Python (3) Matplotlib

plot your results

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CEE 696

Plotting

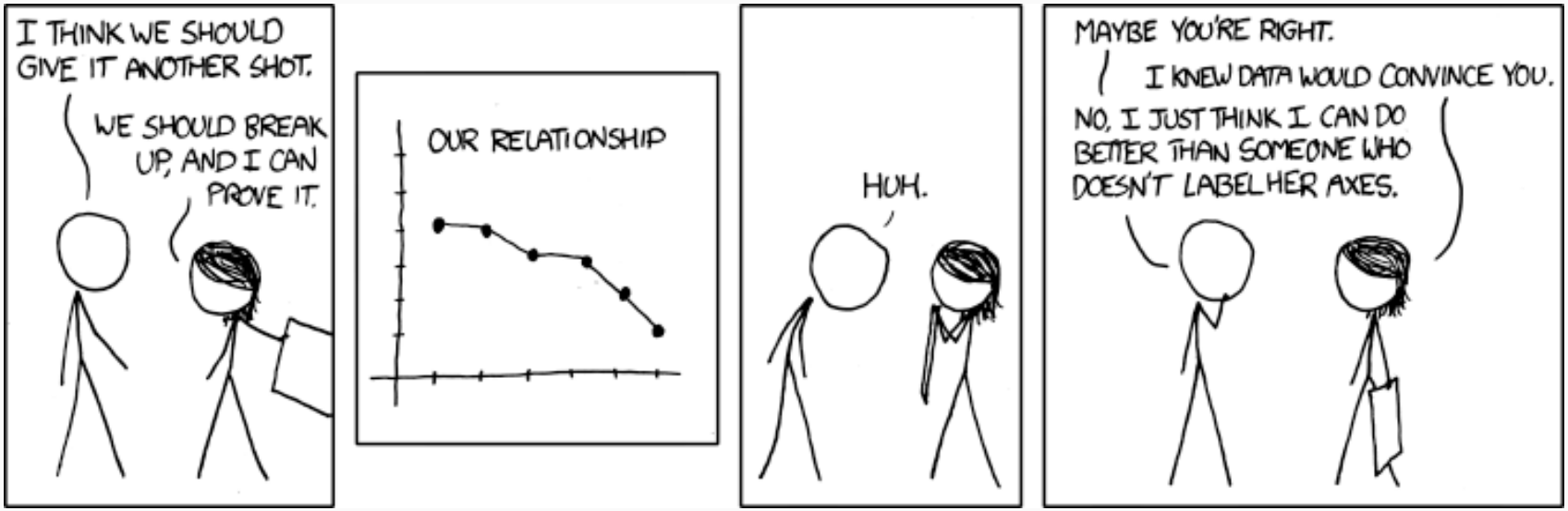


Figure 1: `https://xkcd.com/833/`

Before we start (1)

