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, 100)
   Y = np.sin(X)
   ```

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

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

Choose

Matplotlib offers several kind of plots (see Gallery):

- `imshow`
- `bar`
- `scatter`
- `plot`
- `boxplot`
- `pie`
- `contourf`
- `hist`
- `pie`
- `contourf`

Tweak

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

Organize

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

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

Label (everything)

```python
ax.plot(X, Y)
fig.suptitle("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.

Save (bitmap or vector format)

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