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 care-
fully by using the weighted combination of moments on the Kriging model.
Chapter 4.

5. Niching methods can facilitate the parallelization of infill criteria, with rela-
tively small computational overhead. Chapter 4.

6. In hypervolume indicator gradient method, adaptively controlling the step-
size 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 con-
traction rate of the Kriging model and the error that occurs when optimizing
the infill criterion.