Q: so slow for updating skeletons

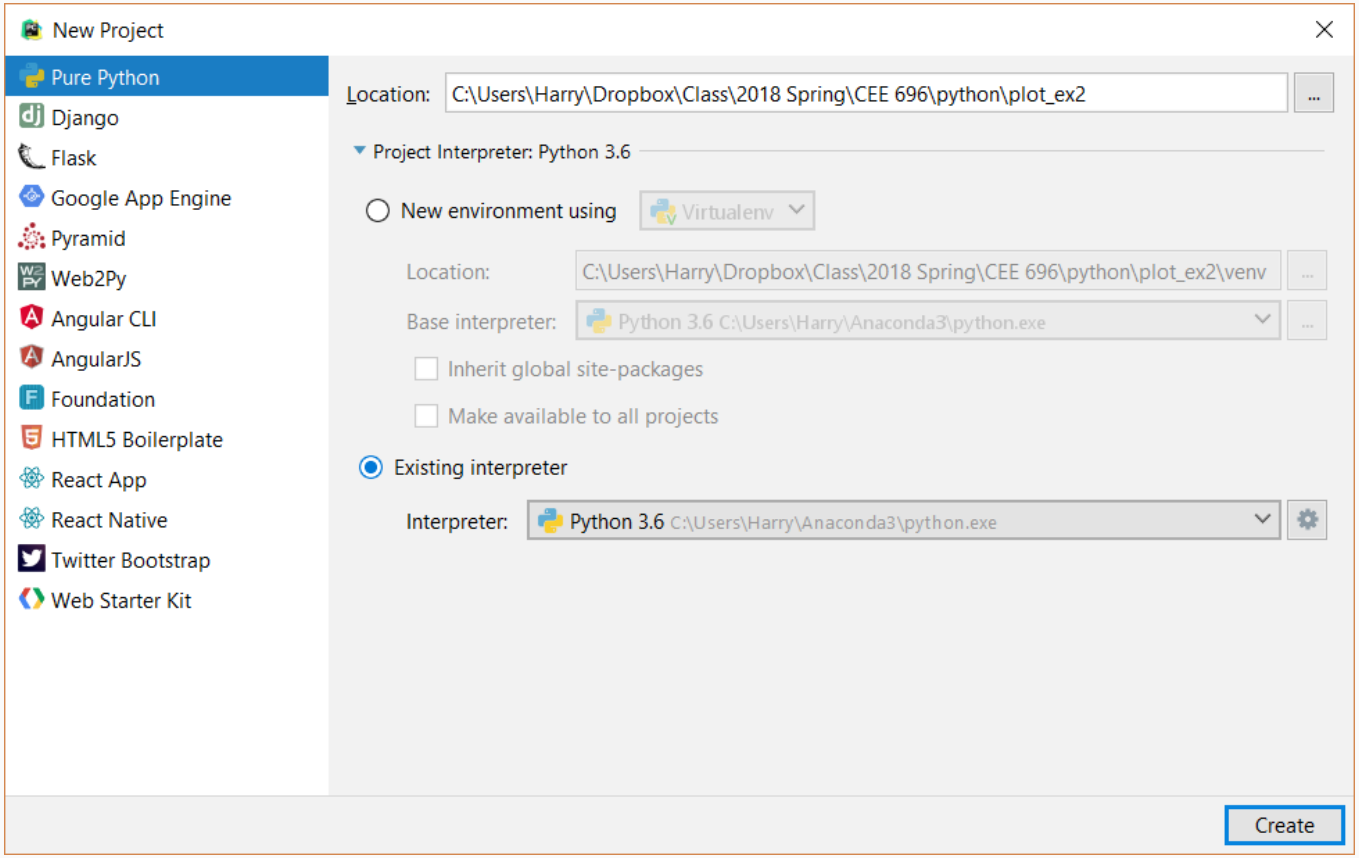
A: it should be only one-time task

Q: Project directory?

A: Somewhere convenient to you

Before we start (2)

