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Nota di contenuto	1. Optimal Control under Stochastic Uncertainty -- 2. Stochastic Optimization of Regulators -- 3. Optimal Open-Loop Control of Dynamic Systems under Stochastic Uncertainty -- 4. Construction of feedback control by means of homotopy methods -- 5. Constructions of Limit State Functions -- 6. Random Search Procedures for Global Optimization -- 7. Controlled Random Search under Uncertainty -- 8. Controlled Random Search Procedures for Global Optimization -- 9. Mathematical Model of Random Search Methods and Elementary Properties -- 10. Special Random Search Methods -- 11. Accessibility Theorems -- 12. Convergence Theorems -- 13. Convergence of Stationary Random Search Methods for Positive Success Probability -- 14. Random Search Methods of convergence order U(n") -- 15. Random Search Methods with a Linear Rate of Convergence -- 16. Success/Failure-driven Random Direction Procedures -- 17. Hybrid Methods -- 18. Solving optimization problems under stochastic uncertainty by Random Search Methods(RSM).
Sommario/riassunto	This book examines application and methods to incorporating stochastic parameter variations into the optimization process to decrease expense in corrective measures. Basic types of deterministic substitute problems occurring mostly in practice involve i) minimization of the expected primary costs subject to expected recourse cost

constraints (reliability constraints) and remaining deterministic constraints, e.g. box constraints, as well as ii) minimization of the expected total costs (costs of construction, design, recourse costs, etc.) subject to the remaining deterministic constraints. After an introduction into the theory of dynamic control systems with random parameters, the major control laws are described, as open-loop control, closed-loop, feedback control and open-loop feedback control, used for iterative construction of feedback controls. For approximate solution of optimization and control problems with random parameters and involving expected cost/loss-type objective, constraint functions, Taylor expansion procedures, and Homotopy methods are considered, Examples and applications to stochastic optimization of regulators are given. Moreover, for reliability-based analysis and optimal design problems, corresponding optimization-based limit state functions are constructed. Because of the complexity of concrete optimization/control problems and their lack of the mathematical regularity as required of Mathematical Programming (MP) techniques, other optimization techniques, like random search methods (RSM) became increasingly important. Basic results on the convergence and convergence rates of random search methods are presented. Moreover, for the improvement of the – sometimes very low – convergence rate of RSM, search methods based on optimal stochastic decision processes are presented. In order to improve the convergence behavior of RSM, the random search procedure is embedded into a stochastic decision process for an optimal control of the probability distributions of the search variates (mutation random variables). .