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### A Model-Based Approach to Multi-Objective Optimization

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We develop a model-based algorithm for the optimization of multiple objective functions that can only be assessed through black-box evaluation. The algorithm iteratively generates candidate solutions from a mixture distribution over the solution space and updates the mixture distribution based on the sampled solutions' domination count such that the future search is biased towards the set of Pareto optimal solutions. The proposed algorithm seeks to find a mixture distribution on the solution space so that:

- 1) Each component of the mixture distribution is a degenerate distribution centered at a Pareto optimal solution.
- 2) Each estimated Pareto optimal solution is uniformly spread across the Pareto optimal set by a threshold distance.

We demonstrate the performance of the proposed algorithm on several benchmark problems.