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Talk 1:

Effects of noise in excitable systems I

I review the behavior of theoretical models of excitable systems driven by Gaussian white noise. I focus mainly on those general properties of such systems that are due to noise, and present several applications of our findings in biophysics and lasers. As prototypes of excitable stochastic dynamics I consider the FitzHugh-Nagumo and its discrete Non-Markovian approximation.. In these systems, taken as individual units or as networks of globally or locally coupled elements, I show various phenomena due to noise, such as noise-induced oscillations, stochastic resonance, stochastic synchronization, noise-induced phase transitions and noise-induced pulse and spiral dynamics.

Talk 2:

Effects of noise in excitable systems II

In the second lecture I consider networks with noisy oscillators at the nodes. I will introduce situation where the nodes are coupled by a extracellular potassium which decreases adaptively excitability of the elements. The model is aimed to describe depression waves in neuronal tissues. Various spatial patterns induced by noise will be shown. Special attention is paid to the effect of boundaries and defects on the excitations in the medium.