



Quick start

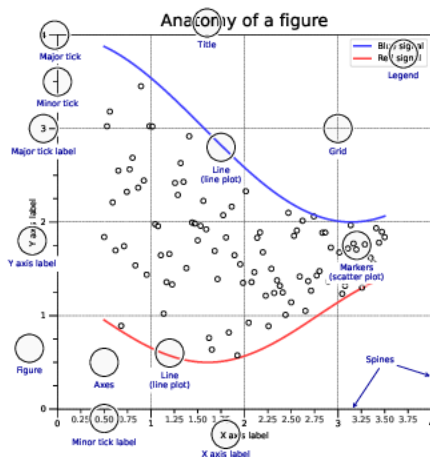
```
import numpy as np
import matplotlib as mpl
import matplotlib.pyplot as plt
```

```
X = np.linspace(0, 2*np.pi, 100)
Y = np.cos(X)
```

```
fig, ax = plt.subplots()
ax.plot(X, Y, color='green')
```

```
fig.savefig("figure.pdf")
fig.show()
```

Anatomy of a figure



Subplots layout

```
subplot[s](rows,cols,...)
fig, axs = plt.subplots(3, 3)
```

```
G = gridspec(rows,cols,...)
ax = G[0,:]
```

```
ax.inset_axes(extent)
```

```
d=make_axes_locatable(ax)
ax = d.new_horizontal('10%')
```

Getting help

matplotlib.org
github.com/matplotlib/matplotlib/issues
discourse.matplotlib.org
stackoverflow.com/questions/tagged/matplotlib
gitter.im/matplotlib
twitter.com/matplotlib
[Matplotlib users mailing list](#)

Basic plots

```
plot([X],Y,[fmt],...)
X,Y,fmt,color,marker,linestyle
```

```
scatter(X,Y,...)
X,Y,[s]izes,[c]olors,marker,cmap
```

```
bar[h](x,height,...)
x,height,width,bottom,align,color
```

```
imshow(Z,...)
Z,cmap,interpolation,extent,origin
```

```
contour[f](X,[Y],Z,...)
X,Y,Z,levels,colors,extent,origin
```

```
pcolormesh([X],[Y],Z,...)
X,Y,Z,vmin,vmax,cmap
```

```
quiver([X],[Y],U,V,...)
X,Y,U,V,C,units,angles
```

```
pie(X,...)
Z,explode,labels,colors,radius
```

```
text(x,y,text,...)
x,y,text,va,ha,size,weight,transform
```

```
fill[_between](x,...)
X,Y1,Y2,color,where
```

Advanced plots

```
step(X,Y,[fmt],...)
X,Y,fmt,color,marker,where
```

```
boxplot(X,...)
X,notch,sym,bootstrap,widths
```

```
errorbar(X,Y,xerr,yerr,...)
X,Y,xerr,yerr,fmt
```

```
hist(X,bins,...)
X,bins,range,density,weights
```

```
violinplot(D,...)
D,positions,widths,vert
```

```
barbs([X],[Y],U,V,...)
X,Y,U,V,C,length,pivot,sizes
```

```
eventplot(positions,...)
positions,orientation,lineoffsets
```

```
hexbin(X,Y,C,...)
X,Y,C,gridsize,bins
```

Scales

```
ax.set_[xy]scale(scale,...)
linear any values
log values > 0
```

```
symlog any values
logit 0 < values < 1
```

Projections

```
subplot(...,projection=p)
p='polar' p='3d'
```

```
p=Orthographic()
from cartopy.crs import Cartographic
```

Lines

```
linestyle or ls
"solid" "dashed" "dotted" "dashdot" "longdash" "longdashshort" "none" (0,(0.01,2))
```

```
capstyle or dash_capstyle
"butt" "round" "projecting"
```

Markers

A grid of markers including: circle, square, triangle, diamond, star, cross, plus, x, asterisk, hash, percent, dollar, at, arrow, circle with cross, circle with x, circle with plus, circle with asterisk, circle with hash, circle with percent, circle with dollar, circle with at, circle with arrow, circle with circle with cross, circle with circle with x, circle with circle with plus, circle with circle with asterisk, circle with circle with hash, circle with circle with percent, circle with circle with dollar, circle with circle with at, circle with circle with arrow.

marker every 10 [0,-1] (25,5) [0,25,-1]

Colors

A color bar showing various color maps and their corresponding values.

Colormaps

```
plt.get_cmap(name)
```

Uniform: viridis, magma, plasma

Sequential: Greys, YlOrBr, WiStia

Diverging: Spectral, coolwarm, RdGy

Qualitative: tab10, tab20

Cyclic: twilight

Tick

```
from matplotlib.ticker import *
```

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ax.[xy].ticklabelsize
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