

Effect of external input currents on bursting in neural network models

Senathirajah Selvarajan¹, Asiri Nanayakkara¹ and Malmini Ranasinghe²

¹*Institute of Fundamental Studies, Hanthana Road, Kandy* ²*Department of Mathematics, University of Sri Jayawardanapura, Nugagoda*

A continuous biophysical Neural Network Model was used to simulate synchronized population bursting by introducing external input current as back ground activity of the neural system. It was found that maps of membrane potential exhibit stable stationary states, limit cycles and bursting (chaotic) like trajectories similar to those were found in experiments on hippocampal slices. Single neuron and neurons in population are found to be very sensitive to the input current, the outside potassium concentration changes and synaptic weights. We investigated the effect of the input current and the potassium concentration changes on neuronal dynamics of a single neuron and population of neurons. It was observed that the input current with the high potassium medium makes high bursting activity in neurons similar to the spontaneously population bursting observed in some experiments.