Identifiability Of Linear Compartment Models The Singular

Identifiability and Estimation in Linear and Nonlinear Compartment Models with Application
Molecular, Cellular, and Tissue Engineering
EPA-600/3
Quasilinearization and the Identification Problem
Compartmental Modeling and Tracer Kinetics
Mathematical Modeling in Experimental Nutrition
Algebraic Statistics
Transport Processes in Pharmaceutical Systems
Ecological Research Series
Splines and Compartment Models
Pharmacokinetic-Pharmacodynamic Modeling and Simulation
Biological Control Systems and Disease Modelling
Compartmental Models and Their Application
Compartmental Analysis of Ecosystem Models
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Biomedical Systems Analysis Via Compartmental Concept
Tracer Kinetics in Biomedical Research
Compartmental Analysis in Biology and Medicine
Identifiability of State Space Models
Compartmental Analysis
European Control Conference 1995
Identification and System Parameter Estimation 1982
Modelling Methodology for Physiology and Medicine
Modelling and Control in Biomedical Systems 1997 (including Biological Systems)
An Introduction to Identification
Mathematics for Healthcare
Identifiability of Parametric Models
Pharmacokinetics in Drug Development
Atkinson's Principles of Clinical Pharmacology
New Sampling Theory for Measuring Ecosystem Structure
Federation Proceedings
Identification and System Parameter Estimation 1982
Dissertation Abstracts International
Parameter Redundancy and Identifiability
Identification and System Parameter Estimation
Advances in Isotope Methods for the Analysis of Trace Elements in Man
Biomedical Engineering Fundamentals
Theoretical Systems Ecology

Nonlinear Phenomena in Mathematical Sciences
Characterizing Sources of Indoor Air Pollution and Related Sink Effects

JOHNSON NICHOLSON

Identifiability and Estimation in Linear and Nonlinear Compartment Models with Application Frontiers Media SA
Deals with basic linear and nonlinear systems and graph theory, distribution of tracer-labeled materials, connectivity, and identifiability
Molecular, Cellular, and Tissue Engineering CRC Press
Proceedings of the European Control Conference 1995, Rome, Italy 5-8 September 1995
EPA-600/3 Courier Corporation
This book presents methods of mathematical modeling from two points of view. Splines provide a general approach while compartment models serve as examples for context related to modeling. The preconditions and characteristics of the developed mathematical models as well as the conditions surrounding data collection and model fit are taken into account. The substantial statements of this book are mathematically proven. The results are ready for application with examples and related program codes given. In this book, splines are algebraically developed such that the reader or user can easily understand and vary the numerical construction of the different kinds of spline functions. The classical compartment models of the pharmacokinetics are systematically analyzed and connected with lifetime distributions. As such, parameter estimation and model fit can be treated statistically with a varied minimum chi-square method. This method is applicable for single kinetics and also allows the calculation of average kinetics.
Quasilinearization and the Identification Problem S. Karger AG (Switzerland)
Based on presentations at a 1994 Symposium, these detailed papers review source/sink characterization; design, construction, characterization, and operation of test chambers and facilities; testing protocols for determining emission factors and sink absorption/desorption rates; models for predicting
Compartmental Modeling and Tracer Kinetics CRC Press
This is a second edition to the original published by Springer in 2006. The comprehensive volume takes a textbook approach systematically developing the field by starting from linear models and then moving up to generalized linear and non-linear mixed effects models. Since the first edition was published the field has grown considerably in terms of maturity and technicality. The second edition of the book therefore considerably expands with the addition of three new chapters relating to Bayesian models, Generalized linear and nonlinear mixed effects models, and Principles of simulation. In addition, many of the other chapters have been expanded and updated.
Mathematical Modeling in Experimental Nutrition CRC Press
These volumes are designed to be the most complete guide to pharmacokinetics (PK) and its role in drug development. They fill a gap between the academic science and the practical application of that knowledge in drug development. Volume 1 discusses the role that PK plays in selected clinical study designs. Volume 2 details the key regulatory and development paradigms in which PK supplements decision-making during drug development.
Algebraic Statistics World Scientific
1. Introduction. 2. Fundamentals of Tracer Kinetics. 3. The Noncompartmental Model of Multipool Systems. 4. The Compartmental Model. 5. Identifiability of the Tracer Model. 6. Using the Tracer Model to Estimate Kinetic Parameters. 7. Compartmental Versus Noncompartmental Kinetic Parameters. 8. Parameter Estimation: Some Fundamentals of Regression Analysis. 9. Parameter Estimation in Noncompartmental Models. 10. Parameter Estimation in Compartmental Models. 11. Precursor-Product Models. Appendices. Index.
Transport Processes in Pharmaceutical Systems CRC Press
Nonlinear Phenomena in Mathematical Sciences contains the proceedings of an International Conference on Nonlinear Phenomena in Mathematical Sciences, held at the University of Texas at Arlington, on June 16-20,1980. The papers explore trends in nonlinear phenomena in mathematical sciences, with emphasis on nonlinear functional analytic methods and their applications; nonlinear wave theory; and applications to medical and life sciences. In the area of nonlinear functional analytic methods and their applications, the following subjects are discussed: optimal control theory; periodic oscillations of nonlinear mechanical systems; Leray-Schauder degree theory; differential inequalities applied to parabolic and elliptic partial differential equations; bifurcation theory, stability theory in analytical mechanics; singular and ordinary boundary value problems, etc. The following topics in nonlinear wave theory are considered: nonlinear wave propagation in a randomly homogeneous media; periodic solutions of a semilinear wave equation; asymptotic behavior of solutions of strongly damped nonlinear wave equations; shock waves and dissipation theoretical methods for a nonlinear Schr?dinger equation; and nonlinear hyperbolic Volterra equations occurring in viscoelasticity. Applications to medical and life sciences include mathematical modeling in physiology, pharmacokinetics, and neuro-mathematics, along with epidemic modeling and parameter estimation techniques. This book will be helpful to students, practitioners, and researchers in the field of mathematics.
Ecological Research Series CRC Press
Paperback. This volume contains the 90 papers presented at the 3rd IFAC Symposium on Modelling and Control in Biomedical Systems held in Warwick, UK from 23-26 March 1997. Significant work in the field of biomedical systems analysis and design is taking place throughout the world and the opportunities for technological interchanges offered by symposia like this one are extremely valuable for the progress and stability of effort and vision in this important human-centred field.The symposium was multi- and inter-disciplinary in nature with the choice of topics solicited covering the major systems' components and functions of complex physiology. The remit was also extended, on this occasion, beyond mammalian physiology to that of biological systems. Therefore, a special session was devoted to the modelling and control of botanical systems with the aim of providing an exchange of ideas with biomathematicians.
Splines and Compartment Models World Scientific
This monograph is concerned with mathematical aspects of compartmental an alysis. In particular, linear models are closely analyzed since they are fully justifiable as an investigative tool in

