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**Introduction to python and obspy**

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**Overview of covered topics**

1. Intro. Object oriented programming, history etc
2. Python modules
   1. Importing py modules and your own modules
3. file I/O:
   * 1. np.savetxt,
     2. scipy.io.savemat,
     3. file\_obj = open( ‘w’),
     4. csv files etc .. pickels etc ..
   1. lFiles = glob.glob( \*.txt)
   2. if os.path.isfile path.isdir
4. Data handling:
   1. vectors, strings etc.: - float, scalar, string, list, array, dictionary (compare to mat structure)
   2. Vectors, matrices
   3. Indices
   4. Compare to Matlab, matlab cheat-sheet
      1. Differences in indices between matlab and python
5. Some useful commands
   1. Find statement find = vector == 0
   2. for, while, etc
   3. if isinstance( )
   4. track code performance
   5. anticipate errors and help resolve
6. Python objects

Textbook:

**Think Python, 2nd Edition**

**By:** Allen B. Downey

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Resources:

1. <http://matplotlib.org/gallery.html> (a lot of nice plots)
2. <http://pandas.pydata.org/pandas-docs/stable/tutorials.html> (database analysis, creation)
3. <http://docs.python-guide.org/en/latest/writing/style/>

Python for matlab users:

1. <http://mathesaurus.sourceforge.net/matlab-numpy.html>
2. <http://www.cert.org/flocon/2011/matlab-python-xref.pdf>
3. <http://bastibe.de/2013-01-20-a-python-primer-for-matlab-users.html>

Seismo tools for python:

1. <https://github.com/iwbailey/pythMT> (moment tensor analysis)
2. [www.obspy.org](http://www.obspy.org) (a little bit of everything)
3. <http://matplotlib.org/basemap/> (georeferenced plotting)

**Obspy**

1. Download and analyze earthquake catalogs
2. Phase data
3. Waveform access, basic viusalization
4. Filtering
5. Cross-correlations
6. Envelopes
7. Spectral analysis – frequency content, etc.
8. Periodogram

Mode advanced stuff:

1. Using python as integration tool with other codes, command line input, bash scripts, fortran, C etc.
   1. Python and matlab
   2. Py – and bash scripting (sed, awk, file I/O etc.)
      1. Find replace with sed (e.g. , to .)
      2. Data manipulation switch columns if first entry is a float (use try, except)
   3. Python and C and fortran modules