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Nota di contenuto	Time Series Analysis in Meteorology and Climatology: An Introduction; Contents; Series foreword; Preface; 1. Fourier analysis; 1.1 Overview and terminology; 1.2 Analysis and synthesis; 1.3 Example data sets; 1.4 Statistical properties of the periodogram; 1.5 Further important topics in Fourier analysis; Appendix 1.A Subroutine foranx; Appendix 1.B Sum of complex exponentials; Appendix 1.C Distribution of harmonic variances; Appendix 1.D Derivation of Equation 1.42; Problems; References; 2. Linear systems; 2.1 Input-output relationships; 2.2 Evaluation of the convolution integral 2.3 Fourier transforms for analog data2.4 The delta function; 2.5 Special input functions; 2.6 The frequency response function; 2.7 Fourier transform of the convolution integral; 2.8 Linear systems in series; 2.9 Ideal interpolation formula; Problems; References; 3. Filtering data; 3.1 Recursive and nonrecursive filtering; 3.2 Commonly used digital nonrecursive filters; 3.3 Filter design; 3.4 Lanczos filtering; Appendix 3.A Convolution of two running mean filters; Appendix 3.B Derivation of Equation 3.20; Appendix 3.C Subroutine sigma; Problems; References; 4. Autocorrelation 4.1 Definition and properties4.2 Formulas for the acvf and acf; 4.3 The

acvf and acf for stationary digital processes; 4.4 The acvf and acf for selected processes; 4.5 Statistical formulas; 4.6 Confidence limits for the population mean; 4.7 Variance of the acvf and acf estimators; Appendix 4.A Generating a normal random variable; Problems; References; 5. Lagged-product spectrum analysis; 5.1 The variance density spectrum; 5.2 Relationship between the variance density spectrum and the acvf; 5.3 Spectra of random processes; 5.4 Spectra of selected processes; 5.5 Smoothing the spectrum
Appendix 5.A Proof of Equation 5.11Appendix 5.B Proof of Equation 5.12; Problems; References; Index

Sommario/riassunto

"Time Series Analysis in Meteorology and Climatology provides an accessible overview of this notoriously difficult subject. Clearly structured throughout, the authors develop sufficient theoretical foundation to understand the basis for applying various analytical methods to a time series and show clearly how to interpret the results. Taking a unique approach to the subject, the authors use a combination of theory and application to real data sets to enhance student understanding throughout the book.This book is written for those students that have a data set in the form of a time series and are confronted with the problem of how to analyse this data. Each chapter covers the various methods that can be used to carry out this analysis with coverage of the necessary theory and its application. In the theoretical section topics covered include; the mathematical origin of spectrum windows, leakage of variance and understanding spectrum windows. The applications section includes real data sets for students to analyse. Scalar variables are used for ease of understanding for example air temperatures, wind speed and precipitation.Students are encouraged to write their own computer programmes and data sets are provided to enable them to recognize quickly whether their programme is working correctly- one data set is provided with artificial data and the other with real data where the students are required to physically interpret the results of their periodgram analysis.Based on the acclaimed and long standing course at the University of Oklahoma, the book is distinct in its approach to the subject matter in that it is written specifically for readers in meteorology and climatology and uses a mix of theory and application to real data sets"--