

1. Record Nr.	UNINA9910254309203321
Autore	Soize Christian
Titolo	Uncertainty Quantification : An Accelerated Course with Advanced Applications in Computational Engineering // by Christian Soize
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2017
ISBN	3-319-54339-3
Edizione	[1st ed. 2017.]
Descrizione fisica	1 online resource (XXII, 329 p. 110 illus., 86 illus. in color.)
Collana	Interdisciplinary Applied Mathematics, , 0939-6047 ; ; 47
Disciplina	519.2
Soggetti	Computer mathematics Applied mathematics Engineering mathematics Probabilities Computational Science and Engineering Mathematical and Computational Engineering Probability Theory and Stochastic Processes
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Fundamental Notions in Stochastic Modeling of Uncertainties and their Propagation in Computational Models -- Elements of Probability Theory -- Markov Process and Stochastic Differential Equation -- MCMC Methods for Generating Realizations and for Estimating the Mathematical Expectation of Nonlinear Mappings of Random Vectors -- Fundamental Probabilistic Tools for Stochastic Modeling of Uncertainties -- Brief Overview of Stochastic Solvers for the Propagation of Uncertainties -- Fundamental Tools for Statistical Inverse Problems -- Uncertainty Quantification in Computational Structural Dynamics and Vibroacoustics -- Robust Analysis with Respect to the Uncertainties for Analysis, Updating, Optimization, and Design -- Random Fields and Uncertainty Quantification in Solid Mechanics of Continuum Media.
Sommario/riassunto	This book presents the fundamental notions and advanced mathematical tools in the stochastic modeling of uncertainties and their quantification for large-scale computational models in sciences and

engineering. In particular, it focuses in parametric uncertainties, and non-parametric uncertainties with applications from the structural dynamics and vibroacoustics of complex mechanical systems, from micromechanics and multiscale mechanics of heterogeneous materials. Resulting from a course developed by the author, the book begins with a description of the fundamental mathematical tools of probability and statistics that are directly useful for uncertainty quantification. It proceeds with a well carried out description of some basic and advanced methods for constructing stochastic models of uncertainties, paying particular attention to the problem of calibrating and identifying a stochastic model of uncertainty when experimental data is available. < This book is intended to be a graduate-level textbook for students as well as professionals interested in the theory, computation, and applications of risk and prediction in science and engineering fields.

---