Solution And Estimation Methods For Dsge Models

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Computer Aided Property Estimation for Process and Product Design Harvard University Press
In this book, we study theoretical and practical aspects of computing methods for mathematical modelling of nonlinear systems. A number of computing techniques are considered, such as methods of operator approximation with any given accuracy; operator interpolation techniques including a non-Lagrange interpolation; methods of system representation subject to constraints associated with concepts of causality, memory and stationarity; methods of system representation with an accuracy that is the best within a given class of models; methods of covariance matrix estimation; methods for low-rank matrix approximations; hybrid methods based on a combination of iterative procedures and best operator approximation; and methods for information compression and filtering under condition that a filter model should satisfy restrictions associated with causality and different types of memory. As a result, the book represents a blend of new methods in general computational analysis, and specific, but also generic, techniques for study of systems theory ant its particular branches, such as optimal filtering and information compression. - Best operator approximation, - Non-Lagrange interpolation, - Generic Karhunen-Loeve transform - Generalised low-rank matrix approximation - Optimal data compression - Optimal nonlinear filtering
Improved Estimation Method John Wiley & Sons
Explosive growth in the size of spatial databases has highlighted the need for spatial data mining techniques to mine the interesting but implicit spatial patterns within these large databases. This book explores computational structure of the exact and approximate spatial autoregression (SAR) model solutions. Estimation of the parameters of the SAR model using Maximum Likelihood (ML) theory is computationally very expensive because of the need to compute the logarithm of the determinant (log-det) of a large matrix in the log-likelihood function. The second part of the book introduces theory on SAR model solutions. The third part of the book applies parallel processing techniques to the exact SAR model solutions. Parallel formulations of the SAR model parameter estimation procedure based on ML theory are probed using data parallelism with load-balancing techniques. Although this parallel implementation showed scalability up to eight processors, the exact SAR model solution still suffers from high computational complexity and memory requirements. These limitations have led the book to investigate serial and parallel approximate solutions for SAR model parameter estimation. In the fourth and fifth parts of the book, two candidate approximate-semi-sparse solutions of the SAR model based on Taylor's Series expansion and Chebyshev Polynomials are presented. Experiments show that the differences between exact and approximate SAR parameter estimates have no significant effect on the prediction accuracy. In the last part of the book, we developed a new ML based approximate SAR model solution and its variants in the next part of the thesis. The new approximate SAR model solution is called the Gauss-Lanczos approximated SAR model solution. We algebraically rank the error of the Chebyshev Polynomial approximation, Taylor's Series approximation and the Gauss-Lanczos approximation to the solution of the SAR model and its variants. In other words, we established a novel relationship between the error in the log-det term, which is the approximated term in the concentrated log-likelihood function and the error in estimating the SAR parameter for all of the

approximate SAR model solutions.

Multicollinearity in linear economic models CRC Press

This estimation reference text thoroughly describes matrix factorization methods successfully employed by numerical analysts, familiarizing readers with the techniques that lead to efficient, economical, reliable, and flexible estimation algorithms. Topics include a review of least squares data processing and the Kalman filter algorithm; positive definite matrices, the Cholesky decomposition, and some of their applications; Householder orthogonal transformations; sequential square root data processing; mapping effects and process noise; biases and correlated process noise; and covariance analysis of effects due to mismodeled variables and incorrect filter a priori statistics. The concluding chapters explore SRIF error analysis of effects due to mismodeled variables and incorrect filter a priori statistics as well as square root information smoothing. Geared toward advanced undergraduates and graduate students, this pragmatically oriented and detailed presentation is also a useful reference, featuring numerous helpful appendixes throughout the text.

Theory of Difference Equations Numerical Methods and Applications by V Lakshmikantham and D Trigiante Solution and Estimation Methods for DSGE ModelsNonlinear Estimation

This edition is one in a series of works by the authors on the investigation and systematic presentation of the physical and chemical properties of binary and multicomponent electrolyte solutions and on the pertinent estimation methods. The present edition offers extensive coverage of the volumetric properties of electrolyte solutions and includes new data on apparent molar volumes. The experimental density data for the most extensively used electrolytes cover a high temperature region and a range of pressures.

