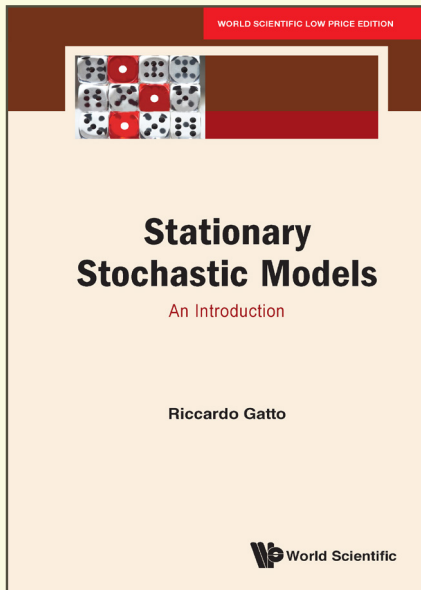


Stationary Stochastic Models

An Introduction

By **Riccardo Gatto**
(University of Bern, Switzerland)



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ABOUT THE BOOK

This volume provides a unified mathematical introduction to stationary time series models and to continuous time stationary stochastic processes. The analysis of these stationary models is carried out in time domain and in frequency domain. It begins with a practical discussion on stationarity, by which practical methods for obtaining stationary data are described. The presented topics are illustrated by numerous examples. Readers will find the following covered in a comprehensive manner:

- Autoregressive and moving average time series.
- Important properties such as causality.
- Autocovariance function and the spectral distribution of these models.
- Practical topics of time series like filtering and prediction.
- Basic concepts and definitions on the theory of stochastic processes, such as Wiener measure and process.
- General types of stochastic processes such as Gaussian, selfsimilar, compound and shot noise processes.
- Gaussian white noise, Langevin equation and Ornstein–Uhlenbeck process.
- Important related themes such as mean square properties of stationary processes and mean square integration.
- Spectral decomposition and spectral theorem of continuous time stationary processes. This central concept is followed by the theory of linear filters and their differential equations.

At the end, some selected topics such as stationary random fields, simulation of Gaussian stationary processes, time series for planar directions, large deviations approximations and results of information theory are presented. A detailed appendix containing complementary materials will assist the reader with many technical aspects of the book.

READERSHIP

Upper-level undergraduate and graduate students, for lectures on time series or on stochastic processes with continuous time. Researchers in academia and applied scientists in the industry, in the field of time series or stationary processes. These lectures can be given to students of mathematics or statistics as well as to students from other technical fields, at Bachelor's upper-level and at Master's level.

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