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The Canonical Thermodynamic Formalism: Chaotic States of Spin and Gauge Systems

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Abstract: The three-site antiferromagnetic Ising, Q-state Potts (Q<2) and Z(N) gauge models in some temperatures and external fields have a chaotic behavior. We investigate the thermodynamic formalism of these models on the hierarchical lattices. Using the canonical thermodynamic formalism of dynamical systems, the nonanalytic behavior in the distribution of Lyapunov exponents is investigated and the phase transition point on the ``chaotic free energy\" for multisite interaction antiferromagnetic Ising, Q-state Potts and Z(2) gauge models. We also consider Fisher Zeros of the Baxter-Wu model.

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