

## STOCHASTIC MULTI-RESONANCE IN A NEURAL NETWORK WITH DYNAMIC SYNAPSES

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We numerically studied the emergence of Stochastic Resonance (SR) in a complex neural network. This phenomenon consists in the enhancement of the signal-to-noise ratio at several levels of a disturbing ambient noise. The setting was an autoassociative Ising-Hopfield network modified to include the mechanism of synaptic depression. Such highly non-linear system provides an adequate framework to study how different types of intrinsic noise, affecting the excitability of neurons and synapses, can interact in a non-trivial way to amplify weak signals and stimulus that carry relevant information. After an extensive study of such system, we demonstrated that, for different values of mean neural activity of the network, there are two different noise levels which optimize the transmission of weak signals, leading to the phenomenon of stochastic multi-resonance (SMR).