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matplotlib.pyplot.plot

matplotlib.pyplot.plot(**args*, *scalex=True*, *scaley=True*, *data=None*, ***kwargs*) [source]

Plot y versus x as lines and/or markers.

Call signatures:

```
plot([x], y, [fmt], *, data=None, **kwargs)
plot([x], y, [fmt], [x2], y2, [fmt2], ..., **kwargs)
```

The coordinates of the points or line nodes are given by *x*, *y*.

The optional parameter *fmt* is a convenient way for defining basic formatting like color, marker and linestyle. It's a shortcut string notation described in the *Notes* section below.

```
>>> plot(x, y)        # plot x and y using default line style and color
>>> plot(x, y, 'bo')  # plot x and y using blue circle markers
>>> plot(y)           # plot y using x as index array 0..N-1
>>> plot(y, 'r+')     # ditto, but with red plusses
```

You can use **Line2D** properties as keyword arguments for more control on the appearance. Line properties and *fmt* can be mixed. The following two calls yield identical results:

```
>>> plot(x, y, 'go--', linewidth=2, markersize=12)
>>> plot(x, y, color='green', marker='o', linestyle='dashed',
...      linewidth=2, markersize=12)
```

When conflicting with *fmt*, keyword arguments take precedence.

Plotting labelled data

There's a convenient way for plotting objects with labelled data (i.e. data that can be accessed by index `obj['y']`). Instead of giving the data in *x* and *y*, you can provide the object in the *data* parameter and just give the labels for *x* and *y*:

```
>>> plot('xlabel', 'ylabel', data=obj)
```

All indexable objects are supported. This could e.g. be a **dict**, a **pandas.DataFrame** or a structured numpy array.

Plotting multiple sets of data

There are various ways to plot multiple sets of data.

- The most straight forward way is just to call **plot** multiple times. Example:

  ```
  >>> plot(x1, y1, 'bo')
  >>> plot(x2, y2, 'go')
  ```

- If *x* and/or *y* are 2D arrays a separate data set will be drawn for every column. If both *x* and *y* are 2D, they must have the same shape. If only one of them is 2D with shape (N, m) the other must have length N and will be used for every data set m.

  Example:

  ```
  >>> x = [1, 2, 3]
  >>> y = np.array([[1, 2], [3, 4], [5, 6]])
  >>> plot(x, y)
  ```

is equivalent to:

```
>>> for col in range(y.shape[1]):
...     plot(x, y[:, col])
```

- The third way is to specify multiple sets of *[x]*, *y*, *[fmt]* groups:

```
>>> plot(x1, y1, 'g^', x2, y2, 'g-')
```

In this case, any additional keyword argument applies to all datasets. Also this syntax cannot be combined with the *data* parameter.

By default, each line is assigned a different style specified by a 'style cycle'. The *fmt* and line property parameters are only necessary if you want explicit deviations from these defaults. Alternatively, you can also change the style cycle using `rcParams["axes.prop_cycle"]` (default: `cycler('color', ['#1f77b4', '#ff7f0e', '#2ca02c', '#d62728', '#9467bd', '#8c564b', '#e377c2', '#7f7f7f', '#bcbd22', '#17becf'])`).

Parameters:

x, y : *array-like or scalar*

The horizontal / vertical coordinates of the data points. *x* values are optional and default to `range(len(y))`.
Commonly, these parameters are 1D arrays.
They can also be scalars, or two-dimensional (in that case, the columns represent separate data sets).
These arguments cannot be passed as keywords.

fmt : *str, optional*

A format string, e.g. 'ro' for red circles. See the *Notes* section for a full description of the format strings.
Format strings are just an abbreviation for quickly setting basic line properties. All of these and more can also be controlled by keyword arguments.
This argument cannot be passed as keyword.

data : *indexable object, optional*

An object with labelled data. If given, provide the label names to plot in *x* and *y*.

> **Note**
>
> Technically there's a slight ambiguity in calls where the second label is a valid *fmt*. `plot('n', 'o', data=obj)` could be `plt(x, y)` or `plt(y, fmt)`. In such cases, the former interpretation is chosen, but a warning is issued. You may suppress the warning by adding an empty format string `plot('n', 'o', '', data=obj)`.

Returns:

list of `Line2D`

A list of lines representing the plotted data.

