*, *cb_hard_bounds=False*, *cb_outline_width=None*, *cb_tick_number=5*, *cb_ticklabelsize=10*, *cb_tick_label_decimals=None*, *plot_label=None*, *legend=False*, *legend_loc='upper right'*, *legend_bbox_to_anchor=None*, *legend_size=13*, *legend_weight='normal'*, *legend_style='normal'*, *legend_handleheight=None*, *legend_ncol=1*, *show=False*, *zorder=None*, *top=0.93*, *bottom=0.105*, *left=0.165*, *right=0.87*, *hspace=0.2*, *wspace=0.2*, *filename=None*, *dpi=None*, *suppress=True*)

Bases: *plot*

plot()

Fill the region below the intersection of S and Z

i_below()

i_above()

intersection()

mock()

1.2 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

1.3 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

1.4 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 Plotting Methods

class plot

Bases: canvas, guides, framing, text

init()

run()

main()

finish()

class line(*x=None*, *y=None*, *z=None*, *line_width=5*, *line_alpha=1*, *color='darkred'*, *cmap='RdBu_r'*, *scale_x=None*, *scale_y=None*, *scale_z=None*, *backend='Qt5Agg'*, *font='serif'*, *font_math='dejavuserif'*, *font_color='black'*, *font_size_increase=0*, *fig=None*, *ax=None*, *figsize=(5, 4)*, *shape_and_position=111*, *azim=- 138*, *elev=19*, *remove_axis=None*, *prune=None*, *resize_axes=True*, *aspect_equal=False*, *box_to_plot_pad=10*, *spines_juggled=(1, 0, 2)*, *spine_color=None*, *blend_edges=False*, *workspace_color=None*, *workspace_color2=None*, *background_color_figure='white'*, *background_color_plot='white'*, *background_alpha=1*, *style=None*, *light=None*, *dark=None*, *pane_fill=None*, *bound_upper_x=None*, *bound_lower_x=None*, *bound_upper_y=None*, *bound_lower_y=None*, *bound_upper_z=None*, *bound_lower_z=None*, *bounds_x=None*, *bounds_y=None*, *bounds_z=None*, *pad_demo=False*, *pad_upper_x=0*, *pad_lower_x=0*, *pad_upper_y=0*, *pad_lower_y=0*, *pad_upper_z=0*, *pad_lower_z=0*, *show_axes=True*, *grid=True*, *grid_color='lightgrey'*, *grid_lines='-.'*, *title=None*, *title_weight='normal'*, *title_size=12*, *title_y=1.025*, *title_color=None*, *title_font=None*, *label_x='x'*, *label_weight_x='normal'*, *label_size_x=12*, *label_pad_x=7*, *label_rotation_x=None*, *label_y='y'*, *label_weight_y='normal'*, *label_size_y=12*, *label_pad_y=7*, *label_rotation_y=None*, *label_z='z'*, *label_weight_z='normal'*, *label_size_z=12*, *label_pad_z=7*, *label_rotation_z=None*, *tick_color=None*, *tick_number_x=5*, *tick_labels_x=None*, *tick_bounds_x=None*, *tick_rotation_x=None*, *tick_number_y=5*, *tick_labels_y=None*, *tick_bounds_y=None*, *tick_rotation_y=None*, *tick_number_z=5*, *tick_labels_z=None*, *tick_bounds_z=None*, *tick_rotation_z=None*, *tick_label_size=10*, *tick_label_decimals=1*, *tick_label_pad_x=4*, *tick_label_decimals_x=None*, *tick_label_size_x=None*, *tick_label_pad_y=4*, *tick_label_decimals_y=None*, *tick_label_size_y=None*, *tick_label_pad_z=4*, *tick_label_decimals_z=None*, *tick_label_size_z=None*, *plot_label=None*, *legend=False*, *legend_loc='upper right'*, *legend_size=13*, *legend_weight='normal'*, *legend_style='normal'*, *legend_handleheight=None*, *legend_columns=1*, *show=False*, *top=0.975*, *bottom=0.085*, *left=0.14*, *right=0.945*, *hspace=0.2*, *wspace=0.2*, *filename=None*, *dpi=None*, *suppress=True*)

