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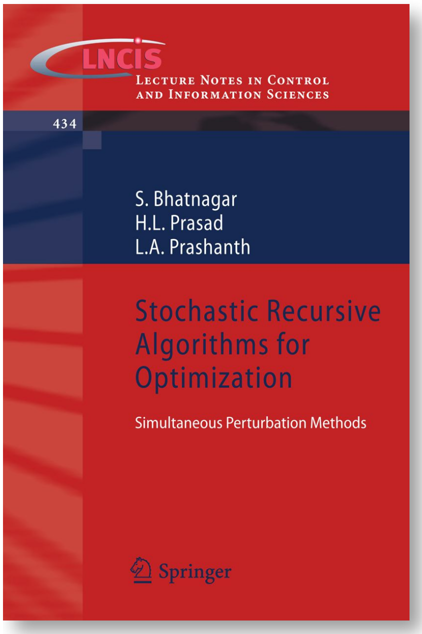

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Stochastic Recursive Algorithms for Optimization

Simultaneous Perturbation Methods

Series: Lecture Notes in Control and Information Sciences, Vol. 434

- **Algorithms described perform better in real-life settings than many previously described in the literature**
- **Detailed mathematical treatment of the algorithms proposed is provided using both gradient- and Hessian-based methods**
- **Both constrained and unconstrained optimization problems are treated with applications in service systems, traffic signal control and communication networks**

Stochastic Recursive Algorithms for Optimization presents algorithms for constrained and unconstrained optimization and for reinforcement learning. Efficient perturbation approaches form a thread unifying all the algorithms considered. Simultaneous perturbation stochastic approximation and smooth fractional estimators for gradient- and Hessian-based methods are presented. These algorithms:

• are easily implemented;

• do not require an explicit system model; and

• work with real or simulated data.

Chapters on their application in service systems, vehicular traffic control and communications networks illustrate this point. The book is self-contained with necessary mathematical results placed in an appendix.

The text provides easy-to-use, off-the-shelf algorithms that are given detailed mathematical treatment so the material presented will be of significant interest to practitioners, academic researchers and graduate students alike. The breadth of applications makes the book appropriate for reader from similarly diverse backgrounds: workers in relevant areas of computer science, control engineering, management science, applied mathematics, industrial engineering and operations research will find the content of value.