Execution setting if you have any issues with virtualenv



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Introduction

Matplotlib

Matplotlib (pyplot) environment behave similar to MATLAB

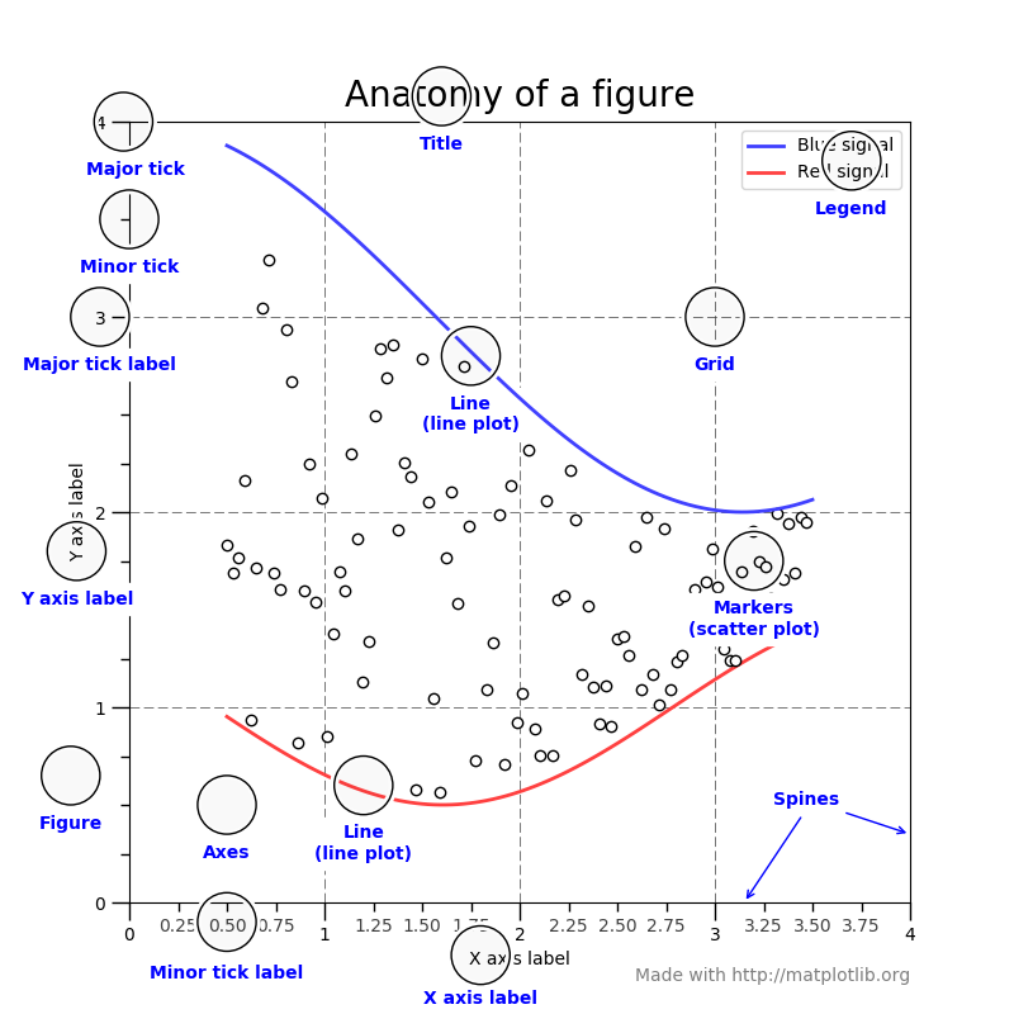
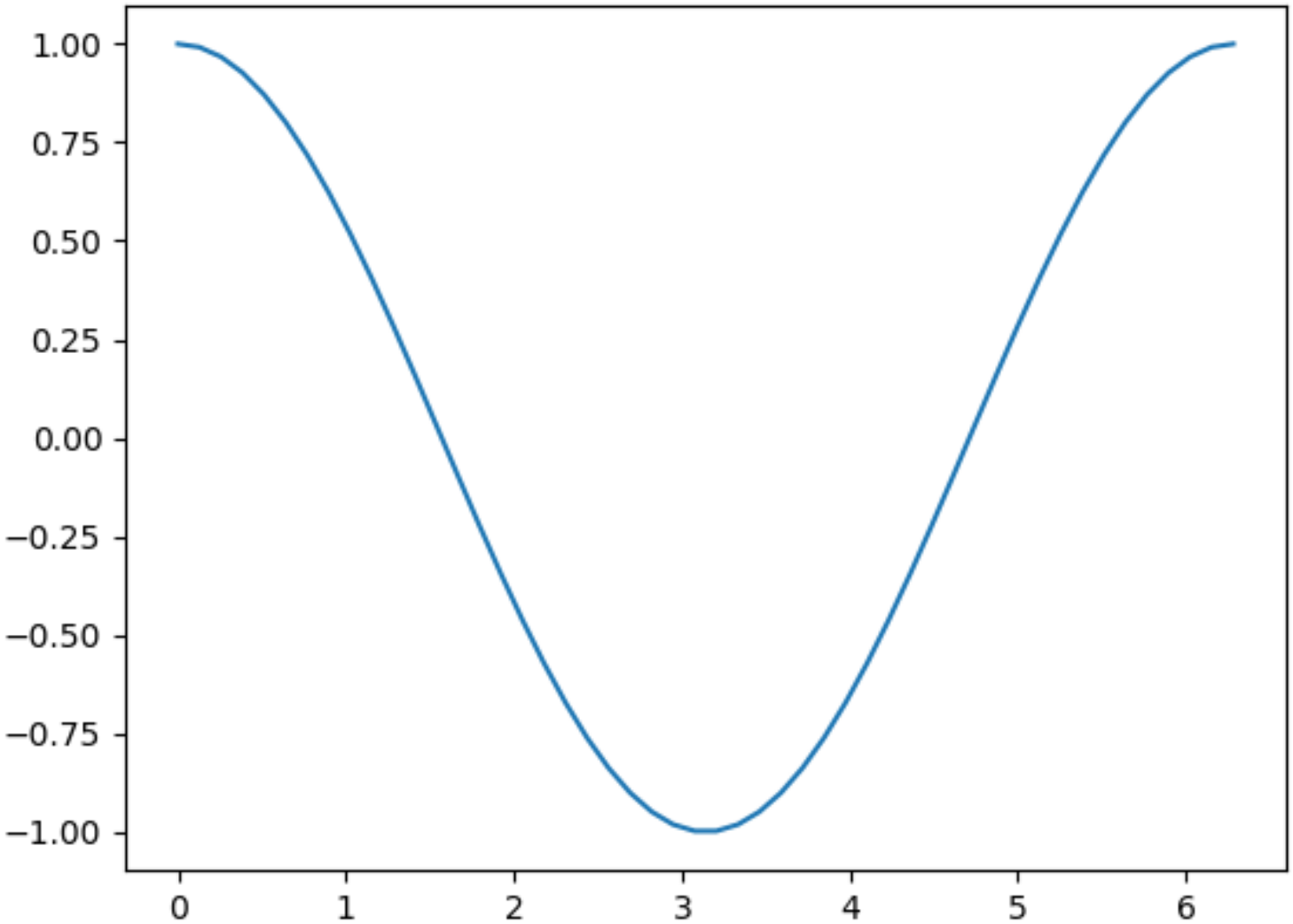


