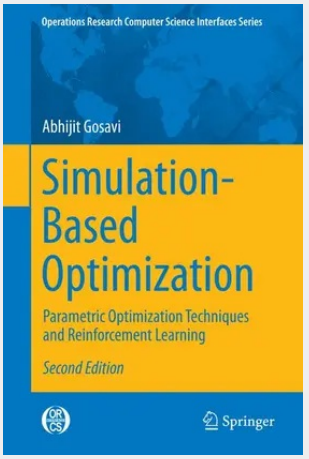
Gosavi

Simulation-Based Optimization

Parametric Optimization Techniques and Reinforcement Learning



192,59 €
179,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9781489974907
Medium: Buch
ISBN: 978-1-4899-7490-7
Verlag: Springer
Erscheinungstermin: 30.10.2014
Sprache(n): Englisch
Auflage: 2. Auflage 2015
Serie: Operations Research/Computer Science Interfaces Series
Produktform: Gebunden
Gewicht: 9221 g
Seiten: 508
Format (B x H): 160 x 241 mm

Simulation-Based Optimization: Parametric Optimization Techniques and Reinforcement Learning introduce the evolving area of static and dynamic simulation-based optimization. Covered in detail are *model-free* optimization techniques – especially designed for those discrete-event, stochastic systems which can be simulated but whose analytical models are difficult to find in closed mathematical forms.

Key features of this revised and improved Second Edition include:

· Extensive coverage, via step-by-step recipes, of powerful new algorithms for static simulation optimization, including simultaneous perturbation, backtracking adaptive search and nested partitions, in addition to traditional methods, such as response surfaces, Nelder-Mead search and meta-heuristics (simulated annealing, tabu search, and genetic algorithms)

· Detailed coverage of the Bellman equation framework for Markov Decision Processes (MDPs), along with dynamic programming(value and policy iteration) for discounted, average, and total reward performance metrics

· An in-depth consideration of dynamic simulation optimization via temporal differences and Reinforcement Learning: *Q - Learning* , *SARSA* , and *R-SMART* algorithms, and policy search, via *API* , *Q - P - Learning* , actor-critics, and learning automata

· A special examination of neural-network-based function approximation for Reinforcement Learning, semi-Markov decision processes (SMDPs), finite-horizon problems, two time scales, case studies for industrial tasks, computer codes (placed online) and convergence proofs, via Banach fixed point theory and Ordinary Differential Equations

Themed around three areas in separate sets of chapters – **Static Simulation Optimization, Reinforcement Learning** and **Convergence Analysis** – this book is written for researchers and students in the fields of engineering (industrial, systems,electrical and computer), operations research, computer science and applied mathematics.

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