Bases: *plot*

plot()

mock()

class scatter(*x=None*, *y=None*, *z=None*, *scatter_size=30*, *scatter_marker='o'*, *scatter_facecolors=None*, *color_rule=None*, *scatter_alpha=1*, *color='darkred'*, *cmap='RdBu_r'*, *color_bar=False*, *cb_orientation='vertical'*, *shrink=0.75*, *extend='neither'*, *cb_vmin=None*, *cb_vmax=None*, *cb_bounds_hard=False*, *cb_pad=0.1*, *cb_outline_width=None*, *cb_tick_number=5*, *cb_tick_label_decimals=5*, *cb_tick_label_size=10*, *cb_tick_label_pad=10*, *cb_title=None*, *cb_title_top=True*, *cb_title_y=False*, *cb_title_top_x=0*, *cb_title_top_y=1*, *cb_title_pad=10*, *cb_title_weight='normal'*, *cb_title_rotation=None*, *cb_title_style='normal'*, *cb_title_size=10*, *scale_x=None*, *scale_y=None*, *scale_z=None*, *backend='Qt5Agg'*, *font='serif'*, *font_math='dejavuserif'*, *font_color='black'*, *font_size_increase=0*, *fig=None*, *ax=None*, *figsize=(5, 4)*, *shape_and_position=111*, *azim=- 138*, *elev=19*, *remove_axis=None*, *prune=None*, *resize_axes=True*, *aspect_equal=False*, *box_to_plot_pad=10*, *spines_juggled=(1, 0, 2)*, *spine_color=None*, *blend_edges=False*, *workspace_color=None*, *workspace_color2=None*, *background_color_figure='white'*, *background_color_plot='white'*, *background_alpha=1*, *style=None*, *light=None*, *dark=None*, *pane_fill=None*, *bound_upper_x=None*, *bound_lower_x=None*, *bound_upper_y=None*, *bound_lower_y=None*, *bound_upper_z=None*, *bound_lower_z=None*, *bounds_x=None*, *bounds_y=None*, *bounds_z=None*, *pad_demo=False*, *pad_upper_x=0*, *pad_lower_x=0*, *pad_upper_y=0*, *pad_lower_y=0*, *pad_upper_z=0*, *pad_lower_z=0*, *show_axes=True*, *grid=True*, *grid_color='lightgrey'*, *grid_lines='-.'*, *title=None*, *title_weight='normal'*, *title_size=12*, *title_y=1.025*, *title_color=None*, *title_font=None*, *label_x='x'*, *label_weight_x='normal'*, *label_size_x=12*, *label_pad_x=7*, *label_rotation_x=None*, *label_y='y'*, *label_weight_y='normal'*, *label_size_y=12*, *label_pad_y=7*, *label_rotation_y=None*, *label_z='z'*, *label_weight_z='normal'*, *label_size_z=12*, *label_pad_z=7*, *label_rotation_z=None*, *tick_color=None*, *tick_number_x=5*, *tick_labels_x=None*, *tick_bounds_x=None*, *tick_rotation_x=None*, *tick_number_y=5*, *tick_labels_y=None*, *tick_bounds_y=None*, *tick_rotation_y=None*, *tick_number_z=5*, *tick_labels_z=None*, *tick_bounds_z=None*, *tick_rotation_z=None*, *tick_label_size=10*, *tick_label_decimals=1*, *tick_label_pad_x=4*, *tick_label_decimals_x=None*, *tick_label_size_x=None*, *tick_label_pad_y=4*, *tick_label_decimals_y=None*, *tick_label_size_y=None*, *tick_label_pad_z=4*, *tick_label_decimals_z=None*, *tick_label_size_z=None*, *plot_label=None*, *legend=False*, *legend_loc='upper right'*, *legend_size=13*, *legend_weight='normal'*, *legend_style='normal'*, *legend_handleheight=None*, *legend_columns=1*, *show=False*, *top=0.975*, *bottom=0.085*, *left=0.14*, *right=0.945*, *hspace=0.2*, *wspace=0.2*, *filename=None*, *dpi=None*, *suppress=True*)