Other Parameters: **scalex, scaley** : *bool, default: True*

These parameters determine if the view limits are adapted to the data limits. The values are passed on to `autoscale_view`.

****kwargs** : *Line2D properties, optional*

kwargs are used to specify properties like a line label (for auto legends), linewidth, antialiasing, marker face color. Example:

```
>>> plot([1, 2, 3], [1, 2, 3], 'go-', label='line 1',
linewidth=2)
>>> plot([1, 2, 3], [1, 4, 9], 'rs', label='line 2')
```

If you specify multiple lines with one plot call, the kwargs apply to all those lines. In case the label object is iterable, each element is used as labels for each set of data.

Here is a list of available `Line2D` properties:

Property	Description
`agg_filter`	a filter function, which takes a (m, n, 3) float array and a dpi value, and returns a (m, n, 3) array
`alpha`	scalar or None
`animated`	bool
`antialiased` or aa	bool
`clip_box`	`Bbox`
`clip_on`	bool
`clip_path`	Patch or (Path, Transform) or None
`color` or c	color
`dash_capstyle`	`CapStyle` or {'butt', 'projecting', 'round'}
`dash_joinstyle`	`JoinStyle` or {'miter', 'round', 'bevel'}
`dashes`	sequence of floats (on/off ink in points) or (None, None)
`data`	(2, N) array or two 1D arrays
`drawstyle` or ds	{'default', 'steps', 'steps-pre', 'steps-mid', 'steps-post'}, default: 'default'
`figure`	`Figure`
`fillstyle`	{'full', 'left', 'right', 'bottom', 'top', 'none'}
`gid`	str
`in_layout`	bool
`label`	object
`linestyle` or ls	{'-', '--', '-.', ':', '', (offset, on-off-seq), ...}
`linewidth` or lw	float
`marker`	marker style string, `Path` or `MarkerStyle`
`markeredgecolor` or mec	color
`markeredgewidth` or mew	float
`markerfacecolor` or mfc	color
`markerfacecoloralt` or mfcalt	color
`markersize` or ms	float
`markevery`	None or int or (int, int) or slice or

	list[int] or float or (float, float) or list[bool]
path_effects	AbstractPathEffect
picker	float or callable[[Artist, Event], tuple[bool, dict]]
pickradius	float
sketch_params	(scale: float, length: float, randomness: float)
snap	bool or None
solid_capstyle	CapStyle or {'butt', 'projecting', 'round'}
solid_joinstyle	JoinStyle or {'miter', 'round', 'bevel'}
transform	unknown
url	str
xdata	1D array
ydata	1D array
zorder	float

See also

scatter
: XY scatter plot with markers of varying size and/or color (sometimes also called bubble chart).

Notes

Format Strings

A format string consists of a part for color, marker and line:

```
fmt = '[marker][line][color]'
```

Each of them is optional. If not provided, the value from the style cycle is used. Exception: If `line` is given, but no `marker`, the data will be a line without markers.

Other combinations such as `[color][marker][line]` are also supported, but note that their parsing may be ambiguous.

Markers

character	description
'.'	point marker
','	pixel marker
'o'	circle marker
'v'	triangle_down marker
'^'	triangle_up marker
'<'	triangle_left marker
'>'	triangle_right marker

character	description
'1'	tri_down marker
'2'	tri_up marker
'3'	tri_left marker
'4'	tri_right marker
'8'	octagon marker
's'	square marker
'p'	pentagon marker
'P'	plus (filled) marker
'*'	star marker
'h'	hexagon1 marker
'H'	hexagon2 marker
'+'	plus marker
'x'	x marker
'X'	x (filled) marker
'D'	diamond marker
'd'	thin_diamond marker
'|'	vline marker
'_'	hline marker

Line Styles

character	description
'-'	solid line style
'--'	dashed line style
'-.'	dash-dot line style
':'	dotted line style

Example format strings:

```
'b'    # blue markers with default shape
'or'   # red circles
'-g'   # green solid line
'--'   # dashed line with default color
'^k:'  # black triangle_up markers connected by a dotted line
```

Colors

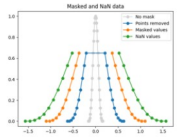
The supported color abbreviations are the single letter codes

character	color
`'b'`	blue
`'g'`	green
`'r'`	red
`'c'`	cyan
`'m'`	magenta
`'y'`	yellow
`'k'`	black
`'w'`	white

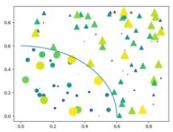
and the `'CN'` colors that index into the default property cycle.

