Stochastic and deterministic algorithms for continuous black-box optimization

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Propositions

accompanying the thesis

Stochastic and Deterministic Algorithms for Continuous Black-Box Optimization

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1. The effectiveness and efficiency of a stochastic variation can be judged by the discrepancy of the sample generated from it. *Chapter 2.*

2. When using Kriging for modeling, we should always question about the assumption that the target function can be represented in the function space induced by Kriging. *Chapter 3.*

3. In modeling, it is better to build fine-grained local models and construct a global model by combining the local ones. This makes it possible to extend Kriging for big data sets. *Chapter 3.*

4. The balance between exploration and exploitation can be controlled carefully by using the weighted combination of moments on the Kriging model. *Chapter 4.*

5. Niching methods can facilitate the parallelization of infill criteria, with relatively small computational overhead. *Chapter 4.*

6. In hypervolume indicator gradient method, adaptively controlling the stepsize of the steepest descent direction speeds up the convergence significantly. *Chapter 5*

7. The so-called Kriging mean squared error measures how well the assumed stochastic process is approximated by finite samples.

8. During the optimization process, it is beneficial to infer the structure and feature of the objective function online.

9. The convergence rate of efficient global optimization is affected by the contraction rate of the Kriging model and the error that occurs when optimizing the infill criterion.

10. You reap, what you sow. You get out, what you put in.