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Sommario/riassunto

"Probabilistic analysis is increasing in popularity and importance within engineering and the applied sciences. However, the stochastic perturbation technique is a fairly recent development and therefore remains as yet unknown to many students, researchers and engineers. Fields in which the methodology can be applied are widespread, including various branches of engineering, heat transfer and statistical mechanics, reliability assessment and also financial investments or economical prognosis in analytical and computational contexts. Stochastic Perturbation Method in Applied Sciences and Engineering is devoted to the theoretical aspects and computational implementation of the generalized stochastic perturbation technique. It is based on any order Taylor expansions of random variables and enables for determination of up to fourth order probabilistic moments and characteristics of the physical system response.Key features: Provides a grounding in the basic elements of statistics and probability and reliability engineering Describes the Stochastic Finite, Boundary Element and Finite Difference Methods, formulated according to the perturbation method Demonstrates dual computational implementation of the perturbation method with the use of Direct Differentiation Method and the Response Function Method Accompanied by a website (www.wiley.com/go/kaminski) with supporting stochastic numerical software Covers the computational implementation of the homogenization method for periodic composites with random and stochastic material properties Features case studies, numerical examples and practical applications Stochastic Perturbation Method in Applied Sciences and Engineering is a comprehensive reference for researchers and engineers, and is an ideal introduction to the subject for postgraduate and graduate students"--