Bases: *plot*

plot()

mock()

class surface(*x=None*, *y=None*, *z=None*, *surface_rstride=1*, *surface_cstride=1*, *surface_wire_width=0.1*, *surface_lighting=False*, *surface_antialiased=False*, *surface_shade=False*, *surface_alpha=1*, *surface_cmap_lighting=None*, *surface_norm=None*, *surface_edge_color='black'*, *surface_edges_to_rgba=False*, *cmap='RdBu_r'*, *color=None*, *color_rule=None*, *color_bar=False*, *cb_orientation='vertical'*, *shrink=0.75*, *extend='neither'*, *cb_vmin=None*, *cb_vmax=None*, *cb_bounds_hard=False*, *cb_pad=0.1*, *cb_outline_width=None*, *cb_tick_number=5*, *cb_tick_label_decimals=5*, *cb_tick_label_size=10*, *cb_tick_label_pad=10*, *cb_title=None*, *cb_title_top=True*, *cb_title_y=False*, *cb_title_top_x=0*, *cb_title_top_y=1*, *cb_title_pad=10*, *cb_title_weight='normal'*, *cb_title_rotation=None*, *cb_title_style='normal'*, *cb_title_size=10*, *scale_x=None*, *scale_y=None*, *scale_z=None*, *backend='Qt5Agg'*, *font='serif'*, *font_math='dejavuserif'*, *font_color='black'*, *font_size_increase=0*, *fig=None*, *ax=None*, *figsize=(5, 4)*, *shape_and_position=111*, *azim=- 138*, *elev=19*, *remove_axis=None*, *prune=None*, *resize_axes=True*, *aspect_equal=False*, *box_to_plot_pad=10*, *spines_juggled=(1, 0, 2)*, *spine_color=None*, *blend_edges=False*, *workspace_color=None*, *workspace_color2=None*, *background_color_figure='white'*, *background_color_plot='white'*, *background_alpha=1*, *style=None*, *light=None*, *dark=None*, *pane_fill=None*, *bound_upper_x=None*, *bound_lower_x=None*, *bound_upper_y=None*, *bound_lower_y=None*, *bound_upper_z=None*, *bound_lower_z=None*, *bounds_x=None*, *bounds_y=None*, *bounds_z=None*, *pad_demo=False*, *pad_upper_x=0*, *pad_lower_x=0*, *pad_upper_y=0*, *pad_lower_y=0*, *pad_upper_z=0*, *pad_lower_z=0*, *show_axes=True*, *grid=True*, *grid_color='lightgrey'*, *grid_lines='-.'*, *title=None*, *title_weight='normal'*, *title_size=12*, *title_y=1.025*, *title_color=None*, *title_font=None*, *label_x='x'*, *label_weight_x='normal'*, *label_size_x=12*, *label_pad_x=7*, *label_rotation_x=None*, *label_y='y'*, *label_weight_y='normal'*, *label_size_y=12*, *label_pad_y=7*, *label_rotation_y=None*, *label_z='z'*, *label_weight_z='normal'*, *label_size_z=12*, *label_pad_z=7*, *label_rotation_z=None*, *tick_color=None*, *tick_number_x=5*, *tick_labels_x=None*, *tick_bounds_x=None*, *tick_rotation_x=None*, *tick_number_y=5*, *tick_labels_y=None*, *tick_bounds_y=None*, *tick_rotation_y=None*, *tick_number_z=5*, *tick_labels_z=None*, *tick_bounds_z=None*, *tick_rotation_z=None*, *tick_label_size=10*, *tick_label_decimals=1*, *tick_label_pad_x=4*, *tick_label_decimals_x=None*, *tick_label_size_x=None*, *tick_label_pad_y=4*, *tick_label_decimals_y=None*, *tick_label_size_y=None*, *tick_label_pad_z=4*, *tick_label_decimals_z=None*, *tick_label_size_z=None*, *plot_label=None*, *legend=False*, *legend_loc='upper right'*, *legend_size=13*, *legend_weight='normal'*, *legend_style='normal'*, *legend_handleheight=None*, *legend_columns=1*, *show=False*, *top=0.975*, *bottom=0.085*, *left=0.14*, *right=0.945*, *hspace=0.2*, *wspace=0.2*, *filename=None*, *dpi=None*, *suppress=True*)

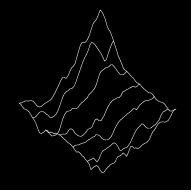
Bases: *plot*

plot()

mock()

method_lighting()

method_edges_to_rgba()



2.2 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.

