Pylab (Matplotlib) Introduction

Molecular Statistic

2014

1 Introduction

Pylab is a module for Python used for plotting. It is a module which uses another module called Matplotlib. Pylab is very useful for plotting all kinds of data and is exteremly customizable. See the gallery matplotlib.org/gallery.html, or webloria.loria.fr/~rougier/teaching/matplotlib for examples.

In this short introduction we will go through small useful examples with provided code. For more advanced examples (like 3D plots), see the links above or use Google.

All the examples below will be using the python package `pylab`, and must thus be included in your script. Which is done by including

```
1 import pylab
```

in the head of the `.py`-file.

To illustrate the result of the plot/graph, you can either show it or save the plot as a image.

```
1 # Show the result in a new window
2 pylab.show()
3
4 # Save the result in a file
5 pylab.savefig('this_figure.png')
```

The `savefig()` method can save to `.png`, `.eps`, `.svg`, as well as `.pdf`.

When creating multiple plots in the same figure, remember *clear figure*, using

```
1 pylab.clf()
```

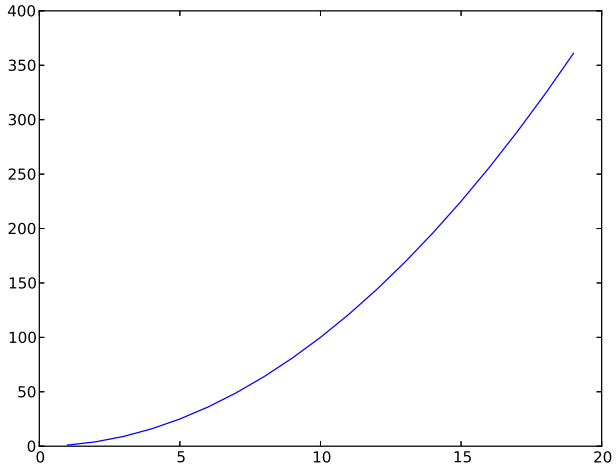
which will erase all work done in pylab.

2 Examples

2.1 XY

The simplest example is to plot x and y coordinates, based on two simple python lists.

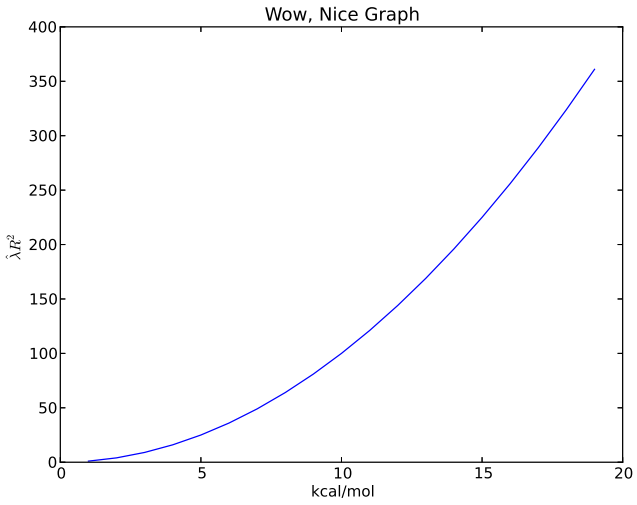
```
1 import pylab
2
3 x = range(1, 20)
4 y = [i**2 for i in x]
5
6 # Plot x- and y coordinates
7 pylab.plot(x, y)
8 pylab.savefig('xy_figure.png')
```



2.2 Titles and labels

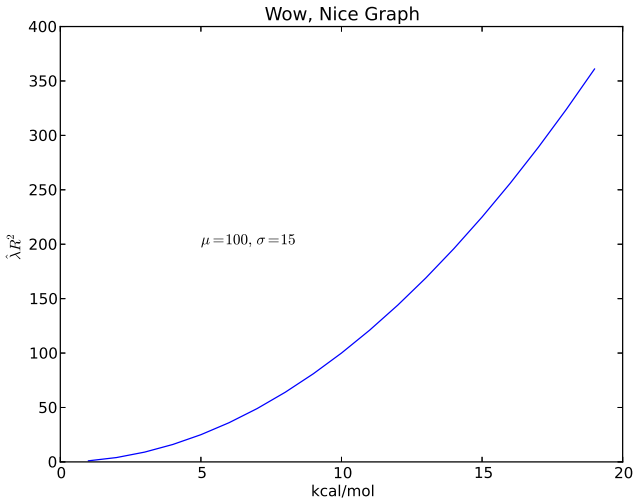
However a graph is worth nothing without title and axis. Which can be included by the following syntax. It is also possible to include latex code in the strings.

```
import pylab

x = range(1, 20)
y = [i**2 for i in x]

# Plot x- and y coordinates
pylab.plot(x, y)

# Set title
pylab.title("Wow, Nice graph")

# Axis
pylab.xlabel('kcal/mol')
pylab.ylabel('$\hat \lambda R^2$')

pylab.savefig('figure_name.png')
```



