



Stochastic Methods in Engineering

I. DOLTSINIS, University of Stuttgart, Germany

The increasing industrial demand for reliable quantification and management of uncertainty in product performance forces engineers to employ probabilistic models in analysis and design, a fact that has occasioned considerable research and development activities in the field. Notes on Stochastics eventually address the topic of computational stochastic mechanics. The single volume uniquely presents tutorials on essential probabilistics and statistics, recent finite element methods for stochastic analysis by Taylor series expansion as well as Monte Carlo simulation techniques. Design improvement and robust optimisation represent key issues as does reliability assessment. The subject is developed for solids and structures of elastic and elasto-plastic material, large displacements and material deformation processes; principles are transferable to various disciplines. A chapter is devoted to the statistical comparison of systems exhibiting random scatter. Where appropriate examples illustrate the theory, problems to solve appear instructive; applications are presented with relevance to engineering practice.

The book, emanating from a university course, includes research and development in the field of computational stochastic analysis and optimization. It is intended for advanced students in engineering and for professionals who wish to extend their knowledge and skills in computational mechanics to the domain of stochastics.

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