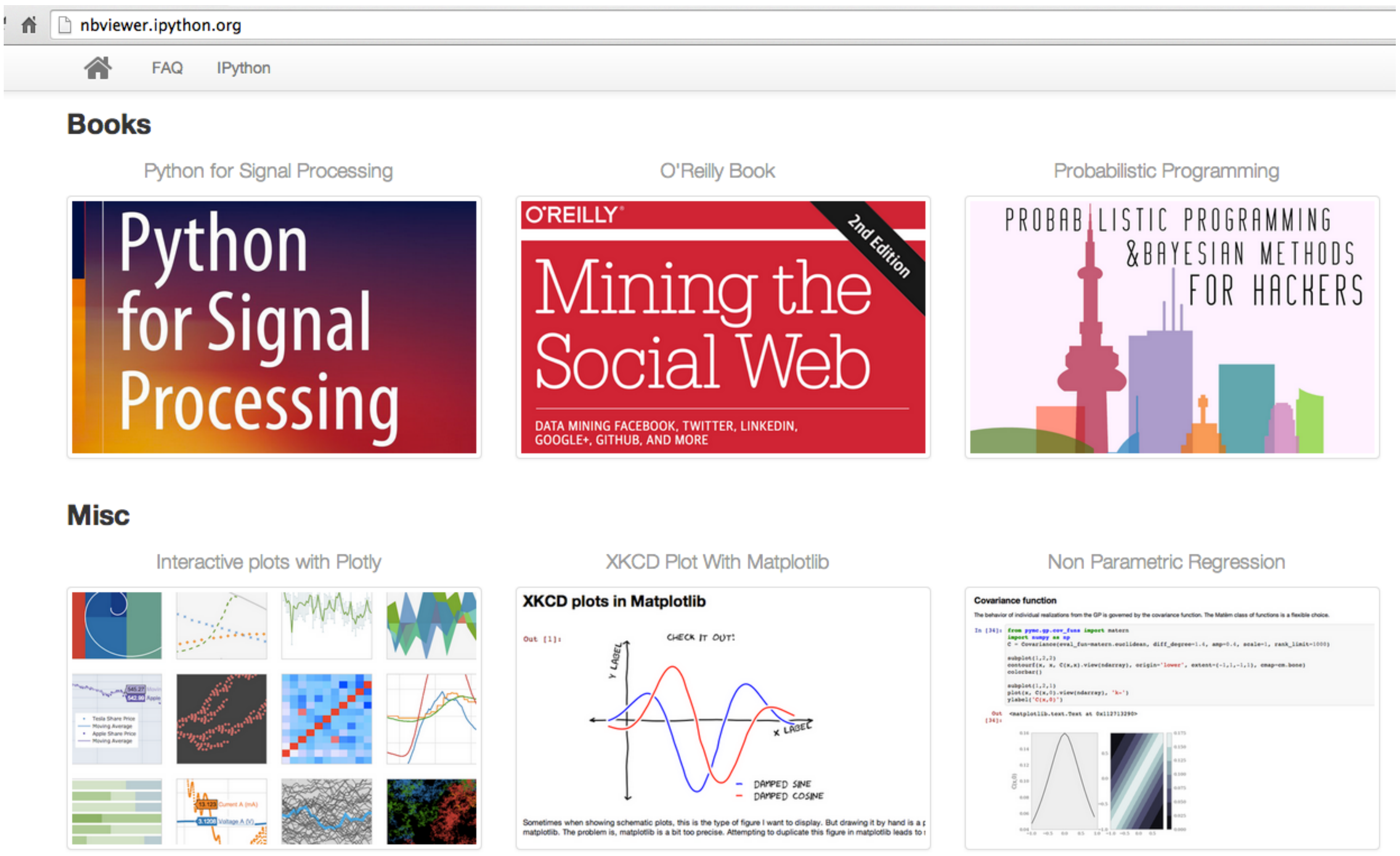
Running Code in the IPython Notebook

First and foremost, the IPython Notebook is an interactive environment for writing and running Python code.

Motivation


nbviewer.ipython.org
FAQ
IPython
Books
Python for Signal Processing
O'Reilly Book
Probabilistic Programming
Misc
Interactive plots with Plotly
XKCD Plot With Matplotlib
Non Parametric Regression

First, let's take a look at the IPython shell that the Notebook sits on top of

Setup a directory for this work

```
cd <YOURFORKEDREPO>
git pull origin master
cd lab_submissions/lab03
mkdir <FLASTNAME>
cd <FLASTNAME>
```

IPython -- An enhanced Interactive Python

IPython offers a combination of convenient shell features, special commands and a history mechanism for both input (command history) and output (results caching, similar to Mathematica). It is intended to be a fully compatible replacement for the standard Python interpreter, while offering vastly improved functionality and flexibility.

Magic Commands

```
%magic
```

TAB completions

Dynamic Object Information

```
?word
```

Input and Output caching

To run:

```
ipython
```

```
?
```

review the help later if interested

IPython Notebook

- Full manual: http://ipython.org/notebook.html

Starting the notebook server Start running a notebook server from the command line using the following command:

```
ipython notebook
```

This will print some information about the notebook server in your console, and open a web browser to the URL of the web application (by default, http://127.0.0.1:8888).

Code cells allow you to enter and run Python code

Run a code cell using `Shift-Enter` or pressing the "Play" button in the toolbar above:

```
In [ ]: a = 10
```

```
In [ ]: print(a)
```

Managing the IPython Kernel

Code is run in a separate process called the IPython Kernel. The Kernel can be interrupted or restarted. Try running the following cell and then hit the "Stop" button in the toolbar above.

In [4]:
```
import time
time.sleep(10)
print('OK, I\'m up!')
```

```
OK, I'm up!
```

If the Kernel dies you will be prompted to restart it. Here we call the low-level system libc.time routine with the wrong argument via ctypes to segfault the Python interpreter:

In [*]:
```
import sys
from ctypes import CDLL
# This will crash a Linux or Mac system; equivalent calls can be made on Wind
ows
dll = 'dylib' if sys.platform == 'darwin' else 'so.6'
libc = CDLL("libc.%s" % dll)
libc.time(-1)  # BOOM!!
```

All of the goodness of IPython works

Here are two system aliases:

In [ ]:
```
pwd
```

In [ ]:
```
ls
```

Any command line program can be run using `!` with string interpolation from Python variables:

In [ ]:
```
message = 'The IPython notebook is great!'
# note: the echo command does not run on Windows, it's a unix command.
!echo $message
```

Tab completion works:

In [ ]:
```
import numpy
numpy.random.
```

Tab completion after `(` brings up a tooltip with the docstring:

In [ ]:
```
numpy.random.rand(
In [ ]: numpy.random.rand(
```

Adding `?` opens the docstring in the pager below:

```
In [ ]: magic?
```

Working with external code

There are a number of ways of getting external code into code cells.

Pasting code with >>> prompts works as expected:

```
In [ ]: >>> the_world_is_flat = 1
        >>> if the_world_is_flat:
        ...     print("Be careful not to fall off!")
```

The `%load` magic lets you load code from URLs or local files:

```
In [ ]: %matplotlib inline
```

```
In [15]: %load http://matplotlib.sourceforge.net/mpl_examples/pylab_examples/integral_
         demo.py
```