# Matplotlib for beginners

Matplotlib is a library for making 2D plots in Python. It is designed with the philosophy that you should be able to create simple plots with just a few commands:

### 1 Initialize

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

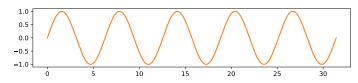
## 2 Prepare

```
X = np.linspace(0, 10*np.pi, 1000)
Y = np.sin(X)
```

### 3 Render

```
fig, ax = plt.subplots()
ax.plot(X, Y)
plt.show()
```

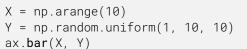
## 4 Observe



### Choose

Matplotlib offers several kind of plots (see Gallery):

```
X = np.random.uniform(0, 1, 100)
Y = np.random.uniform(0, 1, 100)
ax.scatter(X, Y)
```





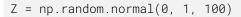






ax.pie(Z)

ax.contourf(Z)



ax.hist(Z)

```
X = np.arange(5)
Y = np.random.uniform(0, 1, 5)
ax.errorbar(X, Y, Y/4)
```

X = np.linspace(0, 10, 100)

ax.plot(X, Y, color="black")

X = np.linspace(0, 10, 100)

X = np.linspace(0, 10, 100)

ax.plot(X, Y, linewidth=5)

X = np.linspace(0, 10, 100)

ax.plot(X, Y, marker="o")

ax.plot(X, Y, linestyle="--")



You can modify pretty much anything in a plot, including lim-

its, colors, markers, line width and styles, ticks and ticks la-

ax.boxplot(Z)

bels, titles, etc.

Y = np.sin(X)

Y = np.sin(X)

Y = np.sin(X)

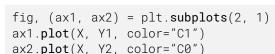
Y = np.sin(X)

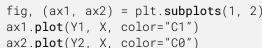
**Tweak** 

### Organize

You can plot several data on the same figure, but you can also split a figure in several subplots (named Axes):

```
X = np.linspace(0, 10, 100)
Y1, Y2 = np.sin(X), np.cos(X)
ax.plot(X, Y1, X, Y2)
```



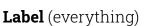




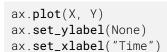








```
ax.plot(X, Y)
fig.suptitle(None)
ax.set_title("A Sine wave")
```





A Sine wave

# **Explore**

Figures are shown with a graphical user interface that allows to zoom and pan the figure, to navigate between the different views and to show the value under the mouse

## **Save** (bitmap or vector format)

```
fig.savefig("my-first-figure.pdf")
```

fig.savefig("my-first-figure.png", dpi=300)

