

STOCHASTIC MODELING

Stochastic Modeling Series

Stochastic Modeling of Scientific Data

Peter Guttorp

This text combines stochastic modeling and statistical inference in a variety of standard and less common models, such as point processes, Markov random fields and hidden Markov models, in a clear, thoughtful and succinct manner.

The main distinguishing feature of this work is that, in addition to probability theory, it contains statistical aspects of model fitting and a variety of data sets that are either analysed in the text or used as exercises. Markov chain Monte Carlo methods are introduced for evaluating likelihoods in complicated models and the forward-backward algorithm for analysing hidden Markov models is presented.

The strength of this text lies in the use of informal language that makes the topic more accessible to non-mathematicians. The combination of hard science topics with stochastic processes and their statistical inference puts it in a new category of probability textbooks.

The numerous examples and exercises drawn from astronomy, geology, genetics, hydrology, neurophysiology and physics, make this an ideal textbook for researchers, lecturers and graduate students studying statistics and probability, especially applied probability and stochastic processes.

Peter Guttorp is a Professor of Statistics at the University of Washington, Seattle. He is the author of a monograph on *Statistical Inference for Branching Processes*, and has published extensively in the areas of stochastic modeling, inference for stochastic processes and stochastic hydrology.

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