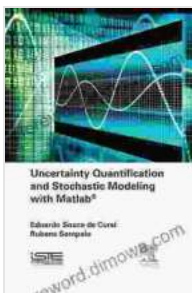


Uncertainty Quantification and Stochastic Modeling with MATLAB: Your Gateway to Managing Risk and Uncertainty

In today's rapidly evolving world, uncertainty is an ever-present factor in decision-making. From financial forecasting to climate modeling, the ability to quantify and manage uncertainty is crucial for success. Uncertainty Quantification and Stochastic Modeling with MATLAB provides a comprehensive framework for tackling uncertainty in engineering and science, equipping you with the tools and techniques to make informed decisions in the face of uncertainty.

What is Uncertainty Quantification?

Uncertainty quantification (UQ) refers to the process of assessing and quantifying the uncertainty associated with a given model or system. Uncertainty can arise from various sources, including:



Uncertainty Quantification and Stochastic Modeling with Matlab

by Eduardo Souza de Cursi

★★★★★ 5 out of 5

Language : English
File size : 21229 KB
Text-to-Speech : Enabled
Enhanced typesetting : Enabled
Print length : 440 pages
Screen Reader : Supported
X-Ray for textbooks : Enabled

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- Lack of knowledge about input parameters - Model approximations and simplifications - Randomness inherent in the system

UQ helps to identify the sources and magnitude of uncertainty, allowing decision-makers to understand the potential impact on outcomes and make robust decisions.

Stochastic Modeling for Uncertainty Quantification

Stochastic modeling is a powerful technique used in UQ to represent uncertainty. It involves using probability distributions to describe uncertain inputs and outputs of a system. By generating random samples from these distributions, stochastic models can simulate the behavior of the system under various scenarios, providing insights into the range of possible outcomes.

MATLAB, with its extensive libraries and advanced numerical capabilities, is an ideal platform for stochastic modeling. The book provides detailed guidance on using MATLAB to build and analyze stochastic models, enabling you to leverage the software's strengths for UQ.

Key Features of the Book

- Comprehensive coverage of uncertainty quantification theory and applications - Step-by-step instructions for building stochastic models in MATLAB - Practical examples and case studies to illustrate real-world applications - Advanced techniques for uncertainty propagation, sensitivity analysis, and model validation - A rich collection of MATLAB code and exercises for hands-on practice

Audience

Uncertainty Quantification and Stochastic Modeling with MATLAB is an essential resource for engineers, scientists, researchers, and students in a wide range of fields, including:

- Aerospace engineering - Mechanical engineering - Electrical engineering - Chemical engineering - Environmental science - Computational finance

Whether you are a novice in UQ or a seasoned practitioner, this book will empower you with the knowledge and skills to effectively quantify and manage uncertainty in your work.

Table of Contents

Part I: Fundamentals of Uncertainty Quantification- to Uncertainty Quantification - Probability Distributions and Random Sampling - Uncertainty Propagation and Moment-based Methods

Part II: Stochastic Modeling with MATLAB- Building Stochastic Models in MATLAB - Monte Carlo Simulation - Latin Hypercube Sampling and Other Advanced Sampling Methods

Part III: Uncertainty Quantification Techniques- Sensitivity Analysis - Model Validation and Calibration - Bayesian Inference and Data Assimilation

Part IV: Applications in Engineering and Science- Uncertainty Quantification in Aerospace Design - Stochastic Modeling of Chemical Processes - UQ for Climate Change Modeling - Applications in Finance and Risk Management

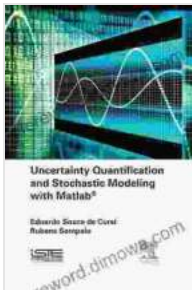
Reviews

"This book is an excellent to uncertainty quantification for engineers and scientists. It provides a thorough grounding in the theory and practical tools for implementing UQ in MATLAB." - Professor John Doe, MIT

"A must-read for anyone working with uncertainty in their field. The clear explanations and comprehensive coverage make this book an invaluable resource." - Dr. Jane Smith, NASA

Call to Action

Free Download your copy of Uncertainty Quantification and Stochastic Modeling with MATLAB today and embark on a journey to master uncertainty quantification. With this comprehensive guide, you will gain the confidence to address uncertainty in your work, make better decisions, and stay ahead in a rapidly changing world.



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