Figure 2: https://matplotlib.org/faq/usage_faq.html

my_first_plotting.py

```
import matplotlib.pyplot as plt
import numpy as np
# import matplotlib.pylab
x = np.linspace(0,2*np.pi, 50)
y = np.cos(x)
plt.figure()
plt.plot(x,y)
plt.show()
```

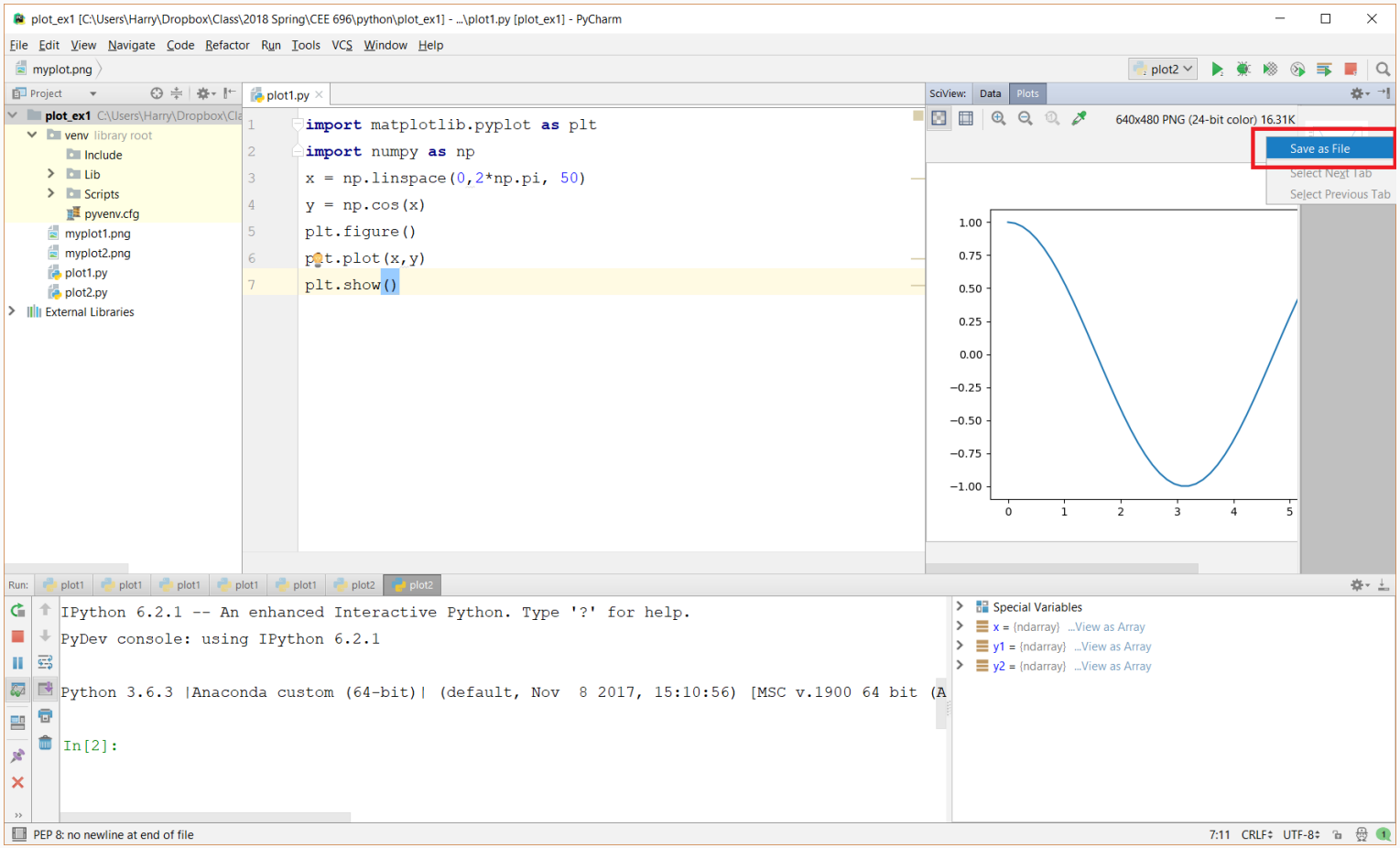
myplot1.png



matplotlib

- matplotlib.pyplot
- Artist : figure, axes, axis, text
- backend : type matplotlib.get_backend()

