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Sommario/riassunto	This book deals with efficient estimation and optimization methods to improve the design of electrotechnical devices under uncertainty. Uncertainties caused by manufacturing imperfections, natural material variations, or unpredictable environmental influences, may lead, in turn, to deviations in operation. This book describes two novel methods for yield (or failure probability) estimation. Both are hybrid methods that combine the accuracy of Monte Carlo with the efficiency of surrogate models. The SC-Hybrid approach uses stochastic

collocation and adjoint error indicators. The non-intrusive GPR-Hybrid approach consists of a Gaussian process regression that allows surrogate model updates on the fly. Furthermore, the book proposes an adaptive Newton-Monte-Carlo (Newton-MC) method for efficient yield optimization. In turn, to solve optimization problems with mixed gradient information, two novel Hermite-type optimization methods are described. All the proposed methods have been numerically evaluated on two benchmark problems, such as a rectangular waveguide and a permanent magnet synchronous machine. Results showed that the new methods can significantly reduce the computational effort of yield estimation, and of single- and multi-objective yield optimization under uncertainty. All in all, this book presents novel strategies for quantification of uncertainty and optimization under uncertainty, with practical details to improve the design of electrotechnical devices, yet the methods can be used for any design process affected by uncertainties. .