

Globally Correlated Discrete Systems: Attractors in Probability Space and Entropic Extensivity

John A. Marsh

SI International, USA

Abstract:

We consider globally correlated systems composed of N identical distinguishable binary random variables, and study two aspects of these systems: attractors in the space of probability distributions, and entropic extensivity. Several models recently appearing in the literature and several new models are considered. In the case of independent system composition (where the joint probabilities satisfy a product law), the generalized entropy S_q (with entropic parameter q) is extensive for $q = 1$, and the attractor is a Gaussian, in accordance with the central limit theorem. We study in detail the deviations from this "normal" behavior when global correlations are introduced, and discuss the results in terms of the q -generalized central limit theorem that has recently appeared in the literature.