

Python Advance Course via Astronomy street



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Why Python?

What do we need?

- Get data – Observations / Simulations
- Manipulate and process the data
- Analysis and Visualization of the data
- Making plots for papers/presentations/reports etc...
- Other stuff???

Why Python?

Languages Available in the market:

	Readability	Speed	Vectorized Operations	Astronomy Routines	Multithreading	User Community	Cost & Copyright
Python	:D	Interpreted – Slow Compiled C/ Fortran modules – Medium	With NumPy	Many separate modules*, PyRAF	Easy, several modules	Gigantic, multi-discipline (science, web, games...)	Free & Open
IDL	:/	Interpreted – Slow Built-ins – Medium	Yes	Astrolib	Difficult	Astronomers: Large Others: Tiny	Expensive & Annoying
IRAF	:(Interpreted – Slow Built-ins – Medium, but disk-write bound	evvexpr?	...IRAF	None	Only Astronomers	Free & Open
C	:(::	Compiled – Fast	No	Many libraries	Difficult	Gigantic, multi-discipline	Free & Open
Fortran	*@#*&	Compiled – Fast	Yes	Many libraries	Easy	Scientists, Septuagenarians	Free & Open

*There are current attempts to make a monolithic Astrolib-like package for Python

Why Python?

Advantages

- Many scientific libraries (modules) available;
- Simple and intuitive sintaxe; very readable;
- Many other libraries available (web, interfaces, system, ...);
- Free and open-source software, widely spread;

Drawbacks:

- Still no pleasant development enviroment (missing a good IDE);
- Dependence on modules that slowly follow Python updates

Scientific Python

Building Blocks

- Python
- IPython
- Numpy
- Scipy
- Matplotlib
- Pyraf
- Mayavi

Bibliography

- Python Scientific lecture notes
<http://scipy-lectures.github.io/>
- Python Reference
<http://docs.python.org/2/reference/>
- <http://www.python.org/>
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Advance Course Outline:

- Lesson 1: Python basics (T)
- Lesson 2: Python with Numpy and Matplotlib (T)
- Lesson 3: Science modules (Scipy) (T)