



ORSA Journal on Computing

Publication details, including instructions for authors and subscription information:
<http://pubsonline.informs.org>

Book Review

Richard H. Jones,

To cite this article:

Richard H. Jones, (1990) Book Review. ORSA Journal on Computing 2(1):93-93. <https://doi.org/10.1287/ijoc.2.1.93>

Full terms and conditions of use: <https://pubsonline.informs.org/Publications/Librarians-Portal/PubsOnLine-Terms-and-Conditions>

This article may be used only for the purposes of research, teaching, and/or private study. Commercial use or systematic downloading (by robots or other automatic processes) is prohibited without explicit Publisher approval, unless otherwise noted. For more information, contact permissions@informs.org.

The Publisher does not warrant or guarantee the article's accuracy, completeness, merchantability, fitness for a particular purpose, or non-infringement. Descriptions of, or references to, products or publications, or inclusion of an advertisement in this article, neither constitutes nor implies a guarantee, endorsement, or support of claims made of that product, publication, or service.

© 1990 INFORMS

Please scroll down for article—it is on subsequent pages



With 12,500 members from nearly 90 countries, INFORMS is the largest international association of operations research (O.R.) and analytics professionals and students. INFORMS provides unique networking and learning opportunities for individual professionals, and organizations of all types and sizes, to better understand and use O.R. and analytics tools and methods to transform strategic visions and achieve better outcomes.

For more information on INFORMS, its publications, membership, or meetings visit <http://www.informs.org>

Book Review

Review of: Newton, J.H. (1988) *TIMESLAB: A Time Series Analysis Laboratory*, Wadsworth & Brooks/Cole, Pacific Grove, California.
Reviewed by: Richard H. Jones, Ph.D.
Professor of Biometrics
Department of Preventive Medicine and Biometrics
School of Medicine, Box B-119
University of Colorado Health Sciences Center
Denver, CO 80262
(303) 270-6860

Recently, several books have been published on time series analysis which include computer programs for PC's on a diskette (for example, Brockwell and Davis^[1] and Shumway^[2]). The book by Newton is unique in that it integrates the textbook with the software package. The textbook covers the theory and applications of univariate and bivariate times series in the time and frequency domains, and TIMESLAB is a time series analysis programming language consisting of approximately 150 commands. The book is also a user's guide for the programming language. The book is designed to be used for a two-semester sequence for students with a good background in mathematics and statistics. A one-semester course on the applications of univariate time series analysis is also possible. A strong point of the book is the combining of the time domain and frequency domain approaches to time series analysis (the two books referenced above also consider both time and frequency domain approaches). Too often textbooks consider only one approach which leaves the student with half the story. For example, data smoothing in the time domain can be better understood when the frequency response of the filter is plotted in the frequency domain.

The book has four chapters, a mathematical and statistical appendix, two appendices describing the TIMESLAB programs, an appendix containing time series data sets, and an appendix that is an index to the commands, theorems, macros, examples and figures in the book. The first three chapters cover univariate time series, and the fourth chapter covers bivariate series. In Chapter 1 the ideas of the time and frequency domains are introduced. Some topics include the sample correlogram, the periodogram and sample spectral density, and the relationship between the correlogram and periodogram. Data transformations for stabilizing variance, trend removal, seasonal variability, smoothing operations and some simple forecasting methods are discussed. Chapter 2 presents the basic probability theory of stationary time series including the basic theory of spectral analysis and minimum mean square error prediction. Autoregressive integrated moving average (ARIMA) models are

discussed in detail, and the Kalman filter algorithm is introduced.

Chapter 3 is on statistical inference for univariate time series. The sampling properties of the estimated mean, autocovariances, autocorrelations and spectral density are discussed. Other topics include the identification and estimation of the parameters of ARMA models, forecasting, regression with autoregressive errors, state space and Bayesian forecasting, autoregressive spectral estimation and the search for periodicities. Chapter 4 is on analyzing bivariate time series. The new concepts covered are the cross correlation function, cross spectral density including the coherence and phase, bivariate ARMA processes and the estimation of the transfer function of a filter.

It is not difficult to get the programs running on an IBM or compatible PC. The computer language is command driven rather than menu driven so at the beginning the user spends a fair amount of time in Appendix B, which is a user's guide to TIMESLAB, and in Appendix C which is a detailed description of the commands. Graphics are available that produce high resolution pixel graphs on the screen with output to a Hewlett-Packard Laserjet Printer, an IBM Graphics Printer, a Toshiba 321 24 pin dot matrix printer or compatibles. Output can often be obtained on other printers by using the DOS command GRAPHICS prior to invoking TIMESLAB and using the print screen function.

The use of this book as a text does not require that the instructor get involved with the programming language. There is sufficient material in the book that it can be used as a stand alone text. This would allow the student to explore the computer package if he or she wished. In summary, this combination textbook and computer package provides a unique approach to the teaching of time series analysis which combines both theory and practice.

REFERENCES

1. P.J. BROCKWELL, and R.A. DAVIS, 1987. *Time Series: Theory and Methods*, Springer-Verlag, New York.
2. R.H. SHUMWAY, 1988. *Applied Statistical Time Series Analysis*, Prentice Hall, Englewood Cliffs, N.J.