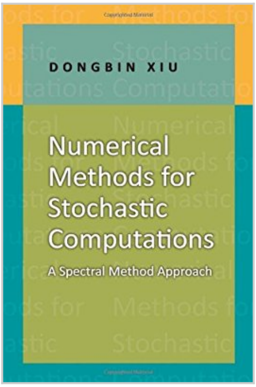

Numerical Methods for Stochastic Computations: A Spectral Method Approach

By Dongbin Xiu

Numerical Methods for Stochastic Computations: A Spectral Method Approach By Dongbin Xiu

The@ first graduate-level textbook to focus on fundamental aspects of numerical methods for stochastic computations, this book describes the class of numerical methods based on generalized polynomial chaos (gPC). These fast, efficient, and accurate methods are an extension of the classical spectral methods of high-dimensional random spaces. Designed to simulate complex systems subject to random inputs, these methods are widely used in many areas of computer science and engineering.

The book introduces polynomial approximation theory and probability theory; describes the basic theory of gPC methods through numerical examples and rigorous development; details the procedure for converting stochastic equations into deterministic ones; using both the Galerkin and collocation approaches; and discusses the distinct differences and challenges arising from high-dimensional problems. The last section is devoted to the application of gPC methods to critical areas such as inverse problems and data assimilation.

Ideal for use by graduate students and researchers both in the classroom and for self-study, *Numerical Methods for Stochastic Computations* provides the required tools for in-depth research related to stochastic computations.

- The first graduate-level textbook to focus on the fundamentals of numerical methods for stochastic computations
- Ideal introduction for graduate courses or self-study
- Fast, efficient, and accurate numerical methods
- Polynomial approximation theory and probability theory included
- Basic gPC methods illustrated through examples

Numerical Methods for Stochastic Computations: A Spectral Method Approach

By Dongbin Xiu

Numerical Methods for Stochastic Computations: A Spectral Method Approach By Dongbin Xiu

The@ first graduate-level textbook to focus on fundamental aspects of numerical methods for stochastic computations, this book describes the class of numerical methods based on generalized polynomial chaos (gPC). These fast, efficient, and accurate methods are an extension of the classical spectral methods of high-dimensional random spaces. Designed to simulate complex systems subject to random inputs, these methods are widely used in many areas of computer science and engineering.

The book introduces polynomial approximation theory and probability theory; describes the basic theory of gPC methods through numerical examples and rigorous development; details the procedure for converting stochastic equations into deterministic ones; using both the Galerkin and collocation approaches; and discusses the distinct differences and challenges arising from high-dimensional problems. The last section is devoted to the application of gPC methods to critical areas such as inverse problems and data assimilation.

Ideal for use by graduate students and researchers both in the classroom and for self-study, *Numerical Methods for Stochastic Computations* provides the required tools for in-depth research related to stochastic computations.

- The first graduate-level textbook to focus on the fundamentals of numerical methods for stochastic computations
- Ideal introduction for graduate courses or self-study
- Fast, efficient, and accurate numerical methods
- Polynomial approximation theory and probability theory included
- Basic gPC methods illustrated through examples

Numerical Methods for Stochastic Computations: A Spectral Method Approach By Dongbin Xiu Bibliography

- Sales Rank: #1295595 in Books
- Brand: Brand: Princeton University Press
- Published on: 2010-07-21
- Original language: English
- Number of items: 1
- Dimensions: 9.30" h x .60" w x 6.10" l, .80 pounds
- Binding: Hardcover
- 144 pages

Editorial Review

Review
"[A]s a newbie to this field, by reading this lively written text I was able to gain insight into this really interesting and challenging matter."**--Peter Mathé, *Mathematical Reviews***

From the Back Cover

"Short and comprehensive, this book is appropriate for novices of polynomial chaos. Many diverse fields are adopting this method, and this book can be used for first-year graduate studies as well as senior undergraduate courses. The book includes important new developments, such as non-Gaussian processes and stochastic collocation methods."**--George Karniadakis, Brown University**

About the Author
Dongbin Xiu is associate professor of mathematics at Purdue University.

Users Review

From reader reviews:

Rebecca Morales:

Spent a free time and energy to be fun activity to try and do! A lot of people spent their free time with their family, or their friends. Usually they undertaking activity like watching television, likely to beach, or picnic inside the park. They actually doing same task every week. Do you feel it? Would you like to something different to fill your own personal free time/ holiday? Could possibly be reading a book could be option to fill your cost-free time/ holiday. The first thing that you will ask may be what kinds of e-book that you should read. If you want to try look for book, may be the guide untitled Numerical Methods for Stochastic Computations: A Spectral Method Approach can be excellent book to read. May be it can be best activity to you.

Andrew Martin:

People live in this new time of lifestyle always attempt to and must have the time or they will get large amount of stress from both everyday life and work. So , if we ask do people have spare time, we will say absolutely yes. People is human not really a huge robot. Then we inquire again, what kind of activity have you got when the spare time coming to an individual of course your answer will unlimited right. Then do you ever try this one, reading publications. It can be your alternative with spending your spare time, the actual book you have read is actually Numerical Methods for Stochastic Computations: A Spectral Method Approach.

Ollie Nadeau:

Is it an individual who having spare time subsequently spend it whole day through watching television programs or just telling lies on the bed? Do you need something totally new? This Numerical Methods for Stochastic Computations: A Spectral Method Approach can be the response, oh how comes? It's a book you know. You are thus out of date, spending your time by reading in this brand new era is common not a geek activity. So what these publications have than the others?

Beverly Rosa:

As a university student exactly feel bored to reading. If their teacher expected them to go to the library or to make summary for some publication, they are complained. Just small students that has reading's heart and soul or real their passion. They just do what the educator want, like asked to go to the library. They go to there but nothing reading critically. Any students feel that reading through is not important, boring as well as can't see colorful photographs on there. Yeah, it is to be complicated. Book is very important to suit your needs. As we know that on this time, many ways to get whatever you want. Likewise word says, many ways to reach Chinese's country. Therefore this Numerical Methods for Stochastic Computations: A Spectral Method Approach can make you feel more interested to read.

Read Numerical Methods for Stochastic Computations: A Spectral Method Approach By Dongbin Xiu for online ebook