

System Size Resonance in Attractor Neural Networks

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Abstract

System Size Resonance (SSR) is a phenomenon related to Stochastic Resonance, first reported recently, by which the response of a finite-size system to an external field or signal is optimal for a given number of elements in the systems, N .

We report the presence of SSR in an attractor neural network trained with two patterns according to Hebb rule. The network is exposed to the action of a time-dependent periodic external stimulus driving the system to one pattern for half a period and to the other pattern for half a period. We show that the response of the system to the stimulus is the highest for a finite size N , which depends on the temperature, the Hamming distance between the patterns and the period of the external stimulus.