

# Computational neurodynamics

## Exercise Sheet 5 (Unassessed) Synchronisation

All the files for these exercises can be found online at

<https://www.github.com/pmediano/ComputationalNeurodynamics>

### *Question 1.*

- a) Start up Python and run `Sync2Run` to simulate the activity of two coupled neural oscillators. You should obtain raster plots and mean firing rate results similar to those for two coupled populations in Topic 10 (Oscillation Sources). Inspect the relevant code and make sure you understand it.
- b) Run `SynchronisationIndex` with the appropriate settings on the generated spike trains to confirm that there is indeed high synchronisation between these two populations.
- c) Now decouple the two populations, and repeat the steps in (a) and (b) to confirm that the level of synchronisation is much lower.

### *Question 2.*

- a) Modify `Sync2Connect` so that the coupling between the two populations is excitatory to excitatory, not excitatory to inhibitory. In other words, the arrangement should be like in the figure below.

Modify the excitatory to inhibitory and inhibitory to excitatory delays within the two PING populations to be both 5ms. Set all the excitatory to excitatory scaling factors to 5.

- b) Run the network as before. Inspect the results with `SynchronisationIndex`. What is the result?

