My personal perspective of

MIGHTY PYTHON

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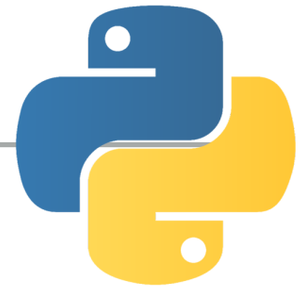
Python is an open source scripting language.

Python was created by Guido van Rossum in 1991.

Python is not named after snake but after Monty Python's Flying Circus.

Python is very object oriented with built-in datatypes (string, lists, …) and has strong numeric processing capabilities (matrix operations, statistical tools, …).



Python has two main versions Python2 and Python3:

- Python2 (almost)= Python3 for a standard user (print and division)
- Python3 is supported by majority of stable version of OSs
- Python2 will stay being supported too, for now

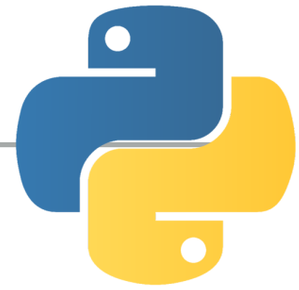
Python should be installed from package system of your OS:

- apt-get install python2(3), packman install python2(3), . . .

Python is module/library based = all you need has already been done by someone else and you can just write: import all I need

To install majority of modules/libraries use pip:

- apt-get install pip and than pip install numpy, scipy, pyplot, matplotlib



Python has three main options of how to run/use it:

(1) Directly from terminal:

python will change the terminal into python environment

useful for quick operations (as a calculator)

(2) Creating python script, file named file.py:

running the script: python file.py

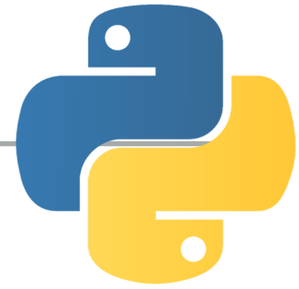
used in vast majority of cases

no compiler, but there is plenty of “debuggers”

(3) Using python notebook:

operated through a internet browser (only python3 support)

often used during lectures/manuals



(1) python shell:

```
floudee@terezka~ $ python
Python 2.7.13 (default, Dec 18 2016, 07:03:39)
>>> 1+1
2
>>> import math as m
>>> m.pi
3.141592653589793
```

(2) python script (print_pi.py):

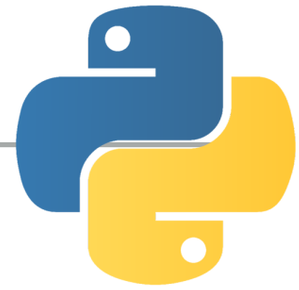
```
floudee@terezka~ $ python  print_pi.py
3.141592653589793
```

The most important feature: INDENTATION (no () or {} for blocks/loops)

```
array = ['zero','one','two','three']
for idex,value in enumerate(array):
    print idex,'= '+value
```

```
floudee@terezka~ $ python  indentation_test.py
0 = zero
1 = one
2 = two
3 = three
```

BASICS OF PYTHON: MODULES/LIBRARIES I USE THE MOST



- math: mathematical functions and constants
- numpy:

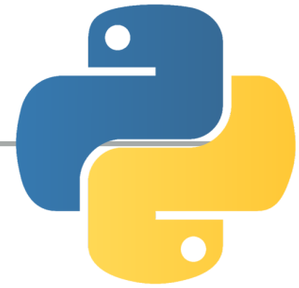
  very fast array operations, fitting and statistic or loading files
- scipy: more detailed statistics and fitting
- matplotlib: general plotting module
- csv and intertools: very convenient for creating column-like output
- astro: astropy, pyfits, photutils, sep

With this libraries for what am I using python?

- before python I was using: bash, awk, gnuplot, fortran/C
- python: data files/directories manipulation, compiling or running

binary codes, all kinds of data statistic (inter/extrapolation, fitting, binning, splines, histograms), shorter computations, plots, animations

BASICS OF PYTHON: QUESTIONS?



- Is python, as a scripting language, slow?

