

A Population Firing Rate Model of Reverberatory Activity in Neuronal Networks

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Synaptic activity based on neurotransmitters has been thoroughly described by mathematical models. Most of the existing models, however, disregard asynchronous synaptic transmission, another type of synaptic signal. Asynchronous synaptic transmission has been shown to elevate the potential of the cell slightly, and take a much longer time to return to resting state than the regular neurotransmitter signal. In this presentation, we will discuss our results in 1) creating firing rate models of neuronal networks incorporating asynchronous synaptic transmission as well as spike frequency adaptation or synaptic depression 2) creating network models with all neurons affecting each other based on the firing rate models 3) analyzing all models. These results emphasize the impact of asynchronous synaptic transmission on neural activity.