Text can also be inserted into the figure, for example

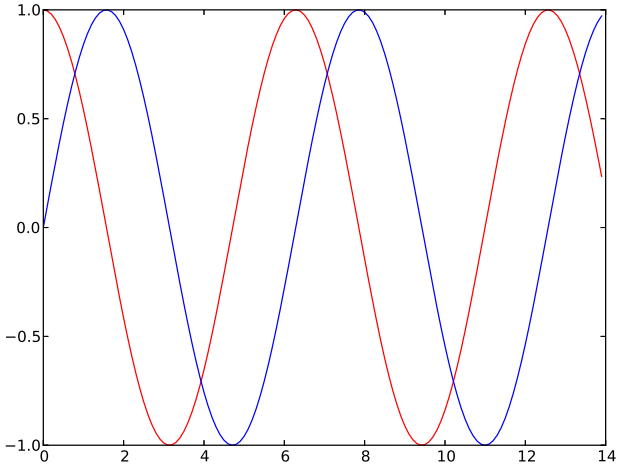
```
import pylab

x = range(1, 20)
y = [i**2 for i in x]

# Plot x- and y coordinates
pylab.plot(x, y)

# Set title
pylab.title("Wow, Nice graph")

# Axis
pylab.xlabel('kcal/mol')
pylab.ylabel('$\hat \lambda R^2$')

# Text
pylab.text(5, 200, r'$\mu=100,\ \sigma
    =15$')

pylab.savefig('figure_name.png')
```



2.3 Multiple lines

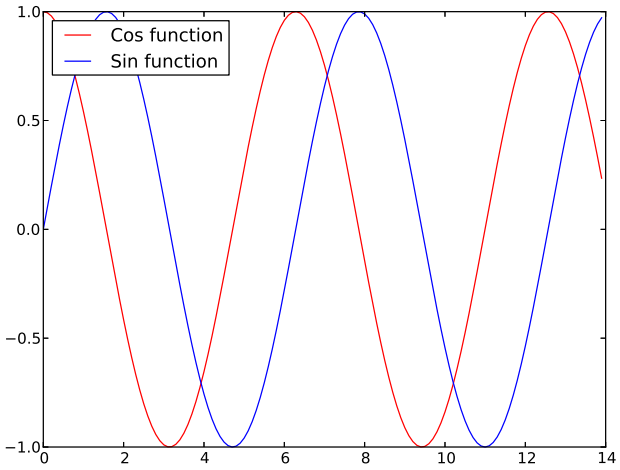
Plotting multiple datasets in same plot can be done by visually choosing a color and a line style for the plot. See appendix A for a full list of colors and line styles.

```
1  import pylab
2  import math
3
4  x = numpy.arange(0, 14, 0.1)
5  y_cos = [math.cos(i) for i in x]
6  y_sin = [math.sin(i) for i in x]
7
8  # Insert x and y coordinates
9  # with a red and blue line
10 pylab.plot(x, y_cos, 'r-')
11 pylab.plot(x, y_sin, 'b-')
12
13 pylab.savefig('figure_sincos1.png')
```



Having labels/legends on the plots can be fairly important, this is done by giving the plots labels, and insert them by using the legend command. Note that the location of the legend box can be set by changing the string location.

```
1  import pylab
2  import math
3
4  x = numpy.arange(0, 14, 0.1)
5  y_cos = [math.cos(i) for i in x]
6  y_sin = [math.sin(i) for i in x]
7
8  pylab.plot(x, y_cos, 'r-', label="Cos
       function")
9  pylab.plot(x, y_sin, 'b-', label="Sin
       function")
10
11 pylab.legend(loc='upper left')
12
13 pylab.savefig('figure_sincos2.png')
```



A Plot styling

A.1 Colors

b	blue
g	green
r	red
c	cyan
m	magenta
y	yellow
k	black
w	white

A.2 Line styles

0	tickleft
1	tickright
2	tickup
3	tickdown
4	caretleft
D	diamond
6	caretup
7	caretdown
s	square
—	vline
x	x
5	caretright
_	hline
^	triangle up
d	thin diamond
h	hexagon1
+	plus
*	star
,	pixel
o	circle
.	point
’1’	tri down
p	pentagon
’3’	tri left
’2’	tri up
’4’	tri right
H	hexagon2
v	triangle down
’8’	octagon
<	triangle left
>	triangle right