Guaranteed Estimation Problems in the Theory of Linear Ordinary Differential Equations with Uncertain Data Academic Press

Solution and Estimation Methods for DSGE ModelsNonlinear EstimationCRC Press

Solution and Maximum Likelihood Estimation of Dynamic Nonlinear Rational Expectations Models International Monetary Fund

The problem of solving nonlinear equations and systems of equations ranks among the most signi?cant in the theory and practice, not only of applied mathematicsbutalsoofmanybranchesofengineeringsciences,physics,c- puter science, astronomy, ?nance, and so on. A glance at the bibliography and the list of great mathematicians who have worked on this topic points to a high level of contemporary interest. Although the rapid development of digital computers led to the e?ective implementation of many numerical methods, in practical realization, it is necessary to solve various problems such as computational e?ciency based on the total central processor unit time, the construction of iterative methods which possess a fast convergence in the presence of multiplicity (or clusters) of a desired solution, the control of rounding errors, information about error bounds of obtained approximate solution, stating computationally veri?able initial conditions that ensure a safe convergence, etc. It is the solution of these challenging problems that was the principal motivation for the present study. In this book, we are mainly concerned with the statement and study of initial conditions that provide the guaranteed convergence of an iterative method for solving equations of the form f(z) = 0. The traditional approach to this problem is mainly based on asymptotic convergence analysis using some strong hypotheses on di?erentiability and derivative bounds in a rather wide domain.

Error Estimation and Adaptive Discretization Methods in Computational Fluid Dynamics CRC Press

Utilizing mathematical algorithms is an important aspect of recreating real-world problems in order to make important decisions. By generating a randomized algorithm that produces statistical patterns, it becomes easier to find solutions to countless situations. Stochastic Methods for Estimation and Problem Solving in Engineering provides emerging research on the role of random probability systems in mathematical models used in various fields of research. While highlighting topics, such as random probability distribution, linear systems, and transport profiling, this book explores the use and behavior of uncertain probability methods in business and science. This book is an important resource for engineers, researchers, students, professionals, and practitioners seeking current research on the challenges and opportunities of non-deterministic probability models.

Inverse Problem Theory and Methods for Model Parameter Estimation Elsevier

This paper considers the estimation of a number of commonly used single-equation linear models, all of which have rationally expected future explanatory variables. Fully efficient and less efficient instrumental variable estimators are proposed in each case. The choice of estimation method is usually represented as a trade-off between efficiency on the one hand and robustness and computational convenience on the other. It is shown in this paper that there is a more fundamental issue which must influence the choice of estimator, namely the type of solution that the model possesses. The construction of an efficient estimation method depends on whether or not the model has a unique solution and often this will not be known a priori. Preliminary estimation by instrumental variable methods can be used to resolve this question. Various tests are proposed in the paper. Whiteman's solution method is used to determine the types of solution that are possible for each model. It is shown how these solutions can be written as both backwards and forwards solutions and the parameter restrictions which are required to obtain unique solutions.

Solving and Estimating Indeterminate DSGE Models Springer

This monograph is an exposition of a novel method for solving inverse problems, a method of parameter estimation for time series data collected from simulations of real experiments. These time series might be generated by measuring the dynamics of aircraft in flight, by the function of a hidden Markov model used in bioinformatics or speech recognition or when analyzing the dynamics of asset pricing provided by the nonlinear models of financial mathematics. Dynamic Systems Models demonstrates the use of algorithms based on polynomial approximation which have weaker requirements than already-popular iterative methods. Specifically, they do not require a first approximation of a root vector and they allow non-differentiable elements in the vector functions being approximated. The text covers all the points necessary for the understanding and use of polynomial approximation from the mathematical fundamentals, through algorithm development to the application of the method in, for instance, aeroplane flight dynamics or biological sequence analysis. The technical material is illustrated by the use of worked examples and methods for training the algorithms are included. Dynamic Systems Models provides researchers in aerospatial engineering, bioinformatics and financial mathematics (as well as computer scientists interested in any of these fields) with a reliable and effective numerical method for nonlinear estimation and solving boundary problems when carrying out control design. It will also be of interest to academic researchers studying inverse problems and their solution.

Specification, Estimation, and Analysis of Macroeconometric Models James Beck

Nonlinear Estimation: Methods and Applications with Deterministic Sample Points focusses on a comprehensive treatment of deterministic sample point filters (also called Gaussian filters) and their variants for nonlinear estimation problems, for which no closed-form solution is available in general. Gaussian filters are becoming popular with the designers due to their ease of implementation and real time execution even on inexpensive or legacy hardware. The main purpose of the book is to educate the reader about a variety of available nonlinear estimation methods so that the reader can choose the right method for a real life problem, adapt or modify it where necessary and implement it. The book can also serve as a core graduate text for a course on state estimation. The book starts from the basic conceptual solution of a nonlinear estimation problem and provides an in depth coverage of (i) various Gaussian filters such as the unscented Kalman filter, cubature and quadrature based filters, Gauss-Hermite filter and their variants and (ii) Gaussian sum filter, in both discrete and continuous-discrete domain. Further, a brief description of filters for randomly delayed measurement and two case-studies are also included. Features: The book covers all the important Gaussian filters, including filters with randomly delayed measurements. Numerical simulation examples with detailed matlab code are provided for most algorithms so that beginners can verify their understanding. Two real world case studies are included: (i) underwater passive target tracking, (ii) ballistic target tracking. The style of writing is suitable for engineers and scientists. The material of the book is presented with the emphasis on key ideas, underlying assumptions, algorithms, and properties. The book combines rigorous mathematical treatment with matlab code, algorithm listings, flow charts and detailed case studies to deepen understanding.

