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Population Annealing: Theory and Application in Spin Glasses[1]
JONATHAN MACHTA, Univ of Mass - Amherst, WENLONG WANG, HELMUT G. KATZGRABER, Texas A&M University — Population annealing is an efficient sequential Monte Carlo algorithm for simulating equilibrium states of systems with rough free energy landscapes. The theory of population annealing is presented, and systematic and statistical errors are discussed. The behavior of the algorithm is studied in the context of large-scale simulations of the three-dimensional Ising spin glass and the performance of the algorithm is compared to parallel tempering. It is found that the two algorithms are similar in efficiency though with different strengths and weaknesses.

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