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Nota di contenuto	Empirical Model Building: Data, Models, and Reality; Contents; Preface; 1. Models of Growth and Decay; 1.1. A Simple Pension and Annuity Plan; 1.2. Income Tax Bracket Creep and the Quiet Revolution of 1980; 1.3. Retirement of a Mortgage; 1.4. Some Mathematical Descriptions of the Theory of Malthus; 1.5. Metastasis and Resistance; Problems; References; 2. Models of Competition, Survival, and Combat; 2.1. An Analysis of the Demographics of Ancient Israel; 2.2. The Plague and John Graunt's Life Table; 2.3. Modular Data-Based Wargaming; 2.3.1. Herman Kahn and the Winning of the Cold War; 2.4. Predation and Immune Response Systems; 2.5. Pyramid Clubs for Fun and Profit; Problems; References; 3. Epidemics; 3.1. Introduction; 3.2. John Snow and the London Cholera Epidemic of 1854; 3.3. Prelude: The Postwar Polio Epidemic; 3.4. AIDS: A New Epidemic for America; 3.5. Why an AIDS Epidemic in America?; 3.5.1. Political Correctness Can Kill; 3.6. The Effect of the Gay Bathhouses; 3.7. A More Detailed Look at the Model; 3.8. Forays into the Public Policy Arena; 3.9. Modeling the Mature Epidemic; 3.10. AIDS as a Facilitator of Other Epidemics; 3.11. Comparisons with First World Countries

3.12. Conclusions: A Modeler's Portfolio Problems; References; 4. Bootstrapping; 4.1. Introduction; 4.2. Bootstrapping Analysis of Darwin's Data; 4.3. A Bootstrapping Approximation to Fisher's Nonparametric Test; 4.4. A Resampling Based Sign Test; 4.5. A Bootstrapping Approach for Confidence Intervals; 4.6. Solving Ill-Structured Problems; Problems; References; 5. Monte Carlo Solutions of Differential Equations; 5.1. Introduction; 5.2. Gambler's Ruin; 5.3. Solution of Simple Differential Equations; 5.4. Solution of the Fokker-Planck Equation; 5.5. The Dirichlet Problem; 5.6. Solution of General Elliptic Differential Equations; 5.7. Conclusions; Problems; References; 6. SIMEST, SIMDAT, and Pseudoreality; 6.1. Introduction; 6.2. The Bootstrap: A Dirac-Comb Density Estimator; 6.3. SIMDAT: A Smooth Resampling Algorithm; 6.3.1. The SIMDAT Algorithm; 6.3.2. An Empirical Justification of SIMDAT; 6.4. SIMEST: An Oncological Example; 6.4.1. An Exploratory Prelude; 6.4.2. Models and Algorithms; Problems; References; 7. Exploratory Data Analysis; 7.1. Introduction; 7.2. Smoothing; 7.3. The Stem and Leaf Plot; 7.4. The Five Figure Summary; 7.5. Tukey's Box Plot; Problems; References; 8. Noise Killing Chaos; 8.1. Introduction; 8.2. The Discrete Logistic Model; 8.3. A Chaotic Convection Model; 8.4. Conclusions; Problems; References; 9. A Primer in Bayesian Data Analysis; 9.1. Introduction; 9.2. The EM Algorithm; 9.3. The Data Augmentation Algorithm; 9.4. The Gibbs Sampler; 9.5. Conclusions; Problems; References; 10. Multivariate and Robust Procedures in Statistical Process Control; 10.1. Introduction; 10.2. A Contamination Model for SPC; 10.3. A Compound Test for Higher Dimensional SPC Data; 10.4. Rank Testing with Higher Dimensional SPC Data; 10.5. A Robust Estimation Procedure for Location in Higher Dimensions

Sommario/riassunto

"This book presents a hands-on approach to the basic principles of empirical model building through the shrewd mixture of differential equations, computer-intensive methods, and data in a single-volume. It includes a series of real-world statistical problems illustrating modeling skills and techniques that are applicable to a broad range of audiences from applied statisticians to practicing MBAs. It covers models of growth and decay, systems where competition and interaction add to the complexity of the model, and discusses both classical and non-classical data analysis methods, alongside an extended list of more than twenty essential topics. The author also includes numerous exercises, an emphasis on computational finance and Bayesian techniques, and timely discussions of epidemics, quality control, and chaos in a dynamic world"--