Matplotlib

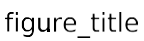
What is Matplotlib?

- Python’s primary plotting package
- Widely used for data visualization
- Easy to use for simple visualizations, but allows for fine-grained control for experienced users
- We will look only into `matplotlib.pyplot`
  - Highest-level module
  - Create figures, add elements such as lines and text

Parts of a figure

- `Figure`: the whole figure. Contains `Axes`, artists (titles, legends). Should have at least one `Axes`

```
import matplotlib.pyplot as plt
fig = plt.figure()
fig.suptitle('figure_title')
plt.show()
```



Parts of a figure

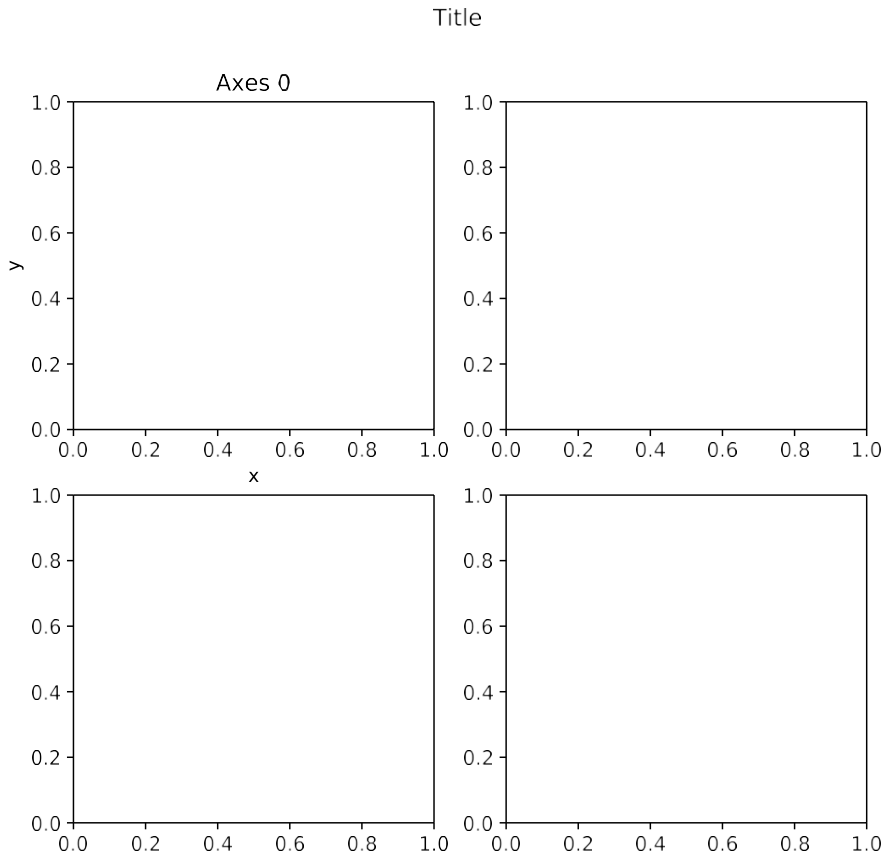
- `Axes`: a plot. There may be more than one per `Figure`. Contains `Axis` objects (2 for 2-D plots, 3 for 3-D). Has a title, an x-label, and a y-label.

```
fig, axes_lst = plt.subplots(2, 2)

fig.suptitle('Title')

axes_lst[0, 0].set_title('Axes 0')
axes_lst[0, 0].set_ylabel('y')
axes_lst[0, 0].set_xlabel('x’)
plt.show()
```

- `Axis`: number-line objects. Set graph limits and ticks



Inputs to plotting functions

- `np.array` is the expected type by all plotting functions
- Array-like objects (lists, tuples, Pandas dataframes) should be converted to arrays by the user

LOTS more to pyplot

- What we covered doesn’t even make a dent into pyplot’s capabilities
  - Let alone matplotlib…
- Where to go from here?
  - Formatting: markers and colors for each point
  - Scatter plots: no curve generation
  - Bar charts: for categorical variables
  - Managing multiple figures and multiple axes within a figure
  - 3-D plotting
- The documentation is very complete, and there is a huge community using matplotlib