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**

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

2. **Prepare**

   ```python
   X = np.linspace(0, 4*np.pi, 1000)
   Y = np.random.uniform(0, 1, 100)
   ```

3. **Render**

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

4. **Observe**

   ![A Sine wave](image)

**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)**

- **X = np.arange(10)**
  - **Y = np.random.uniform(0, 1, 10)**
  - **ax.bar(X, Y)**

- **Z = np.random.uniform(0, 1, (8,8))**
  - **ax.imshow(Z)**

**Tweak**
You can modify pretty much anything in a plot, including limits, colors, markers, line width and styles, ticks and ticks labels, titles, etc.

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

**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)**

**Label (everything)**

- **ax.plot(X, Y)**
  - **fig.suptitle(None)**
  - **ax.set_title("A Sine wave")**
  - **ax.set_xlabel("Time")**

**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)**

**Save (bitmap or vector format)**

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

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