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Mean field study of stochastic spiking neural networks

In this work, we study the dynamics of a network of stochastic spiking neurons akin to the "generalized linear model". This network is a generalization of the one introduced in [DeMasi et al. 2014]. It allows to capture most intrinsic neuronal spiking, like bursting for example, while being quite easy to investigate compared to the Hodgkin-Huxley model. Two sets of results will be provided. On the theory side, the mean field will be derived and the stability of its invariant measure(s) will be investigated. On the numerical side, simulations of the PDE and of the finite network (on GPU) will be compared close to the bifurcations of the system. More precisely, I will present some recent results concerning the quasi-synchronisation of the neurons as function of the different parameters of the network (adaptation variable, synaptic strength...).