tracer experiments. The objective of the monograph is to bring the reader up to date on some of the current mathematical prob lems of interest in compartmental analysis. This is accomplished by reviewing mathematical developments in the literature, especially over the last 10-15 years, and by presenting some new thoughts and directions for future mathematical research. These notes started as a series of lectures that I gave while visiting with the Division of Applied ~1athematics, Brown University, 1979, and have developed in to this collection of articles aimed at the reader with a beginning graduate level background in mathematics. The text can be used as a self-paced reading course. With this in mind, exercises have been appropriately placed throughout the notes. As an aid in reading the material, the e~d of a proof is indicated by ~. Sub section titles are utilized to make it easier for the reader to skim over detailed material on a first reading and make the entire manuscript somewhat more accessible, especially to nonmathematicians in the biosciences. The preparation of this monograph has been a long task that would not have been completed without the influence of a number of individuals. I am especially indebted to H. T. Banks, J. W. Drane, J. Eisenfe1d, J. A. Jacquez, D. J.

Pharmacokinetic-Pharmacodynamic Modeling and Simulation Springer Science & Business Media

Modelling Methodology for Physiology and Medicine, Second Edition, offers a unique approach and an unprecedented range of coverage of the state-of-the-art, advanced modeling methodology that is widely applicable to physiology and medicine. The second edition, which is completely updated and expanded, opens with a clear and integrated treatment of advanced methodology for developing mathematical models of physiology and medical systems. Readers are then shown how to apply this methodology beneficially to real-world problems in physiology and medicine, such as circulation and respiration. The focus of Modelling Methodology for Physiology and Medicine, Second Edition, is the methodology that underpins good modeling practice. It builds upon the idea of an integrated methodology for the development and testing of mathematical models. It covers many specific areas of methodology in which important advances have taken place over recent years and illustrates the application of good methodological practice in key areas of physiology and medicine. It builds on work that the editors have carried out over the past 30 years, working in cooperation with leading practitioners in the field. Builds upon and enhances the reader's existing knowledge of modeling methodology and practice Editors are internationally renowned leaders in their respective fields Provides an understanding of modeling methodologies that can address real problems in physiology and medicine and achieve results that are beneficial either in advancing research or in providing solutions to clinical problems

Biological Control Systems and Disease Modelling European Control Association

Vols. for 1942- include proceedings of the American Physiological Society.

