

Editorial

Stochastic Systems: Modeling, Optimization, and Applications

Shuping He,¹ Ju H. Park,² Hao Shen,³ Zhengguang Wu,⁴ and Hongsheng Dai⁵

¹ School of Electrical Engineering and Automation, Anhui University, Hefei 230602, China

² Department of Electrical Engineering, Yeungnam University, 254-1 Dae-Dong, Kyongsan 712-749, Republic of Korea

³ School of Electrical Engineering and Information, Anhui University of Technology, Maanshan 243002, China

⁴ National Laboratory of Industrial Control Technology, Institute of Cyber-Systems and Control, Zhejiang University, Hangzhou 310058, China

⁵ Department of Mathematical Sciences, University of Essex, Wivenhoe Park, Colchester CO1 3SQ, UK

Correspondence should be addressed to Shuping He; shuping.he@ahu.edu.cn

Received 8 April 2014; Accepted 8 April 2014; Published 29 April 2014

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Many stochastic systems, such as switching systems, Markovian jumping systems, jumping neural networks, T-S fuzzy jumping systems and network control systems, have arisen naturally in the mathematical modeling of phenomena spanning disciplines in the social sciences, natural sciences, and engineering. Much attention has been given to modeling, control optimization, robust filtering, signal processing, and real applications of such stochastic dynamical systems in the literature in recent years. This special issue provides a forum for researchers and practitioners to publish quality research work on modeling, optimization approaches, and their applications in the context of theory analysis and engineering developments. The accepted papers in this special issue include stochastic stability, stabilization and control optimization, stochastic optimization, particle swarm optimization, modeling and identification methods, signal processing, robust filtering, sliding mode control, multiagent systems, nonlinear systems, time-delayed systems, neural networks, T-S fuzzy systems, simulated annealing, and fault diagnosis methods.

In this special issue, we have accepted thirty-nine papers, of which six consider the stability and stabilization problems of stochastic systems. Twelve papers cover the problems of the controller design and relevant optimization algorithms. There are three articles that discussed the signal processing methods. One paper focuses on fault diagnosis and fault tolerant control for non-Gaussian singular time-delayed stochastic

systems, and three consider the state estimation and filtering problems of discrete-time stochastic systems. Finally, fourteen papers study the stochastic systems modeling and identification methods.

Over the past few decades, the stochastic stability, stabilization, and control optimization problems have long been the mainstreams of research topics. "Exponential synchronization of stochastic complex dynamical networks with impulsive perturbations and Markovian switching" by W. Zhou et al. studies the exponential synchronization for a class of Markovian switching networks with impulsive perturbations and "Almost sure asymptotical adaptive synchronization for neutral-type neural networks with stochastic perturbation and Markovian switching" by W. Zhou et al. concerns the almost sure asymptotical adaptive synchronization for a class of nonlinear Markovian switching networks. "Stabilization of discrete-time Markovian jump systems via controllers with partially mode-dependent characterization" by C. Zhai et al. developed a kind of stabilizing controller in terms of being partially mode-dependent for discrete-time Markovian jump systems. "Fuzzy stabilization for nonlinear discrete ship steering stochastic systems subject to state variance and passivity constraints" by W.-J. Chang et al. is concerned with a fuzzy stabilization methodology for nonlinear discrete-time stochastic systems, subject to state variance constraint and passivity constraint. "Simple adaptive asymptotic tracking scheme for parametric strict-feedback nonlinear systems with

Optimization Of Stochastic Systems

Farhad Azadivar



Optimization Of Stochastic Systems:

Optimization of Stochastic Systems Masanao Aoki, 2016-06-03 *Optimization of Stochastic Systems* Masanao Aoki, 2008 **Optimization of stochastic systems** Masanao Aoki, 1967 *Optimization of stochastic systems* Jose Luis Farah, 1977 **Optimization of Stochastic Systems** Masanao Aoki, 1967 *Optimization of stochastic systems* Masanao Aoki, 1967 **Optimization of Stochastic Systems** Masanao Aoki, 1989

