Numerical simulations of two-dimensional stochastic neural field equations with delay

Tiago Sequeira, Pedro Lima[1],

[1] CEMAT - Instituto Superior Técnico, University of Lisbon,

Neural field equations are intended to model the synaptic interactions between neurons in a continuous neural network, called a neural field [1],[2].This kind of integrodifferential equations proved to be a useful tool for a spatiotemporal modeling of the neuronal activity from a macroscopic point of view, allowing the study of a wide variety of neurobiological phenomena, such as the processing of sensory stimuli. The aim of the present talk is to study the effects of additive noise in one- and two-dimensional neural fields, while taking into account finite signal transmission speed. A Galerkin-type method to approximate such models is presented, which applies the Fast Fourier Transformation to optimise the computational effort required to solve this type of equations. Numerical simulations obtained by this algorithm are presented and discussed.

References

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