Compartmental Models and Their Application Pergamon

There is increasing evidence that even minute amounts of trace elements can have profound effects on the human body. Advances in Isotope Methods for the Analysis of Trace Elements in Man describes new methods that are being developed to understand normal and abnormal trace element nutrition and metabolism. This book includes a wealth of pr

Compartmental Analysis of Ecosystem Models Elsevier

In 1996, and with extraordinary prescience, Panfilov and Holden had highlighted in their seminal book 'Computational Biology of the Heart' that biology was, potentially, the most mathematical of all sciences. Fast-forward 20 years and we have seen an explotion of applications of mathematics in not only biology, but healthcare that has already produced significant breakthroughs not imaginable more than 20 years ago. Great strides have been made in explaining through quantitative methods the underlying mechanisms of human disease, not without considerable ingenuity and effort. Biological mechanisms are bewildering: complex, ever evolving, multi-scale, variable, difficult to fully access and understand. This poses immense challenges to the computational physiology community that, nevertheless, has developed an impressive arsenal of tools and methods in a vertiginous race to combat disease with the tall order of improving human healthcare. Mechanistic models are now contending with the advent of machine learning in healthcare and the hope is that both approaches will be used synergistically since the complexity of human patophysiology and the difficulty of acquiring human datasets will require both, deductive and inductive methods. This Research Topic presents work that is currently at the frontier in computational physiology with a striking range of applications, from diabetes to graft failure and using a multitude of mathematical tools. This collection of articles represents a snapshot in a field that is moving a dizzying speed, bringing understanding of fundamental mechanism and solutions to healthcare problems experienced by healthcare systems all over the world.

Kinetic Data Analysis Frontiers Media SA

Statistical and mathematical models are defined by parameters that describe different characteristics of those models. Ideally it would be possible to find parameter estimates for every parameter in that model, but, in some cases, this is not possible. For example, two parameters that only ever appear in the model as a product could not be estimated individually; only the product can be estimated. Such a model is said to be parameter redundant, or the parameters are described as non-identifiable. This book explains why parameter redundancy and non-identifiability is a problem and the different methods that can be used for detection, including in a Bayesian context. Key features of this book: Detailed discussion of the problems caused by parameter redundancy and non-identifiability Explanation of the different general methods for detecting parameter redundancy and non-identifiability, including symbolic algebra and numerical methods Chapter on Bayesian identifiability Throughout illustrative examples are used to clearly demonstrate each problem and method. Maple and R code are available for these examples More in-depth focus on the areas of discrete and continuous state-space models and ecological statistics, including methods that have been specifically developed for each of these areas This book is designed to make parameter redundancy and non-identifiability accessible and understandable to a wide audience from masters and PhD students to researchers, from mathematicians and statisticians to practitioners using mathematical or statistical models.

Biomedical Systems Analysis Via Compartmental Concept Academic Press

This volume presents an overview of the techniques of quasilinearization as they are applied to the problem of system identification. The quasilinear technique has inherent advantages in establishing the intricate interrelationships which exist in complex physical systems. Several advanced topics which are

central to the quasilinear technique are discussed in this book. Problems on orbit determination, estimation of chemical rate constants, complex biomechanics of systems and analytical medicine are investigated, to demonstrate the power of the quasilinear method. The reader will have a good idea of the wide range and complexity of problems which can be solved.

Tracer Kinetics in Biomedical Research Springer Science & Business Media

Over the last century,medicine has come out of theblack bag and emerged as one of the most dynamic and advanced fields of development in science and technology. Today, biomedical engineering plays a critical role in patient diagnosis, care, and rehabilitation. As such, the field encompasses a wide range of disciplines, from biology and physiolog

Compartmental Analysis in Biology and Medicine Springer Science & Business Media

Algebraic statistics uses tools from algebraic geometry, commutative algebra, combinatorics, and their computational sides to address problems in statistics and its applications. The starting point for this connection is the observation that many statistical models are semialgebraic sets. The algebra/statistics connection is now over twenty years old, and this book presents the first broad introductory treatment of the subject. Along with background material in probability, algebra, and statistics, this book covers a range of topics in algebraic statistics including algebraic exponential families, likelihood inference, Fisher's exact test, bounds on entries of contingency tables, design of experiments, identifiability of hidden variable models, phylogenetic models, and model selection. With numerous examples, references, and over 150 exercises, this book is suitable for both classroom use and independent study.

Identifiability of State Space Models Springer Science & Business Media

Nutrients have been recognized as essential for maximum growth, successful reproduction, and infection prevention since the 1940s; since that time, the lion's share of nutrient research has focused on defining their role in these processes. Around 1990, however, a major shift began in the way that researchers viewed some nutrients particularly the vitamins. This shift was motivated by the discovery that modest declines in vitamin nutritional status are associated with an increased risk of ill-health and disease (such as neural tube defects, heart disease, and cancer), especially in those populations or individuals who are genetically predisposed. In an effort to expand upon this new understanding of nutrient action, nutritionists are increasingly turning their focus to the mathematical modeling of nutrient kinetic data. The availability of suitably-tagged (isotope) nutrients (such as B-carotene, vitamin A, folate, among others), sensitive analytical methods to trace them in humans (mass spectrometry and accelerator mass spectrometry), and powerful software (capable of solving and manipulating differential equations efficiently and accurately), has allowed researchers to construct mathematical models aimed at characterizing the dynamic and kinetic behavior of key nutrients in vivo in humans at an unparalleled level of detail.

Compartmental Analysis Newnes

Suitable for advanced undergraduates and graduate students, this text covers the theoretical basis for mathematical modeling as well as a variety of identification algorithms and their applications. 1986 edition.

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