Python for Matlab Users

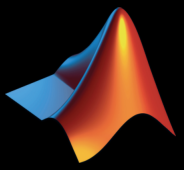https://github.com/dlilien/pybb

What is Python?

- Free and open source programming language
  - Explicit syntax (for, with, in, etc. are very clear)

  - Interpreted (i.e. not scary like fortran or c)

  - Interactive (can run one line at a time like matlab window)

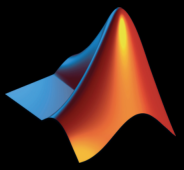 - General purpose (not designed exclusively with linear algebra in mind)

Outline

- Why Python?

- Interacting with Python

- Basic python

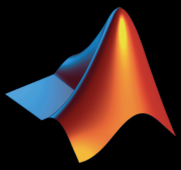- The scientific python stack

- Examples

Why Python?

- Free and open source
  - Still free after you graduate
  - Your code can run on any machine
  - Doesn't break with OSX updates

- More versatile than Matlab
  - General purpose programming language
  - Allows object oriented programming
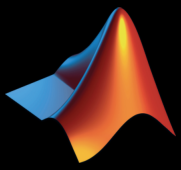 - Follows paradigms of other languages

Cons

- You don't already use it

- Linear algebra takes a few extra characters

- Simulink has no good equivalent

When to switch

- You don't do much linear algebra

- You might graduate some time and leave academia

- You read the documentation constantly when using matlab anyway

- You are sick of 8000 small files to handle all the functions you want to be able to use

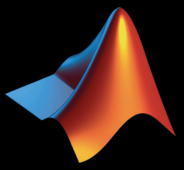What are your frustrations with Matlab?

Who here has Python experience?

Which python?

- `which python`
  - You probably have some weird version of 2.7

- Just start with python 3 (3.6)

- Easiest to install with anaconda
  - Get python, ipython, jupyter, as well as scientific stack
  - Website here

Matlab approximate equivalents

- numpy ~ matlab arrays/operations

- scipy ~ toolboxes

- matplotlib ~ plotting

Ways to interact with python

```
#! /usr/bin/env python3
# myscript.py


print('hello world')
```

- Command line (I use this almost exclusively)
  - `python3 myscript.py`
  - `chmod +x myscript.py; ./myscript.py`

- `ipython3` (interactive, great for tests)

- `jupyter notebook` (interactive, allows markdown, great for demos)

- `Spyder` (A nice IDE, probably most comfortable option for Matlab users)

Where do I get help

- https://docs.python.org/3/

- scipy.org

- matplotlib.org

- Stack exchange!!!

- On-campus resources (e.g. eScience institute)

Demo Time!!