Stochastic Methods for Estimation and Problem Solving in Engineering Pearson Education

Presents an accessible approach to the cost estimation tools, concepts, and techniques needed to support analytical and cost decisions Written with an easy-to-understand approach, Cost Estimation: Methods and Tools provides comprehensive coverage of the quantitative techniques needed by professional cost estimators and for those wanting to learn about this vibrant career field. Featuring the underlying mathematical and analytical principles of cost estimation, the book focuses on the tools and methods used to predict the research and development, production, and operating and support costs for successful cost estimation in industrial, business, and manufacturing processes. The book begins with a detailed historical perspective and key terms of the cost estimating field in order to develop the necessary background prior to implementing the presented quantitative methods. The book proceeds to fundamental cost estimation methods utilized in the field of cost estimation, including working with inflation indices, regression analysis, learning curves, analogies, cost factors, and wrap rates. With a step-by-step introduction to the practicality of cost estimation and the available resources for obtaining relevant data, Cost Estimation: Methods and Tools also features: Various cost estimating tools, concepts, and techniques needed to support business decisions Multiple questions at the end of each chapter to help readers obtain a deeper understanding of the discussed methods and techniques An overview of the software used in cost estimation, as well as an introduction to the application of risk and uncertainty analysis A Foreword from Dr. Douglas A. Brook, a professor in the Graduate School of Business and Public Policy at the Naval Postgraduate School, who spent many years working in the Department of Defense acquisition environment Cost Estimation: Methods and Tools is an excellent reference for academics and practitioners in decision science, operations research, operations management, business, and systems and industrial engineering, as well as a useful guide in support of professional cost estimation training and certification courses for practitioners. The book is also appropriate for graduate-level courses in operations research, operations management, engineering economics, and manufacturing and/or production processes.

Reliable Methods for Computer Simulation BoD – Books on Demand

This monograph is devoted to the construction of optimal estimates of values of linear functionals on solutions to Cauchy and two-point boundary value problems for systems of linear first-order ordinary differential equations, from indirect observations which are linear transformations of the same solutions perturbed by additive random noises. It is assumed that right-hand sides of equations and boundary data as well as statistical characteristics of random noises in observations are not known and belong to certain given sets in corresponding functional spaces. This leads to the necessity of introducing the minimax statement of an estimation problem when optimal estimates are defined as linear, with respect to observations, estimates for which the maximum of mean square error of estimation taken over the above-mentioned sets attains minimal value. Such estimates are called minimax or guaranteed estimates. It is established that these estimates are expressed explicitly via solutions to some uniquely solvable linear systems of ordinary differential equations of the special type. The authors apply these results for obtaining the optimal estimates of solutions from indirect noisy observations. Similar estimation problems for solutions of boundary value problems for linear differential equations of order n with general boundary conditions are considered. The authors also elaborate guaranteed estimation methods under incomplete data of unknown right-hand sides of equations and boundary data and obtain representations for the corresponding guaranteed estimates. In all the cases estimation errors are determined.

Handbook of Property Estimation Methods for Chemicals Academic Press

Recent decades have seen a very rapid success in developing numerical methods based on explicit control over approximation errors. It may be said that nowadays a new direction is forming in numerical analysis, the main goal of which is to develop methods ofreliable computations. In general, a reliable numerical method must solve two basic problems: (a) generate a sequence of approximations that converges to a solution and (b) verify the accuracy of these approximations. A computer code for such a method must consist of two respective blocks: solver and checker. In this book, we are chiefly concerned with the problem (b) and try to present the main approaches developed for a posteriori error estimation in various problems. The authors try to retain a rigorous mathematical style, however, proofs are constructive whenever possible and additional mathematical knowledge is presented when necessary. The book contains a number of new mathematical results and lists a posteriori error estimation methods that have been developed in the very recent time. · computable bounds of approximation errors · checking algorithms · iteration processes · finite element methods · elliptic type problems · nonlinear variational problems · variational inequalities

Point Estimation of Root Finding Methods IGI Global

A complete restructuring and updating of the classic 1982 Handbook of Chemical Property Estimation Methods (commonly known as "Lyman's Handbook"), the Handbook of Property Estimation Methods for Chemicals: Environmental and Health Sciences reviews and recommends practical methods for estimating environmentally important properties of organic chemicals. One of the most eagerly anticipated revisions in scientific publishing, the new Handbook includes both a foreword and a chapter by Dr. Lyman. Written for convenient and frequent use, each chapter integrates recent developments while retaining the elements that made the first version a classic. As a reference tool, the New Edition is indispensable. It comprehensively reviews recent developments in chemical property estimation methods and focuses on the properties most critical to environmental fate assessment.

