README for investigations with the Chialvo model

Repository containing the basic codes used in the Chialvo paper.

Files

1. src/chialvo_powerlaw.cpp: Main code that simulates the network.
2. Makefile: used to compile the codes; contains the compilation recipes. In the paper, we used the C++ intel compiler, icpc (ICC) 14.0.3 20140422. In this repository, the standard compiler is g++ to facilitate compilation for other people. To compile, type 'make' in the terminal.
3. src/noise_generator_shuffled.cpp: example file to print shuffles
4. run.sh: a simple shell script to run the executable generated by compiling chialvo_powerlaw.cpp.
5. plotter_raster.py: a python script to make a raster plot for the example. To run, type python plotter_raster.py in the terminal. After a while, a new file will be generated in the results directory.
6. results: example_RP: the example in the run.sh, but run for 100k transients. This is the same figure as in the paper.

Main program (chialvo_powerlaw.cpp)

Receives the following inputs: alpha N seed K_min sigma eps, in which alpha is the locality parameter, N is the network size, seed is the seed for the number generator used in the shuffle, K_min=0.03 is the minimum value for the input K, sigma is the dissimilarity coefficient, eps are coupling strengths. An example of a run command is in the file run.sh

Outputs a file with the spike times, which can then be used for analysis.

Recipe for running the program

1. Compile the code using the makefile: type 'make' in the terminal
2. Run the executable: type source run.sh (will run an example program). Obs: it will run for only 1000. To replicate the results in the paper, change the execution times in the code.

Very easy, even Roberto could it 😃

Analysis

I did not include the analysis code in this repo, if you want them, email me at kalelluizrossi@gmail.com.