From the Preface The first edition of this book was written mainly for audiences with physical science and engineering backgrounds Nevertheless it reached some readers with economic and management science training Analytical training of graduate students in economics and management sciences had progressed much in the last 20 years and many new research results and optimization algorithms have also become available My own interest in the meantime has shifted to the analysis of dynamics and optimization problems of economic and management science origin With these developments and changes I decided to rewrite much of the first edition to make it more accessible to graduate students and professionals in social sciences I have also incorporated some new analytic tools that I deem useful in analyzing the dynamic and stochastic problems which confront these readers I hope that my efforts successfully bring intertemporal optimization problems closer to economics professionals New topics introduced into this second edition appear mostly in Chapters 2 4 5 6 and 8 Martingales and martingale differences are introduced early in Chapter 2 Some limit theorems and asymptotic properties of linear state space models driven by martingale differences are presented Because many excellent books are available on martingales and their limit theorems derivations and proofs are mostly sketchy and readers are referred to these sources The results in Chapter 2 are applied in Chapters 5 6 and 8 among other places The notion of dynamic aggregation and its relation to cointegration and error correction models are developed in Chapter 4 Some recursive parameter estimation schemes and their statistical properties are included in Chapters 5 and 6 Here again books devoted entirely to these topics are available in the literature and much had to be omitted to keep the second edition to a manageable size In an appendix to Chapter 7 a potentially very powerful tool in proving convergence of adaptive schemes is outlined Rational expectations models and their solution methods are developed in Chapter 8 because of their wide spread interest to economists A very important class of problems in sequential decision problems revolves around questions of approximating nonlinear dynamics or more generally complex situations with a sequence of less complex ones Chapter 9 does not begin to do justice to this class of problems but is included as being suggestive of works to be done When I first started contemplating the revision of the first edition I benefited from a list of excellent suggestions from Rick van der Ploeg though I did not necessarily incorporate all of his suggestions Conversations with Thomas Sargent and Victor Solo were useful in organizing the material into the form of the second edition I also benefited from discussions with Hashem Pesaran and correspondences with L Broze in finalizing Chapter 8 Some material in this book was used as lecture notes in a graduate course in the Department of Economics

University of California Los Angeles the winter quarter of 1987 I thank the participants in the course for many useful comments

Key Features This major revision of the First Edition addresses optimization problems stated in stochastic difference equations which often contain uncertain or randomly varying parameters Presents a set of concepts and techniques useful in analyzing or controlling stochastic dynamic processes with possible incompletely specified characteristics It discusses basic system properties such as Stability and observability Dynamic programming formulations of optimal and adaptive control problems Parameter estimation schemes and their convergence behavior Solution methods for rational expectations models using martingale differences

Optimization, Control, and Applications of Stochastic Systems Daniel Hernández-Hernández, J. Adolfo Minjárez-Sosa, 2012-08-15 This volume provides a general overview of discrete and continuous time Markov control processes and stochastic games along with a look at the range of applications of stochastic control and some of its recent theoretical developments These topics include various aspects of dynamic programming approximation algorithms and infinite dimensional linear programming In all the work comprises 18 carefully selected papers written by experts in their respective fields Optimization Control and Applications of Stochastic Systems will be a valuable resource for all practitioners researchers and professionals in applied mathematics and operations research who work in the areas of stochastic control mathematical finance queueing theory and inventory systems It may also serve as a supplemental text for graduate courses in optimal control and dynamic games

Optimization of Stochastic Systems Through Simulation Using Stochastic Approximation Method Farhad Azadivar, 19?? *Optimization, Control, and Applications of Stochastic Systems* Daniel Hernández-Hernández, J. Adolfo Minjárez-Sosa, 2012-08-14 This volume provides a general overview of discrete and continuous time Markov control processes and stochastic games along with a look at the range of applications of stochastic control and some of its recent theoretical developments These topics include various aspects of dynamic programming approximation algorithms and infinite dimensional linear programming In all the work comprises 18 carefully selected papers written by experts in their respective fields Optimization Control and Applications of Stochastic Systems will be a valuable resource for all practitioners researchers and professionals in applied mathematics and operations research who work in the areas of stochastic control mathematical finance queueing theory and inventory systems It may also serve as a supplemental text for graduate courses in optimal control and dynamic games

Optimization, Control, and Applications of Stochastic Systems, 2012-09-12 *Optimization of Stochastic Systems with Applications in Computer Science* International Federation for Information Processing. Working Group 7.1 Modelling and Simulation, 1990

Optimization of Stochastic Systems with Applications in Computer Science N. M. Arató, Arunabha Bagchi, 1990 *Some Optimization Problems for Stochastic Systems* Torsten Söderström, 1985 *Stochastic systems* Roger J. B. Wets, 1976 *Stochastic Systems and Optimization*, 1989

The Optimization of Linear Stochastic Systems Norman Carl Fromm, 1969 **Monte Carlo Optimization of Stochastic Systems: Two New Approaches** Peter W. Glynn, Jerry L.

Sanders, WISCONSIN UNIV-MADISON MATHEMATICS RESEARCH CENTER., 1986 The design of modern manufacturing systems presents a number of challenges In particular the stochastic nature of machine failures in combination with the large number of decision variables makes optimization of such systems difficult This paper presents two new approaches to optimization of the complex stochastic systems that arise in a manufacturing context both are Monte Carlo simulation oriented and are therefore broadly applicable The first technique involves using a likelihood ratio gradient estimate to drive a Robbins Monro algorithm and is relevant to problems in which the decision variables are continuous The second idea employs homotopy methods to follow an optimal path in decision variable space and can be used for both discrete and continuous optimization Stochastic Systems Roger J.-B. Wets, 1976 **Stochastic systems** Roger J.-B. Wets, 1976

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Optimization Of Stochastic Systems Introduction

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