save in pyCharm

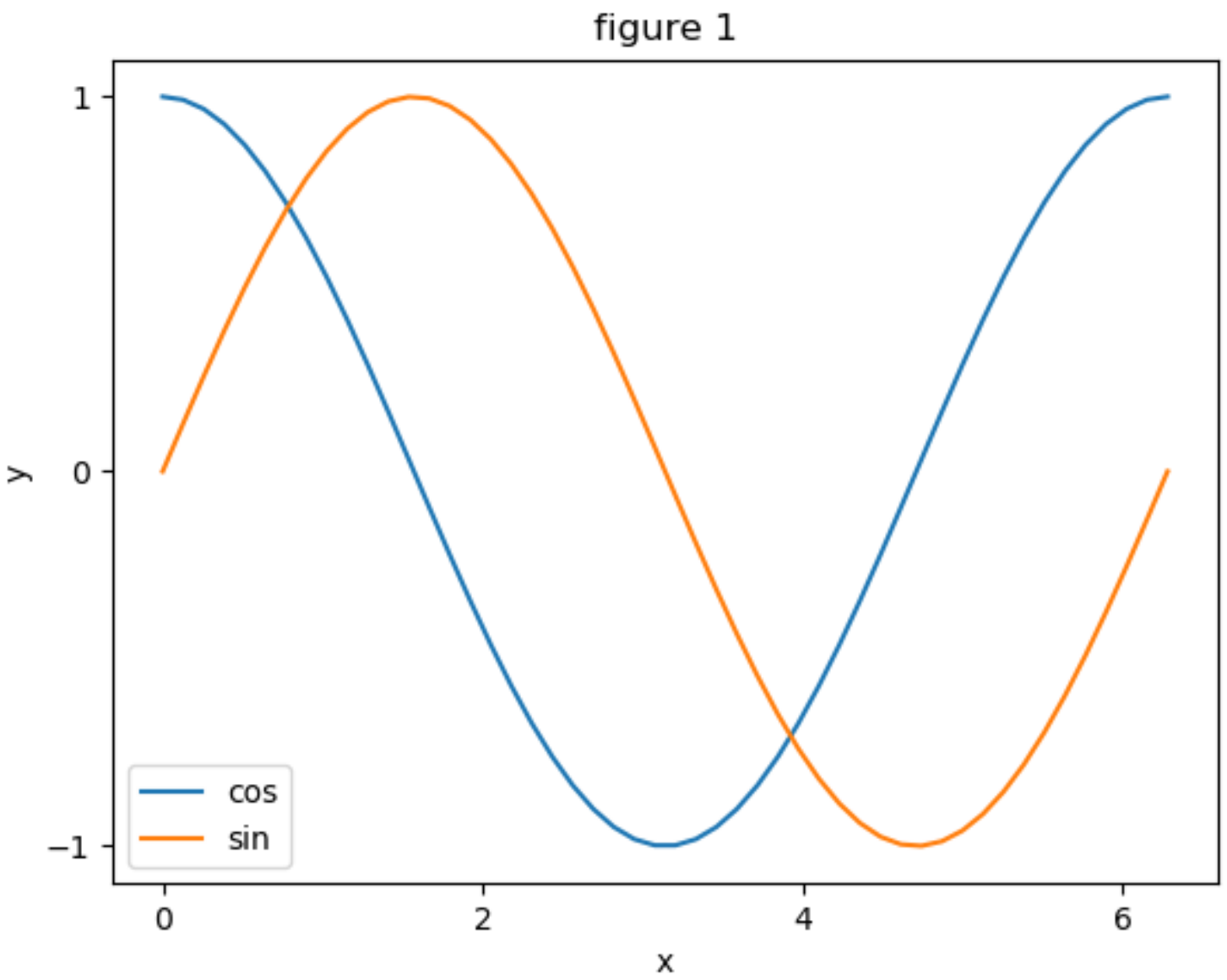


But you can save figures by matplotlib.pyplot.savefig()

my_first_plotting.py for publication quality

```
import matplotlib.pyplot as plt
import numpy as np
x = np.linspace(0,2*np.pi, 50)
y1 = np.cos(x)
y2 = np.sin(x)
plt.figure()
plt.plot(x,y1,label='cos')
plt.plot(x,y2,label='sin')
plt.xticks([0, 2, 4, 6])
plt.yticks([-1, 0, 1])
plt.title("figure 1")
plt.xlabel("x")
plt.ylabel("y")
plt.legend()
plt.savefig("myplot2.png")
plt.show()
```

