Hendrik Madsen: Time series analysis

**2007, Chapman & Hall/CRC, xv + 380pp., US \$79.95,
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Matthias Fischer

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The field of time series analysis has become a major component of both statistical education and research. Consequently, an overwhelming number of books have appeared and are still appearing on this topic, this one announces a global treatment of related topics. A closer look into the table of contents, however, reveals that the major focus of Madsen's book lies, roughly speaking, on uni- and multivariate linear discrete time series and linear stochastic systems, both in the time domain and frequency domain.

It provides a convenient introduction and uses proofs only to clarify the results. At the end of every chapter the reader is faced with small problems. Additionally, the last chapter is devoted to real-life problems with solutions to be found on the author's homepage. Though the different topics are presented in a comprehensible and readable manner, more motivating examples would have additionally improved the quality of the book.

The book under consideration has 12 chapters. Besides providing contents and scope of the book, several example of time series are presented in Chap. 1 which is followed by some introductory material on multivariate random variables in Chap. 2. Chapter 3 presents some fundamentals of regression based methods like GLM or ML, linear dynamic systems are introduced both in the time and frequency domain in Chap. 4. The classical theory of autoregressive and integrated moving average processes is addressed in Chaps. 5 and 6. Chapter 7 is dedicated to spectral analysis, with the main focus on the periodogram and on the cross-spectrum. Chapter 8 connects the theory of linear systems to stochastic processes. A rough and short treatment of multivariate ARMA models can be found in Chap. 9. The concept of time-varying systems is dealt with in Chap. 10 using a state space approach and the Kalman filter, supplemented by Chap. 11 which includes recursive estimation methods. The book concludes with Chap. 12 where some real-life problems are discussed.

M. Fischer (✉)
Universität Erlangen-Nürnberg, Nuremberg, Germany
e-mail: domafisch@freenet.de