Classical unconstrained optimization based on "occasionally accurate" random models

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We will present a very general framework for unconstrained optimization which includes methods using random models for deterministic and stochastic optimization. We make assumptions on the stochasticity that are different from the typical assumptions of stochastic and simulation-based optimization. In particular we assume that our models, search directions and function values satisfy some good quality conditions with some probability, but can be arbitrarily bad otherwise. Recently several convergence and expected convergence rates results have been developed under this framework when applied to standard optimization methods, such as line search, trust region method, direct search methods and adaptive regularization with cubics. We will present these results and outline the general analysis techniques based on theory of stochastic processes.

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