  It can be very fast - numpy can compare with Fortran/C and there is even GPU Accelerated Computing with Python

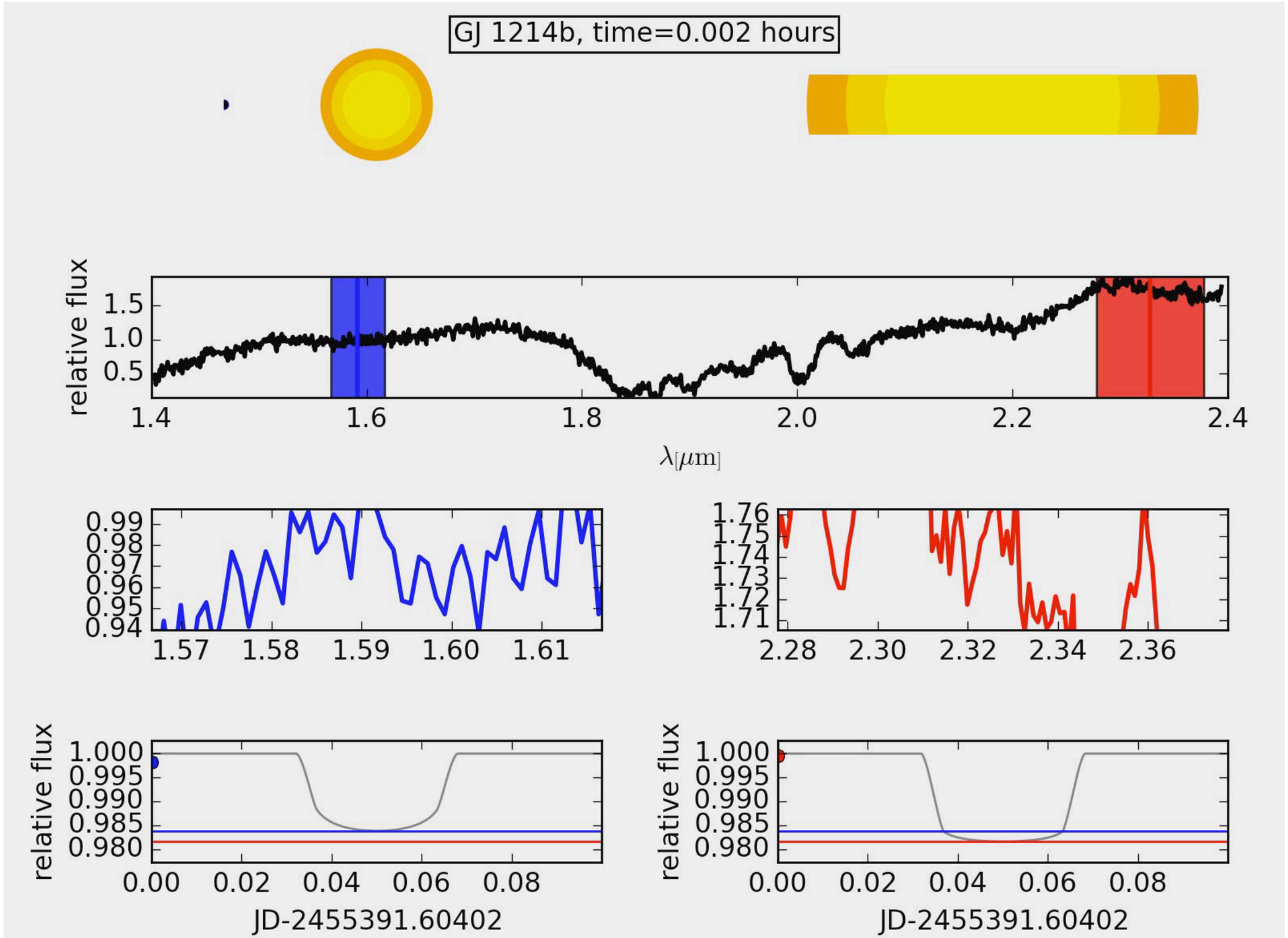
- Can I have problems with (non)compatibility of python2 and python3?

  Yes, but it is not so bad. If you can use python3. But with using only python2 it is possible to do basically the same. There are scripts translating python2 <–> python3.

- Something else?

