GLOBAL OPTIMIZATION WITH NOISE CORRUPTED FUNCTION EVALUATIONS

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In many practical problems, one is interested in approximating the minimum cost associated with some system based on partial information, such as sequentially chosen function evaluations. Sometimes the exact function values are not available, and the optimizer must make do with noisy estimates of the values. For example, if one wishes to minimize the average cost of operating a stochastic system for which no tractable analytic formula is available, then the optimizer might use discrete-event simulation to estimate the cost at a sequence of adaptively chosen parameter values. Typical simulation estimators, when suitably normalized, have an approximately normal distribution for long simulation run lengths. To model this situation, we consider the problem of approximating the minimum of a continuous function using sequentially chosen function evaluations corrupted by normally distributed noise. We describe an optimization algorithm for which the error converges to zero at the optimal rate up to logarithmic factors.