

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Attractors in continuous and Boolean networks¹ JOHANNES NORRELL, JOSHUA SOCOLAR, Physics Department and Center for Nonlinear and Complex Systems, Duke University, BJÖRN SAMUELSSON, Lund University — Random Boolean models of complex regulatory networks are known to exhibit rich dynamical behaviors, including an order/disorder transition. We show that implementation of the nominal Boolean logic of a network using differential equations involving sigmoidal switching functions generically leads to deviations from the Boolean predictions. On simple rings, the “reliable” set of Boolean attractors corresponds to the stable attractors of the analogous continuous system. For networks with more complex logic, however, the set of the continuous attractors is determined by non-Boolean characteristics of the switching events. In large random networks, the nature of the order/disorder transition is altered by collective effects associated with compositions of the sigmoidal switching functions.

¹Supported by NSF

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Date submitted: 22 Nov 2007

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