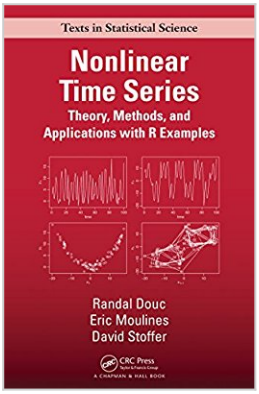

Nonlinear Time Series: Theory, Methods and Applications with R Examples (Chapman & Hall/CRC Texts in Statistical Science)

By Randal Douc, Eric Moulines, David Stoffer

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Designed for researchers and students, **Nonlinear Times Series: Theory, Methods and Applications with R Examples** familiarizes readers with the principles behind nonlinear time series models—without overwhelming them with difficult mathematical developments. By focusing on basic principles and theory, the authors give readers the background required to craft their own stochastic models, numerical methods, and software. They will also be able to assess the advantages and disadvantages of different approaches, and thus be able to choose the right methods for their purposes.

The first part can be seen as a crash course on "classical" time series, with a special emphasis on linear state space models and detailed coverage of random coefficient autoregressions, both ARCH and GARCH models. The second part introduces Markov chains, discussing stability, the existence of a stationary distribution, ergodicity, limit theorems, and statistical inference. The book concludes with a self-contained account on nonlinear state space and sequential Monte Carlo methods. An elementary introduction to nonlinear state space modeling and sequential Monte Carlo, this section touches on current topics, from the theory of statistical inference to advanced computational methods.

The book can be used as a support to an advanced course on these methods, or an introduction to this field before studying more specialized texts. Several chapters

highlight recent developments such as explicit rate of convergence of Markov chains and sequential Monte Carlo techniques. And while the chapters are organized in a logical progression, the three parts can be studied independently.

Statistics is not a spectator sport, so the book contains more than 200 exercises to challenge readers. These problems strengthen intellectual muscles strained by the introduction of new theory and go on to extend the theory in significant ways. The book helps readers hone their skills in nonlinear time series analysis and their applications.

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Editorial Review

Review

"This book is very suitable for mathematicians requiring a very rigorous and complete introduction to nonlinear time series and their applications in several fields."
?*Zentralblatt MATH* 1306

"This book focuses on theory and methods, with applications in mind. It is quite theory-heavy, with many rigorously established theoretical results. …It is also very timely and covers many recent developments in nonlinear time series analysis… readers can get a very up-to-date view of the current developments in nonlinear time series analysis from this book."
?Journal of the American Statistical Association, December 2014

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?T. Subba Rao, *Journal of Time Series Analysis*, 2014

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