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Introduction to derivative-free optimization. (English) Zbl 1163.49001
MPS/SIAM Series on Optimization 8. Philadelphia, PA: Society for Industrial and Applied Mathematics (SIAM) (ISBN 978-0-898716-68-9/pbk; 978-0-89871-876-8/ebook). xii, 277 p. (2009).

This monograph published as a volume in the MPS-SIAM series on optimization is the first comprehensive treatment of unconstrained optimization without derivatives. The first part of the monograph is devoted to sampling and modeling tools needed for derivative-free optimization, which include positive spanning sets and bases, linear interpolation and regression models, simplex gradients, nonlinear polynomial interpolation models in determined, regression and undetermined forms. The second part presents derivative-free frameworks and algorithms for unconstrained optimization, which include directional and simplicial direct-search methods, line-search methods based on simplex derivatives, trust-region methods based on derivative-free models, and trust-region interpolation-based methods. The third part contains review of some relevant topics not covered in detail in previous chapters, which include surrogate models and constrained derivative-free optimization. A list of software packages developed for derivative-free optimization is given as an appendix. This book is appropriate for use in advanced undergraduate or graduate courses on optimization.

Reviewer: Satoshi Ito (Tokyo)

MSC:

49-02	Research exposition (monographs, survey articles) pertaining to calculus of variations and optimal control
90C56	Derivative-free methods and methods using generalized derivatives
90-01	Introductory exposition (textbooks, tutorial papers, etc.) pertaining to operations research and mathematical programming
90-02	Research exposition (monographs, survey articles) pertaining to operations research and mathematical programming
65K05	Numerical mathematical programming methods

Cited in **1** Review
Cited in **198** Documents

Keywords:

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