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A model reference adaptive search method for global optimization. (English) Zbl 1167.90690
Oper. Res. 55, No. 3, 549-568 (2007).

Summary: Model reference adaptive search (MRAS) for solving global optimization problems 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 we call reference models. We provide a particular algorithm instantiation of the MRAS method, where the sequence of reference models can be viewed as the generalized probability distribution models for estimation of distribution algorithms (EDAs) with proportional selection scheme. In addition, we show that the model reference framework can also be used to describe the recently proposed cross-entropy (CE) method for optimization and to study its properties. Hence, this paper can also be seen as a study on the effectiveness of combining CE and EDAs. 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.

MSC:

90C59 Approximation methods and heuristics in mathematical programming Cited in **36** Documents
90C26 Nonconvex programming, global optimization

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