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| Nota di contenuto | Front Cover; Environmental Data Analysis with MatLab; Copyright; Dedication; Preface; Advice on scripting for beginners; Contents; |

Chapter 1: Data analysis with MatLab; 1.1. Why MatLab?; 1.2. Getting started with MatLab; 1.3. Getting organized; 1.4. Navigating folders; 1.5. Simple arithmetic and algebra; 1.6. Vectors and matrices; 1.7. Multiplication of vectors of matrices; 1.8. Element access; 1.9. To loop or not to loop; 1.10. The matrix inverse; 1.11. Loading data from a file; 1.12. Plotting data; 1.13. Saving data to a file; 1.14. Some advice on writing scripts; Problems

Chapter 2: A first look at data2.1. Look at your data!; 2.2. More on MatLab graphics; 2.3. Rate information; 2.4. Scatter plots and their limitations; Problems; Chapter 3: Probability and what it has to do with data analysis; 3.1. Random variables; 3.2. Mean, median, and mode; 3.3. Variance; 3.4. Two important probability density functions; 3.5. Functions of a random variable; 3.6. Joint probabilities; 3.7. Bayesian inference; 3.8. Joint probability density functions; 3.9. Covariance; 3.10. Multivariate distributions; 3.11. The multivariate Normal distributions

3.12. Linear functions of multivariate dataProblems; Chapter 4: The power of linear models; 4.1. Quantitative models, data, and model parameters; 4.2. The simplest of quantitative models; 4.3. Curve fitting; 4.4. Mixtures; 4.5. Weighted averages; 4.6. Examining error; 4.7. Least squares; 4.8. Examples; 4.9. Covariance and the behavior of error; Problems; Chapter 5: Quantifying preconceptions; 5.1. When least square fails; 5.2. Prior information; 5.3. Bayesian inference; 5.4. The product of Normal probability density distributions; 5.5. Generalized least squares

5.6. The role of the covariance of the data5.7. Smoothness as prior information; 5.8. Sparse matrices; 5.9. Reorganizing grids of model parameters; Problems; Chapter 6: Detecting periodicities; 6.1. Describing sinusoidal oscillations; 6.2. Models composed only of sinusoidal functions; 6.3. Going complex; 6.4. Lessons learned from the integral transform; 6.5. Normal curve; 6.6. Spikes; 6.7. Area under a function; 6.8. Time-delayed function; 6.9. Derivative of a function; 6.10. Integral of a function; 6.11. Convolution; 6.12. Nontransient signals; Problems

Chapter 7: The past influences the present7.1. Behavior sensitive to past conditions; 7.2. Filtering as convolution; 7.3. Solving problems with filters; 7.4. Predicting the future; 7.5. A parallel between filters and polynomials; 7.6. Filter cascades and inverse filters; 7.7. Making use of what you know; Problems; Chapter 8: Patterns suggested by data; 8.1. Samples as mixtures; 8.2. Determining the minimum number of factors; 8.3. Application to the Atlantic Rocks dataset; 8.4. Spiky factors; 8.5. Time-Variable functions; Problems; Chapter 9: Detecting correlations among data

9.1. Correlation is covariance

Sommario/riassunto

Environmental Data Analysis with MatLab is for students and researchers working to analyze real data sets in the environmental sciences. One only has to consider the global warming debate to realize how critically important it is to be able to derive clear conclusions from often-noisy data drawn from a broad range of sources. This book teaches the basics of the underlying theory of data analysis, and then reinforces that knowledge with carefully chosen, realistic scenarios. MatLab, a commercial data processing environment, is used in these scenarios; significant content is devoted to teachi