  General advice, try google, the vast majority of your problems already sorted out someone else :).

BASICS OF PYTHON: SELF-PRESENTATION



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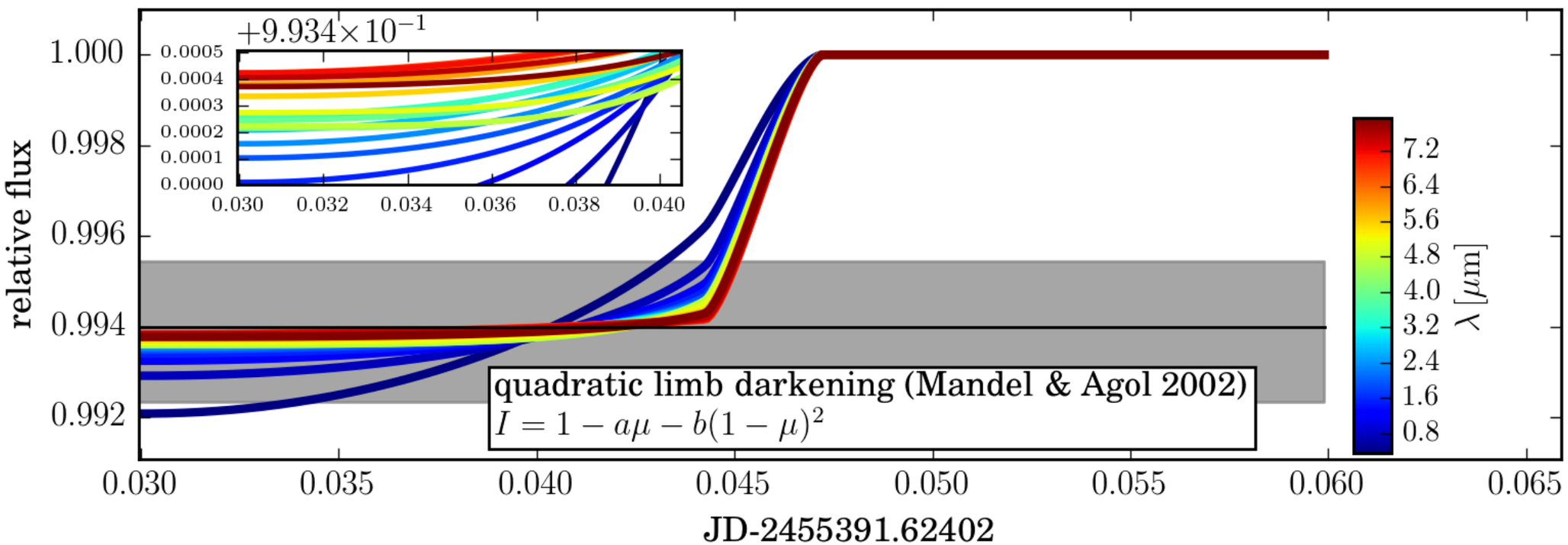