CHAPTER

FIVE

INTERNAL METHODS

5.1 Common

method_backend(*plot*)

method_figure(*plot*)

method_fonts(*plot*)

For context, Matplotlib's typesetting works as follows.

- **Five typeface families are defined: *serif*, *cursive*, *sans-serif*,** *monospace* and *fantasy*.
- Each family has a **list of typefaces** associated with it.
- **The user then chooses a family to typeset a plot, and the first typeface** in the family's typeface list found in the user's system is used to do so.

Matplotlib allows users to modify the **lists of typefaces** of each family through its *runtime configuration (rc) dictionary, ``matplotlib.rcParams`` <*https://matplotlib.org/stable/tutorials/introductory/customizing.html>`_. This dictionary will be referred to as `rcParams`.

MPL Plotter sets lists of its own for each of the typeface families, as well as choosing a *default* and *fallback* typeface for math.

The typesetting of text in MPL Plotter is defined by two parameters:

- `font`
- `font_math`

Furthermore, MPL Plotter allows the user to set the default color for all text, including title, labels and floating text, with the parameter `font_color`.

font

If the `font` attribute of the plot is **one of these families**, `rcParams` `font.family` entry will be set to `plot.font`, thereby making the **first found typeface** of the `plot.font` *family* typeface list the chosen typeface for text in your plot.

Otherwise, that is, if the `font` attribute of the plot is **not** one of the families, the provided `font` will be `insert``ed to the *serif* family typeface list, and the ``rcParams font.family` entry will be set to *serif*, thereby making the provided `font` the chosen typeface for text in the plot.

font_math

The `font_math` attribute of the plot determines the typeface used for math through the `rcParams 'mathtext.fontset` entry, and it may take the following values:

- `cm` (Computer Modern)
- `dejavusans`
- `dejavuserif`
- `stix`
- `stixsans`

Lastly, Matplotlib allows users to choose the typeface of bold, calligraphic, italic and other highlight typefaces for rendered math. MPL Plotter does not provide an interface for this, but it can be done my manually setting the value of the following entries in `rcParams`:

- `mathtext.bf`
- `mathtext.cal`
- `mathtext.it`
- `mathtext.rm`
- `mathtext.sf`
- `mathtext.tt`

font_color

The default text color, set through the `rcParams text.color` and `axis.labelcolor` entries, may be overridden, and MPL Plotter offers the `title_color` argument to that effect in the case of titles. To override the color of tick and axis labels or other text in a plot please consult the Matplotlib documentation. As long as you do **not** set `show=True` in the call to an MPL Plotter plotting class, you are free to continue customization afterwards, including but not limited to text color.

`method_workspace_style`(*plot*)

`method_background_color`(*plot*)

`method_subplots_adjust`(*plot*)

`method_save`(*plot*)

`method_show`(*plot*)

5.2 2D Methods

method_setup (*plot*)

method_spines (*plot*)

method_resize_axes (*plot*)

method_cb (*plot*)

method_grid (*plot*)

method_legend (*plot*)

method_tick_locs (*plot*)

method_tick_labels (*plot*)

method_title (*plot*)

method_axis_labels (*plot*)

5.3 3D Methods

method_setup (*plot*)

method_spines (*plot*)

method_pane_fill (*plot*)

method_remove_axes (*plot*)

method_scale (*plot*)

method_resize_axes (*plot*)

method_cb (*plot*)

method_grid (*plot*)

method_legend (*plot*)

method_tick_locs (*plot*)

method_tick_labels (*plot*)

method_title (*plot*)

method_axis_labels (*plot*)

PYTHON MODULE INDEX

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