myplot2.png



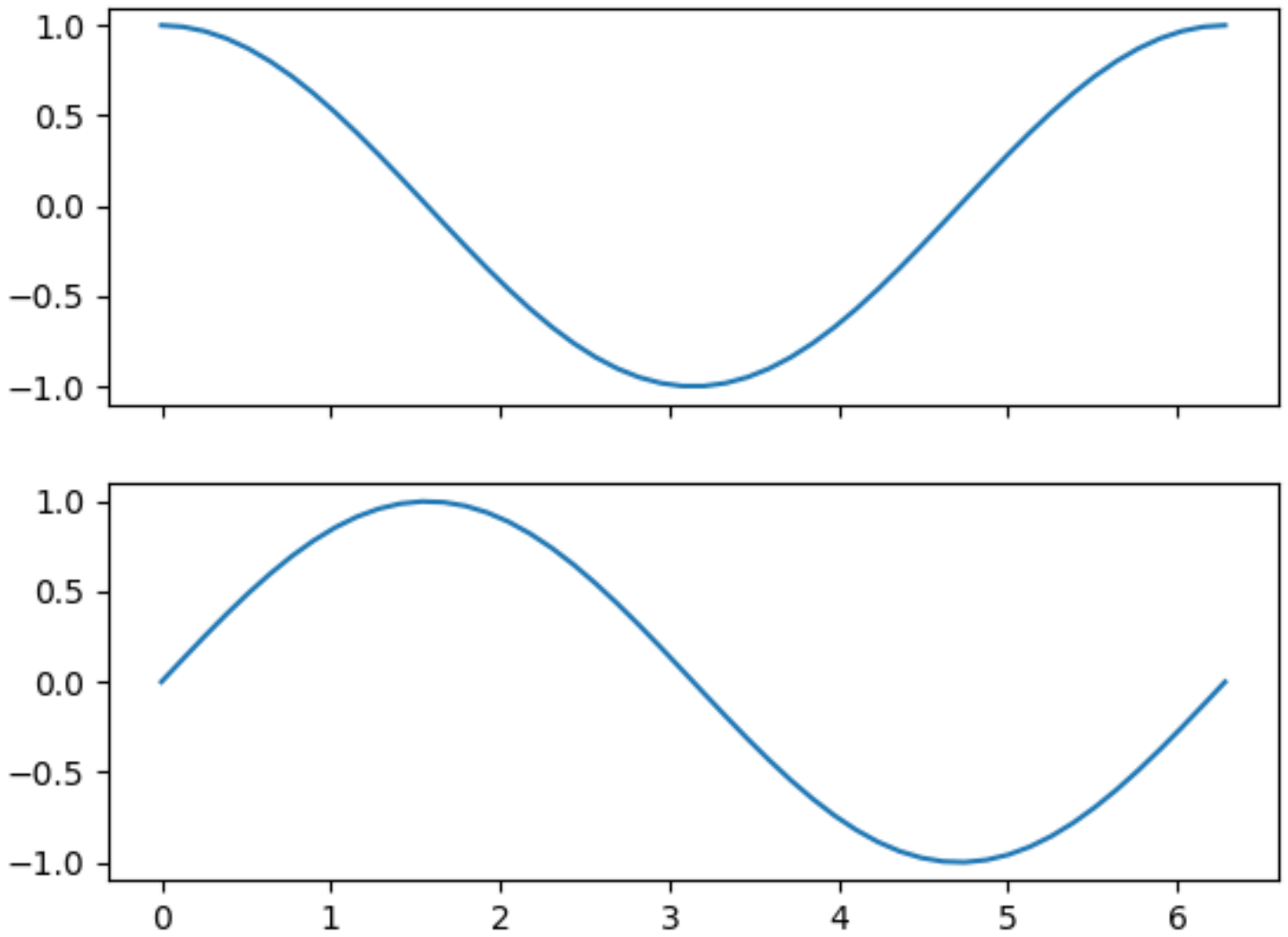
subplots?

