7.1.3 Our First Plot

MO2.1 MO2.3

Let's look at our first example using the `pyplot` interface.

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

# Data for plotting
x = np.linspace(0.0, 1.0, 31)
f1 = x
f2 = x**2

# plotting
fig = plt.figure()
plt.plot(x, f1, color='r', marker='o',
linestyle='-', label='f(x)=x')
plt.plot(x, f2, color='b', marker='x',
linestyle='-.', label='f(x)=x^2')
plt.xlabel('x label')
plt.ylabel('y label')
plt.title('Our first plot!')

# draw the grid on the figure
plt.grid()

# create the legend
plt.legend()

# save the figure to a file you can then send
to your friends
fig.savefig("pyplotexampleplot.png")

# display the figure
plt.show()
```

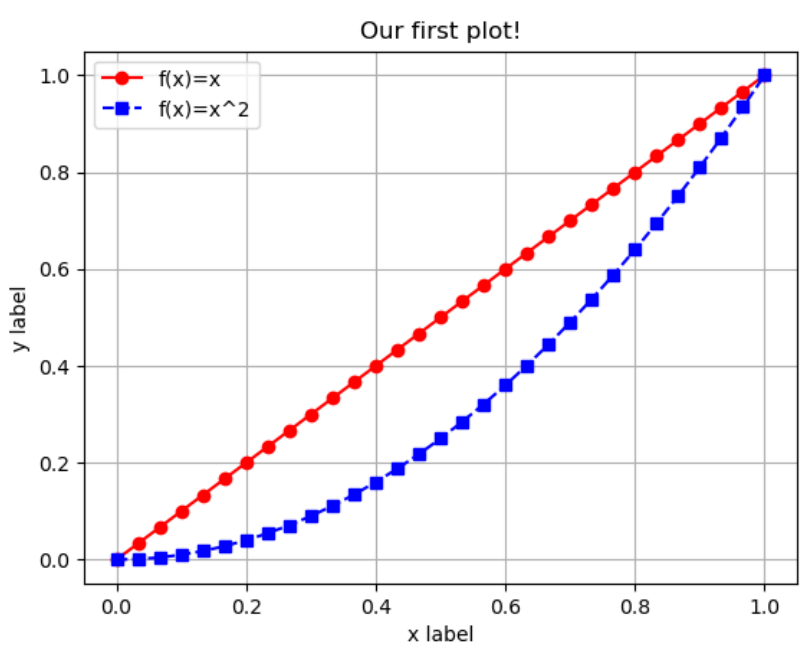

Figure 7.1: Caption for our first plot.

This code generates Figure 7.1 – take some time to try to identify how each line of code corresponds to something you see in the figure. Notice that while we instantiate a figure object and assign it to the variable `fig`, we never reference it when calling `plt.plot`, and this command is not explicitly necessary for plotting

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marker='x' or marker='s' ? Hello, Figure 7.1 : the m
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to work. If you do not first call `plt.figure()` in some form, then the line `plt.plot(x, f1, ...)` will create a figure for you since one does not exist. The key idea here is that the state-based plotter (`pyplot`) always works on the active figure in the state, and if no figure exists in the state, then the first call that needs a figure will cause one to be created. For this same reason, although we made two calls to `plt.plot`, both lines were drawn on the same figure. If you wanted separate figures for each curve you would need to instantiate another figure object, e.g. `fig2 = plt.figure()` before the second `plt.plot` command. Try this yourself.

Hopefully you recognize that the `plt.plot(x,y)` command draws each coordinate $(x[i], y[i])$ on the figure as coloured markers connected by a line. You may think that it is rather cumbersome to have to

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everytime you want to draw these curves. Thankfully many matpiotiib commands accept a *format string*

```
# save the figure to a file you can then send
to your friends
```