COMPUTATIONAL EXPERIMENTS

Experiment 1 - Figure 1

The goal of this experiment is merely to describe what is the starting point of our random network in terms of activities in both populations

- Generate a random Network 20%in 80%exc
- Plot V profile
- Observe firing rates distributions

Experiment 2 - Figure 2

The goal of this experiment is to test the robustness of the network to changes in EE synapses

- Change E->E connectivity to mimic the 6 imaging sessions
- (a) plot the connectivity matrices
- (b1) plot the FiringRate distribution
- (b2) plot, for some random neurons, what is the firing rate
- (c) plot the autocorrelation of:
  - connectivity matrix
  - Inh firing rate vectors
  - Exc firing rate vectors

Experiment 3 - Figure 5

The goal of this experiment is to test the capacity of the network to store patterns (in a short-term memory manner) and see its robustness to synaptic rewiring

- Store (2000) memory patterns in the network through hebbian and anti-hebbian learning rules
- Stimulate one memory and keep track of the correlation coefficients
- (a) inject current corresponding to 3 different patterns a t = 0, 3 and 6 and plot
  - Raster plot of 400/100 exc inh random neurons
  - Overlap as a function of time
- (b) same thing rewiring EE / II

Experiment 4 - Figure 7

The goal of this experiment is to test the effect of increasing synaptic efficacy: it is mimiquinc the process of learning

- There are three different networks: a baseline (no modifications), a f = 0.2 (20% of the exc neurons are increased a 20% their efficacy) and a f = 1 (100% of exc neurons increased a 20% efficacy)
- (a) plot connectivity matrices
- (b) plot firing rate distributions and some examples of firing rate
- (c) same thing altogether
- (d) autocorrelation for different f