**DESCRIPTION OF THE PROGRAMS CONTAINED IN THE ZIP FILE**

The program “**Addestramento sinapsi.m**” can be used to train the synapses of the two channels, starting from an initial condition in which the network is completely naïve, i.e., all synapses entering the Go and NoGo parts have the same value (these values can be assigned in lines 33-66). The dopamine level during training can be set in line 71.

After training, the synapses at different epochs of training are stored in a data file named “**W\_tot\_new. mat**” together with the positions of rewards, punishments and no-responses, and the dopamine level used. It is recommended that the user renames this file to maintain the results.

During training the program calls the function “**BG\_model\_function\_Ach.m**” which simulates the dynamics of the basal ganglia during training. The standard deviation of noise can be assigned in line 174 of this function.

The results can be plotted through the program “**plot\_addestrameno\_sinapsi.m**” which, in line 6, loads the previous data.

The other programs perform the simulations to generate Figures 2-9 in the publication. It is worth noting that these programs load the synapses contained in the file “**W\_tot\_new\_W0e5\_D1e0.mat**”. The latter were obtained by simulating a previous training with dopamine level set at 1.0, and starting from a naïve network with initial synapses in the striatum equal to 0.5. A severe Parkinsonian subject is simulated using synapses after 100 epochs, a normal subject using synapses after 150 (or 200) epochs.

It is worth noting that the programs that generate Figures 2-9 call the function “**BG\_model\_function\_tapping\_mauro.m**” which simulates the finger tapping task (i.e., the inputs to the two channels alternate, with a certain delay between a movement and the subsequent one). This test is performed without noise (see lines 147 and 151).

In particular the program “**Figure6\_learning\_vs\_Levodopa.m**”, performs the simulations necessary to generate Figure 6. This program calls the program “**calcola\_levodopa.m**” (line 56) to simulate the effect of levodopa injection on the patient. Then, it executes some further trainings (50 epochs each) at different moments after levodopa injection, by calling the program “**Addestramento\_sinapsi\_senzaW.m**”. The latter differs from “Addestramento.sinapsi.m” since the values of synapses are not assigned in lines 33-66, but derived from the previous simulation.