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
```

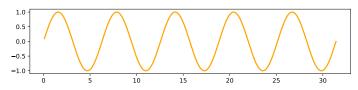
2 Prepare

```
X = np.linspace(0, 4*np.pi, 1000)
Y = np.sin(X)
```

3 Render

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



$$Z = np.random.uniform(0, 1, (8,8))$$



ax.contourf(Z)

```
Z = np.random.uniform(0, 1, 4)
```

ax.pie(Z)

```
Z = np.random.normal(0, 1, 100)
```

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="--")

Z = np.random.normal(0, 1, (100,3))

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)

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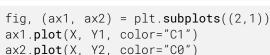
Y = np.sin(X)

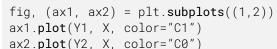
Tweak

Organize

You can plot several data on the 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, Y2)
```











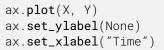
A Sine wave



Label (everything)

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

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

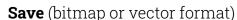


fig.savefig("my-first-figure.pdf")

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