Assignment 4

Due: 2nd March.

1 Python Performance

(*50Points*) Together with this HW you will find a solution in python of a previous HW. That simple code implements very poorly the famous Hénon Map[1] with *npoints=600* on a specific grid.

The main goal of this HW is to speed up the calculations and measure the performance of that simple code.

- (*20 Points*) Using *kernprof*, *line_profiler*[2] and *memory Profiler*[3] to analyse the given code as it is (*V1.ipnyb*). What is that code doing and where? Where is it spending the majority of the time? How much memory is being used and where is the most used one?
- (*5 Points*) Write a version if that code that **does not** use numpy. (Call it *V2.py*)
- (*20 Points*) Optimise the code as much as possible using at least (Call it *V3.py*):
  - Numba[4] (Use the decorator @jit with at least one argument)
  - Broadcasting[5]
- (*5 Points*) Compare the three version of the codes and comment on your results.
- (*Bonus: 10 Points*). The fastest solution will win this bonus.

[1] http://mathworld.wolfram.com/HenonMap.html
[2] https://github.com/rkern/line_profiler
[3] https://pypi.org/project/memory-profiler/
[4] http://numba.pydata.org
[5] https://jakevdp.github.io/PythonDataScienceHandbook/02.05-computation-on-arrays-broadcasting.html