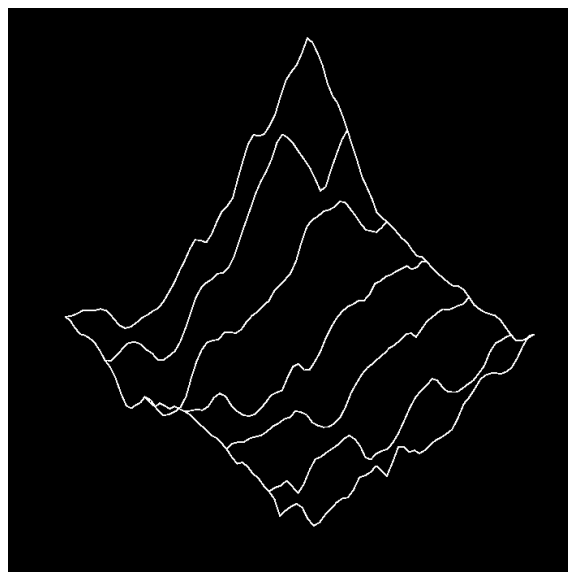


# MPL Plotter Documentation

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July 2022





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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!



## 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=17, title_pad=20, title_weight=None, title_font='Latin Modern Roman',
            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_ymin=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=17,
               title_pad=20, title_weight=None, title_font='Latin Modern Roman', 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=17,
              title_pad=20, title_weight=None, title_font='Latin Modern Roman', 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=17,
             title_pad=20, title_weight=None, title_font='Latin Modern Roman', 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=17, title_pad=20, title_weight=None,
                  title_font='Latin Modern Roman', 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=17, title_pad=20, title_weight=None, title_font='Latin Modern Roman',
    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



## 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, azimuth=-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='Latin Modern
            Roman', 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='Latin Modern Roman', 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='Latin Modern Roman', 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()
```

### 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

## 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** – RGB 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.

## 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 inserted 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 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*)



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