https://matplotlib.org/examples/pylab_examples/subplots_demo.html

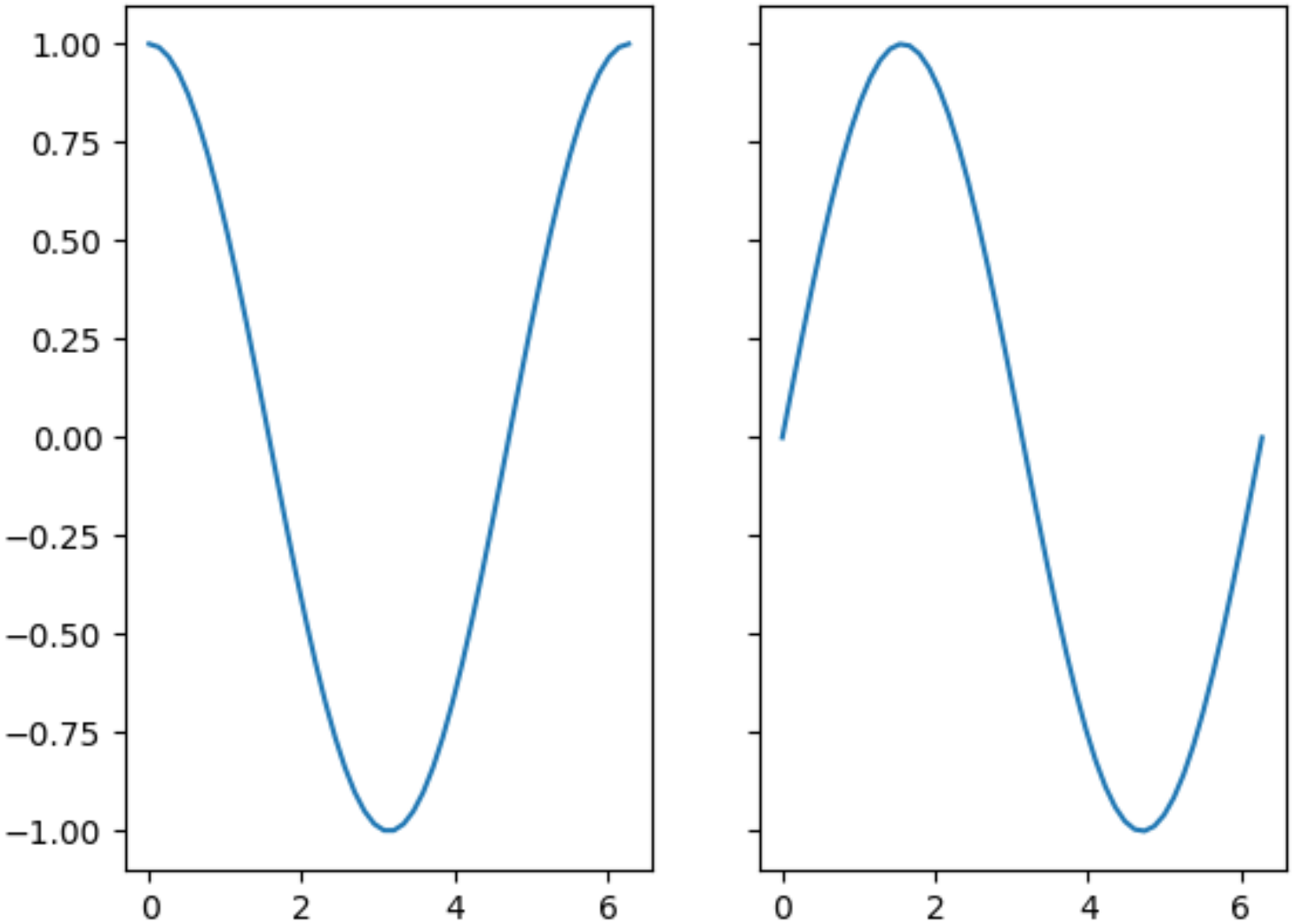
my_first_subplot.py

```
import matplotlib.pyplot as plt
import numpy as np
x = np.linspace(0,2*np.pi, 50)
y1 = np.cos(x)
y2 = np.sin(x)
# Two subplots in a column, the axes array is 1-d
f, axarr = plt.subplots(2,1, sharex=True)
axarr[0].plot(x, y1)
axarr[1].plot(x, y2)
plt.savefig("myplot3.png")
plt.show()
# Two subplots side by side
f, axarr = plt.subplots(1, 2, sharey=True)
axarr[0].plot(x, y1)
axarr[1].plot(x, y2)
plt.savefig("myplot4.png")
plt.show()
```

myplot3.png



myplot4.png



Resources

Resources

Matplotlib gallery is your friend
`https://matplotlib.org/gallery.html`

3 hour comprehensive tutorial by Ben Root
`https://youtu.be/rARMKS8jE9g`

$ 5 e-book for now (deal may be expired soon!)
`https://www.packtpub.com/application-development/interactive-applications-using-matplotlib`