SIMULATED ANNEALING WITH TSALLIS WEIGHTS FOR $\pm J$ SPIN GLASS

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9.7 cm

Recently it has become clear that usual Boltzmann-Gibbs statistics fail for systems underlying special conditions, e.g. nonextensivity of thermodynamic quantities caused by long-range interactions. A possible theoretical tool to deal with such systems has been formulated by Tsallis. On the basis of the resulting non-Boltzmann distribution of states new stochastic Monte Carlo acceptance probabilities have been applied to various optimization problems. We have used generalized Monte Carlo simulated annealing algorithms to the ± J spin glass model. Efficiency of the new annealing procedures has been compared with that of the conventional methods. This has been done with respect to the number of annealing steps and to the lowest energy found. The algorithms have been applied to a system of 70×70 spins on a square lattice with periodical boundary conditions whose ground state configurations are known exactly. This enables us to evaluate the efficiency in a quanitative way.

13.4 cm

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