A Model Reference Adaptive Search Method for Global Optimization

Abstract: Model Reference Adaptive Search (MRAS) is a randomized search method for solving global optimization problems. The method works with a parameterized probabilistic model on the solution space and generates at each iteration a group of candidate solutions. These candidate solutions are then used to update the parameters associated with the probabilistic model in such a way that the future search will be biased toward the region containing high quality solutions. The parameter updating procedure in MRAS is guided by a sequence of implicit probabilistic models called reference models. We show that the model reference framework can be used to describe the recently proposed cross-entropy (CE) method for optimization and study its properties. We prove global convergence of the proposed algorithm in both continuous and combinatorial domains, and we carry out numerical studies to illustrate the performance of the algorithm. At the end of the talk, we will describe recent work (with Enlu Zhou and Yongqiang Wang) utilizing particle filtering and evolutionary games to develop related classes of global optimization algorithms.

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2 This is joint work with Jiaqiao Hu and Michael Fu.