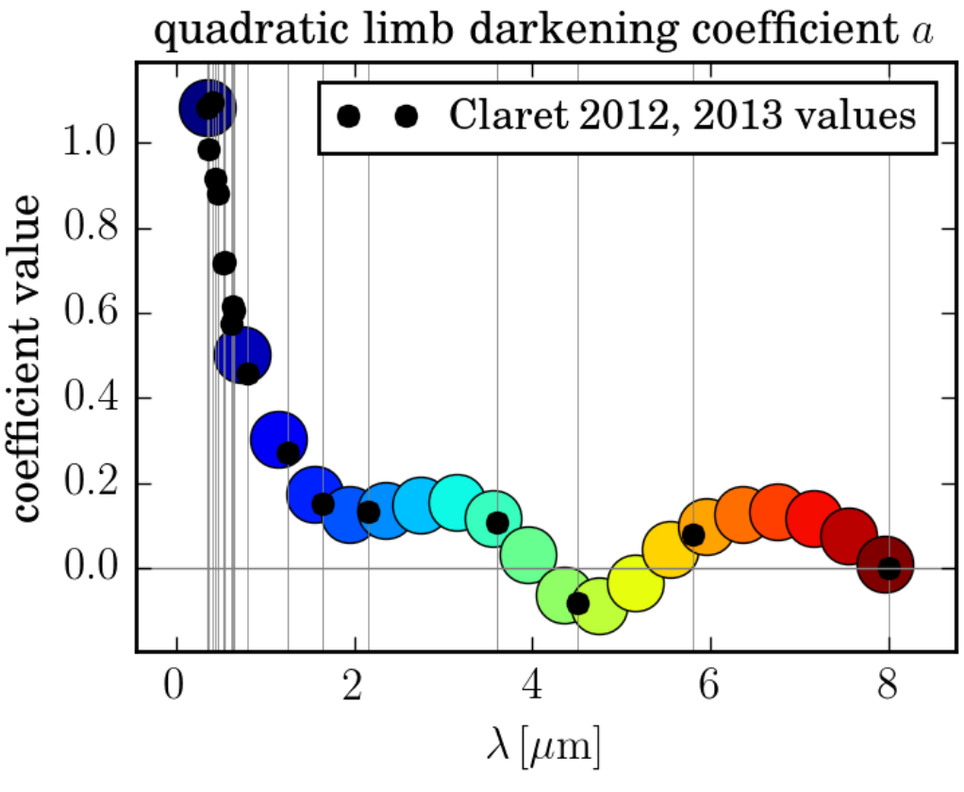

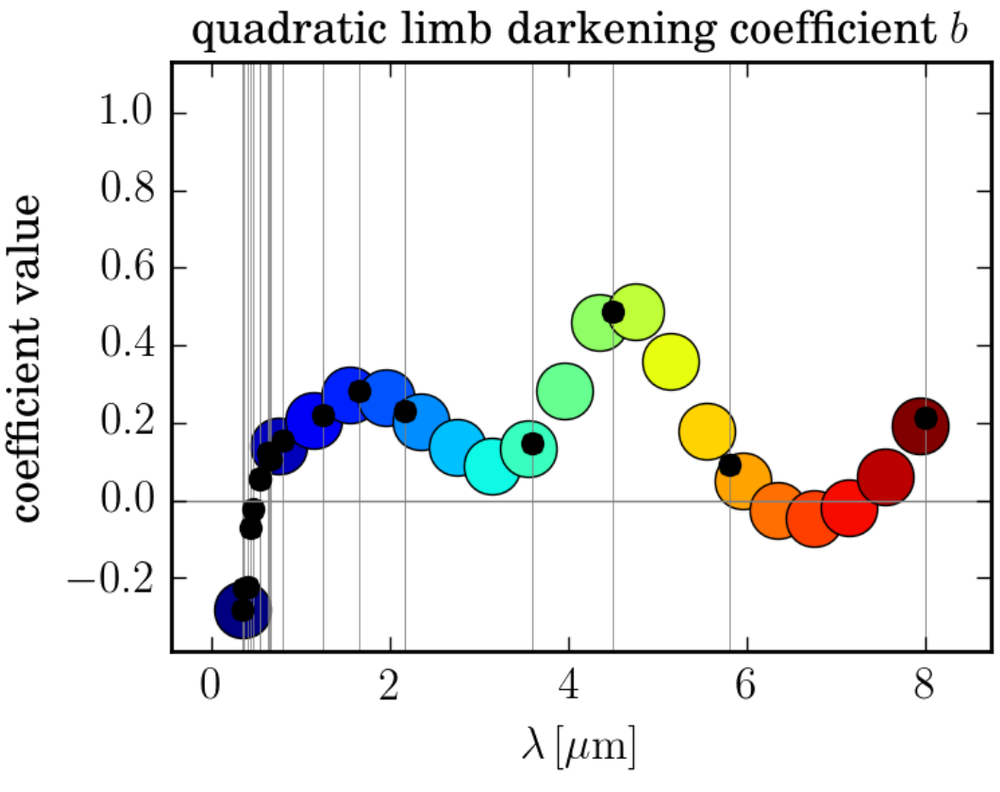

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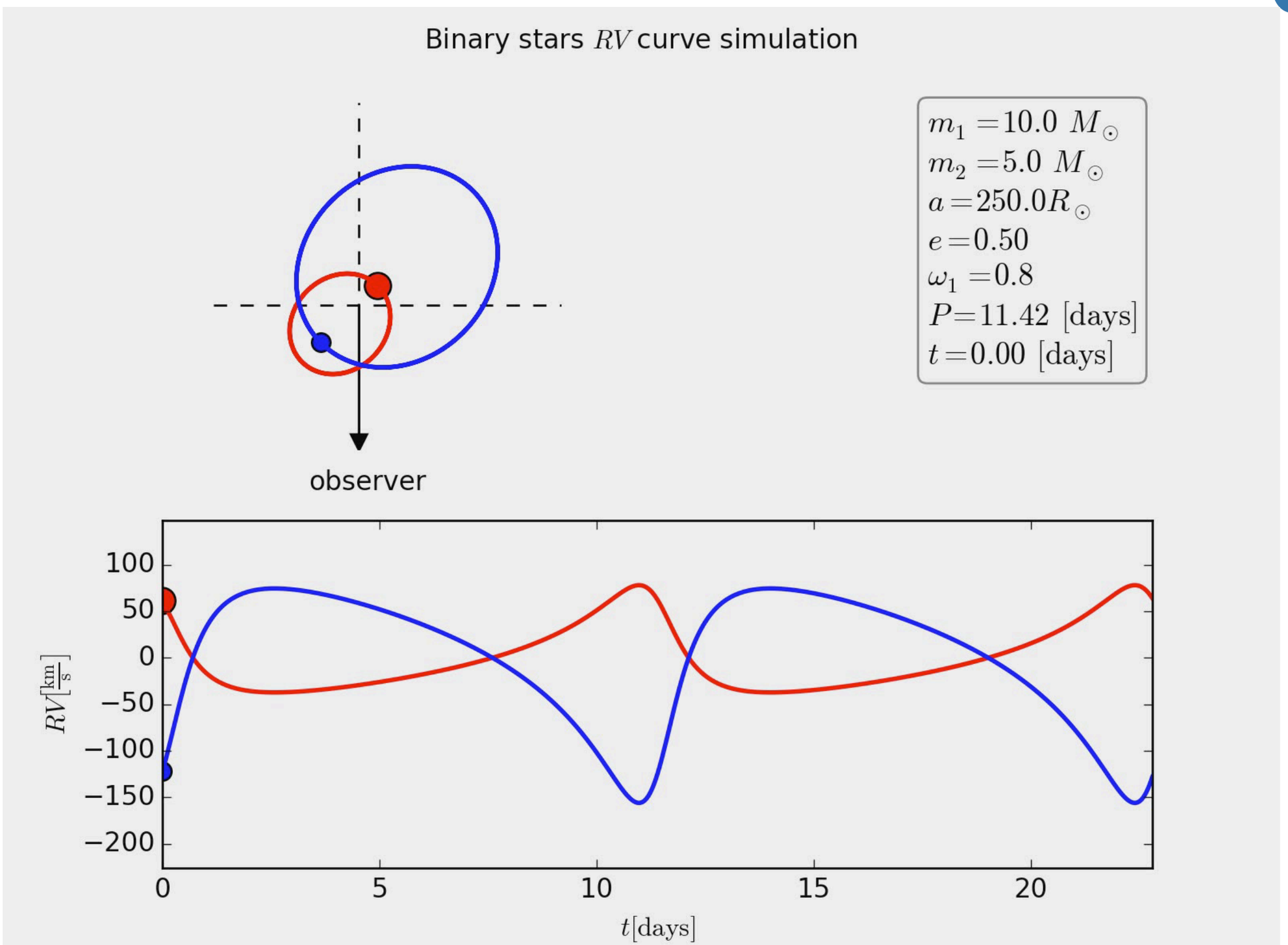

In this more complex example, I would like to show the majority of things I use python for:

1. We will generate random number from a polynomial of a certain degree with gaussian scatter and write it to the external ascii file.
2. We read this ascii file in and interpolate the data, bin the data and fit the data with different functions.
3. We create new directory and write out obtained results.
4. We will run C code and read in its output, just to demonstrate that we can do it.
5. We plot everything, fits with errors, points, colorbar, we add the text

And that's it. Thanks for attention!