

Abstract Submitted
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Population Annealing Monte Carlo for Frustrated Systems¹

CHRISTOPHER AMEY, Univ of Mass - Amherst, JONATHAN MACHTA, Univ of Mass - Amherst, Santa Fe Institute — Population annealing is a sequential Monte Carlo algorithm that efficiently simulates equilibrium systems with rough free energy landscapes such as spin glasses and glassy fluids. A large population of configurations is initially thermalized at high temperature and then cooled to low temperature according to an annealing schedule. The population is kept in thermal equilibrium at every annealing step via resampling configurations according to their Boltzmann weights. Population annealing is comparable to parallel tempering in terms of efficiency, but has several distinct and useful features. In this talk I will give an introduction to population annealing and present recent progress in understanding its equilibration properties and optimizing it for spin glasses. Results from large-scale population annealing simulations for the Ising spin glass in 3D and 4D will be presented.

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Christopher Amey
Univ of Mass - Amherst

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