Matplotlib para iniciantes

Matplotlib é uma biblioteca para gerar plots em 2D e 3D em Python. Foi criada com a filosofia de que você deve ser capaz de criar plots simples com apenas alguns comandos:

1 Inicialize

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

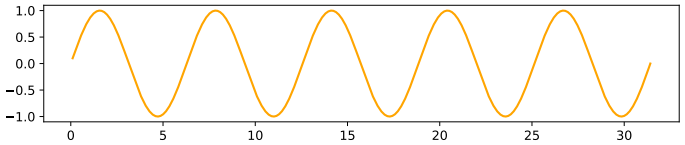
2 Prepare

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

3 Renderize

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

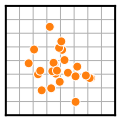
4 Observe



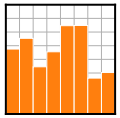
Escolha

Matplotlib oferece diversos tipos de plots (veja Galeria):

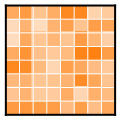
```
X = np.random.uniform(0, 1, 100)
Y = np.random.uniform(0, 1, 100)
ax.scatter(X, Y)
```



```
X = np.arange(10)
Y = np.random.uniform(1, 10, 10)
ax.bar(X, Y)
```

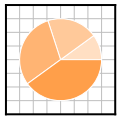


```
Z = np.random.uniform(0, 1, (8,8))

ax.imshow(Z)
```

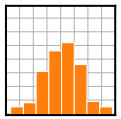


```
Z = np.random.uniform(0, 1, (8,8))

ax.contourf(Z)
```

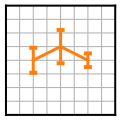
```
Z = np.random.uniform(0, 1, 4)

ax.pie(Z)
```



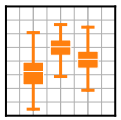
```
Z = np.random.normal(0, 1, 100)

ax.hist(Z)
```



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



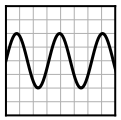
```
Z = np.random.normal(0, 1, (100,3))

ax.boxplot(Z)
```



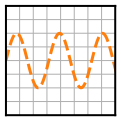
Modifique

Você pode modificar praticamente tudo em um plot, incluindo limites, cores, marcadores, grossura e estilo de linhas, ticks e rótulos de ticks, títulos, etc.

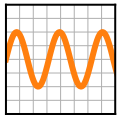
```
X = np.linspace(0, 10, 100)
Y = np.sin(X)
ax.plot(X, Y, color="black")
```



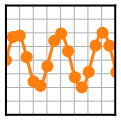
```
X = np.linspace(0, 10, 100)
Y = np.sin(X)
ax.plot(X, Y, linestyle="--")
```



```
X = np.linspace(0, 10, 100)
Y = np.sin(X)
ax.plot(X, Y, linewidth=5)
```



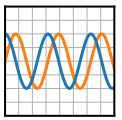
```
X = np.linspace(0, 10, 100)
Y = np.sin(X)
ax.plot(X, Y, marker="o")
```



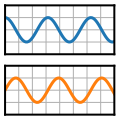
Organize

Você pode plotar diferentes dados na mesma figura, mas você também pode dividir uma figura em diversos subplots (chamados *Axes*):

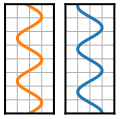
```
X = np.linspace(0, 10, 100)
Y1, Y2 = np.sin(X), np.cos(X)
ax.plot(X, Y1, X, Y2)
```



```
fig, (ax1, ax2) = plt.subplots(2,1)
ax1.plot(X, Y1, color="C1")
ax2.plot(X, Y2, color="C0")
```

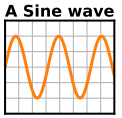


```
fig, (ax1, ax2) = plt.subplots(1,2)
ax1.plot(Y1, X, color="C1")
ax2.plot(Y2, X, color="C0")
```

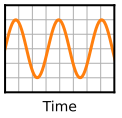


Rotule (tudo)

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




```
ax.plot(X, Y)
ax.set_ylabel(None)
ax.set_xlabel("Tempo")
```



Explore

As figuras estão contidas em uma interface gráfica que permite manipulações como modificar o zoom e deslocar a figura, navegar entre diferentes visualizações e mostrar o valor selecionado pelo mouse.

Salve (bitmap ou vetor)

```
fig.savefig("minha-primeira-figura.png", dpi
   =300)
fig.savefig("minha-primeira-figura.pdf")
```