Condensed Matter > Disordered Systems and Neural Networks

Dynamical Entropy Production in Spiking Neuron Networks in the Balanced State

Michael Monteforte, Fred Wolf

(Submitted on 23 Mar 2010)

We demonstrate deterministic extensive spatio-temporal chaos in the dynamics of spiking neuron networks in the balanced state. The analysis is based on numerically exact calculations of the full spectrum of Lyapunov exponents, the entropy production rate and the attractor dimension. Extensive chaos is found in purely inhibitory networks and becomes more intense when an excitatory population is included. We find a strikingly high rate of entropy production that would limit information representation in cortical spiking patterns to the immediate stimulus response.

Comments:	4 pages, 4 figures
Subjects:	**Disordered Systems and Neural Networks (cond-mat.dis-nn)**; Chaotic Dynamics (nlin.CD); Neurons and Cognition (q-bio.NC)
Cite as:	**arXiv:1003.4410v1 [cond-mat.dis-nn]**

Submission history

From: Michael Monteforte [view email]
[v1] Tue, 23 Mar 2010 13:41:29 GMT (178kb)

Which authors of this paper are endorsers?