Volumetric Properties of Electrolyte Solutions Elsevier

Introduction to and survey of parameter estimation; Probability; Introduction to statistics; Parameter estimation methods; Introduction to linear estimation; Matrix analysis for linear parameter estimation; Minimization of sum of squares functions for models nonlinear in parameters; Design of optimal experiments.

Cost Estimation Routledge

In this book, we study theoretical and practical aspects of computing methods for mathematical modelling of nonlinear systems. A number of computing techniques are considered, such as methods of operator approximation with any given accuracy; operator interpolation techniques including a non-Lagrange interpolation; methods of system representation subject to constraints associated with concepts of causality, memory and stationarity; methods of system representation with an accuracy that is the best within a given class of models; methods of covariance matrix estimation; methods for low-rank matrix approximations; hybrid methods based on a combination of iterative procedures and best operator approximation; and methods for information compression and filtering under condition that a filter model should satisfy restrictions associated with causality and different types of memory. As a result, the book represents a blend of new methods in general computational analysis, and specific, but also generic, techniques for study of systems theory ant its particular branches, such as optimal filtering and information compression. - Best operator approximation, - Non-Lagrange interpolation, - Generic Karhunen-Loeve transform - Generalised low-rank matrix approximation - Optimal data compression - Optimal nonlinear filtering

Initial Value Methods for Boundary Value Problems: Theory and Application of Invariant Imbedding CRC Press

As computational fluid dynamics (CFD) is applied to ever more demanding fluid flow problems, the ability to compute numerical fluid flow solutions to a user specified tolerance as well as the ability to quantify the accuracy of an existing numerical solution are seen as essential ingredients in robust numerical simulation. Although the task of accurate error estimation for the nonlinear equations of CFD seems a daunting problem, considerable effort has centered on this challenge in recent years with notable progress being made by the use of advanced error estimation techniques and adaptive discretization methods. To address this important topic, a special course wasjointly organized by the NATO Research and Technology Office (RTO), the von Karman Insti tute for Fluid Dynamics, and the NASA Ames Research Center. The NATO RTO sponsored course entitled "Error Estimation and Solution Adaptive Discretization in CFD" was held September 10-14, 2002 at the NASA Ames Research Center and October 15-19, 2002 at the von Karman Institute in Belgium. During the special course, a series of comprehensive lectures by leading experts discussed recent advances and technical progress in the area of numerical error estimation and adaptive discretization methods with spe cific emphasis on computational fluid dynamics. The lecture notes provided in this volume are derived from the special course material. The volume con sists of 6 articles prepared by the special course lecturers.

Parameter Estimation in Engineering and Science Elsevier

A focused presentation of how sparse optimization methods can be used to solve optimal control and estimation problems.

Parameter Estimation and Inverse Problems Courier Corporation

Properties of chemical compounds and their mixtures are needed in almost every aspect of process and product design. When the use of experimental data is not possible, one of the most widely used options in the use of property estimation models. Computer Aided Property Estimation for Process and Product Design provides a presentation of the most suitable property estimation models available today as well as guidelines on how to select an appropriate model. Problems that users are faced with, such as: which models to use and what their accuracy is, are addressed using a systematical approach to property estimation. The volume includes contributions from leading experts from academia and industry. A wide spectrum of properties and phase equilibria types is covered, making it indispensable for research, development and educational purposes. * This book presents the latest developments in computational modelling for thermodynamic property estimation. * It combines theory with practice and includes illustrative examples of software applications. * The questions users of property models are faced with are addressed comprehensively.

Solution and Estimation of Dynamic Discrete Choice Structural Models Using Euler Equations Academic Press

We propose a method for solving and estimating linear rational expectations models that exhibit indeterminacy and we provide step-by-step guidelines for implementing this method in the Matlab-based packages Dynare and Gensys. Our method redefines a subset of expectational errors as new fundamentals. This redefinition allows us to treat indeterminate models as determinate and to apply standard solution algorithms. We provide a selection method, based on Bayesian model comparison, to decide which errors to pick as fundamental and we present simulation results to show how our procedure works in practice.