If the color is the only part of the format string, you can additionally use any **`matplotlib.colors`** spec, e.g. full names (`'green'`) or hex strings (`'#008000'`).

Examples using `matplotlib.pyplot.plot`

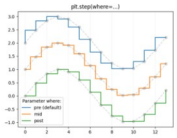


Plotting masked and NaN values

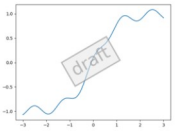


Scatter Masked

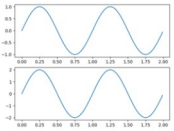
Stairs Demo



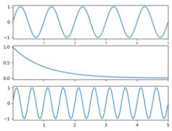
Step Demo



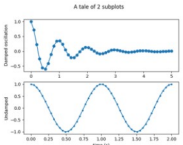
Custom Figure subclasses



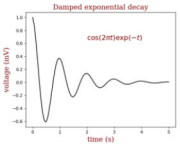
Managing multiple figures in pyplot



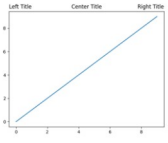
Shared Axis

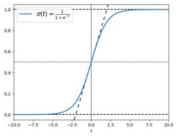


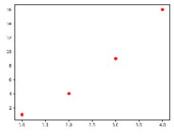
Multiple subplots

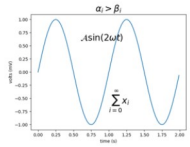


Controlling style of text and labels using a dictionary

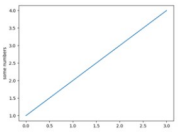




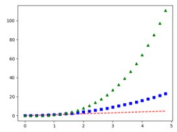




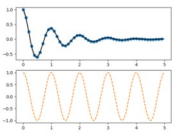
Pyplot Mathtext



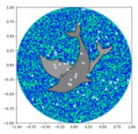
Pyplot Simple



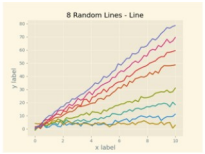
Pyplot Three



Pyplot Two Subplots

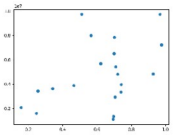


Dolphins

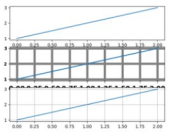


Solarized Light stylesheet

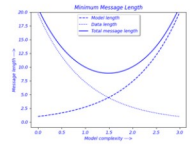
Frame grabbing



Coords Report



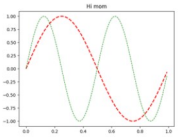
Customize Rc



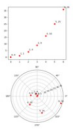
Findobj Demo

Multipage PDF

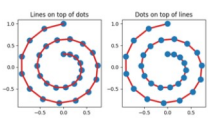
Print Stdout



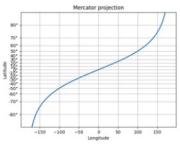
Set and get properties



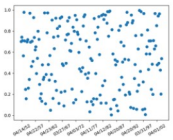
transforms.offset_copy



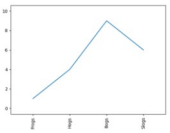
Zorder Demo



Custom scale



Placing date ticks using

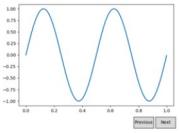


Rotating custom tick

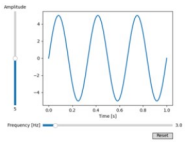
recurrence rules

labels

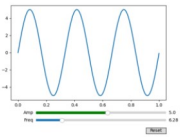
Tool Manager



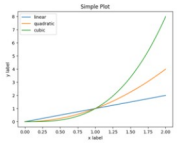
Buttons



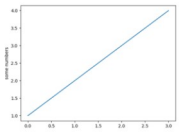
Slider



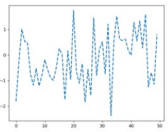
Snapping Sliders to Discrete Values



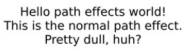
Usage Guide



Pyplot tutorial



Customizing Matplotlib with style sheets and rcParams



Path effects guide