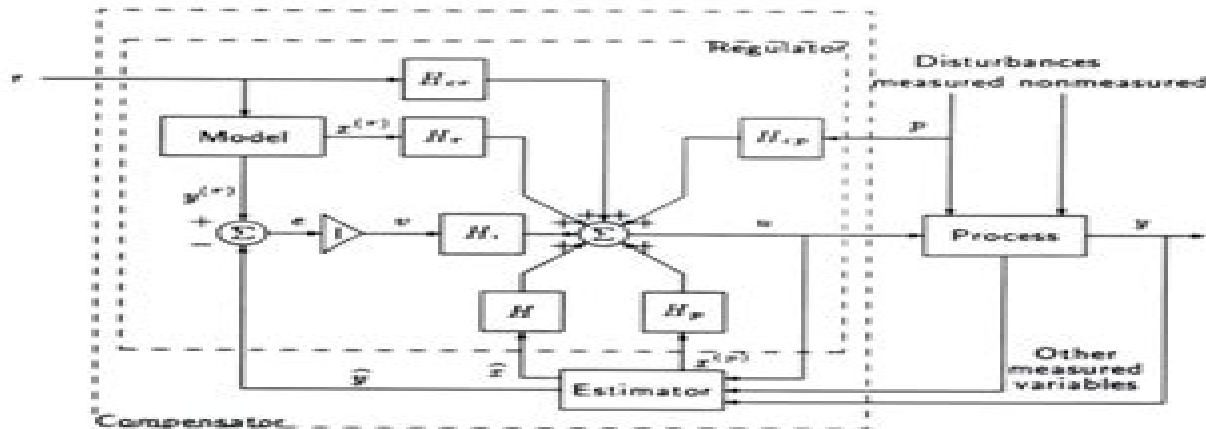


ALGORITHMS FOR LINEAR-QUADRATIC OPTIMIZATION



Vasile Sima

Algorithms For Linear Quadratic Optimization

Sasha Hu



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Algorithms for Linear-Quadratic Optimization Vasile Sima,2021-12-24 This textbook offers theoretical algorithmic and computational guidelines for solving the most frequently encountered linear quadratic optimization problems It provides an overview of recent advances in control and systems theory numerical linear algebra numerical optimization scientific computations and software engineering

Optimal Quadratic Programming Algorithms Zdenek Dostál,2009-04-03 Solving optimization problems in complex systems often requires the implementation of advanced mathematical techniques Quadratic programming QP is one technique that allows for the optimization of a quadratic function in several variables in the presence of linear constraints QP problems arise in fields as diverse as electrical engineering agricultural planning and optics Given its broad applicability a comprehensive understanding of quadratic programming is a valuable resource in nearly every scientific field Optimal Quadratic Programming Algorithms presents recently developed algorithms for solving large QP problems The presentation focuses on algorithms which are in a sense optimal i.e. they can solve important classes of problems at a cost proportional to the number of unknowns For each algorithm presented the book details its classical predecessor describes its drawbacks introduces modifications that improve its performance and demonstrates these improvements through numerical experiments This self contained monograph can serve as an introductory text on quadratic programming for graduate students and researchers Additionally since the solution of many nonlinear problems can be reduced to the solution of a sequence of QP problems it can also be used as a convenient introduction to nonlinear programming The reader is required to have a basic knowledge of calculus in several variables and linear algebra

Encyclopedia of Optimization Christodoulos A. Floudas,Panos M. Pardalos,2008-09-04 The goal of the Encyclopedia of Optimization is to introduce the reader to a complete set of topics that show the spectrum of research the richness of ideas and the breadth of applications that has come from this field The second edition builds on the success of the former edition with more than 150 completely new entries designed to ensure that the reference addresses recent areas where optimization theories and techniques have advanced Particularly heavy attention resulted in health science and transportation with entries such as Algorithms for Genomics Optimization and Radiotherapy Treatment Design and Crew Scheduling

Numerical Optimization Joseph-Frédéric Bonnans,Jean Charles Gilbert,Claude Lemarechal,Claudia A. Sagastizábal,2013-03-14 Just as in its 1st edition this book starts with illustrations of the ubiquitous character of optimization and describes numerical algorithms in a tutorial way It covers fundamental algorithms as well as more specialized and advanced topics for unconstrained and constrained problems Most of the algorithms are explained in a detailed manner allowing straightforward implementation Theoretical aspects of the approaches chosen are also addressed with care often using minimal assumptions This new edition contains computational exercises in the form of case studies which help understanding optimization methods beyond their theoretical description when coming to actual implementation Besides the

nonsmooth optimization part has been substantially reorganized and expanded

Algorithms of the Synthesis of Optimal Regulations F.A. ALIEV, V.B. LARIN, N.I. VELIEVA, 2022-03-30 This book focuses on methods to solutions regarding matrix equations algebraic periodic and unilateral Riccati equations Lyapunov equations Sylvester equations generalized Sylvester equations and factorization of matrix polynomials in continuous and discrete cases These equations are used to solve problems of the synthesis of optimal controllers Also presented is the problem of the synthesis of optimal controllers in the frequency domain when measuring part of the phase coordinates A general parameterization algorithm is proposed for its solution The well known parameterizations Youla Jabr Bongiorno 1976 and Desoer Liu Murrau Saeks 1980 are demonstrated by us to form a special case of the proposed general parameterization algorithm The obtained results can be applied to solve various problems in oil production by the gas lift method and rod pump systems unmanned aerial vehicles and walking machines Each section is illustrated by examples The MATLAB environment is used for numerical solution of the problems The book is intended for students and experts in applied mathematics and control systems theory

Optimal Quadratic Programming Algorithms Zdenek Dostál, 2008-11-01 Quadratic programming QP is one advanced mathematical technique that allows for the optimization of a quadratic function in several variables in the presence of linear constraints This book presents recently developed algorithms for solving large QP problems and focuses on algorithms which are in a sense optimal i.e. they can solve important classes of problems at a cost proportional to the number of unknowns For each algorithm presented the book details its classical predecessor describes its drawbacks introduces modifications that improve its performance and demonstrates these improvements through numerical experiments This self contained monograph can serve as an introductory text on quadratic programming for graduate students and researchers Additionally since the solution of many nonlinear problems can be reduced to the solution of a sequence of QP problems it can also be used as a convenient introduction to nonlinear programming

Interior Point Approach to Linear, Quadratic and Convex Programming D. den Hertog, 2012-12-06 This book describes the rapidly developing field of interior point methods IPMs An extensive analysis is given of path following methods for linear programming quadratic programming and convex programming These methods which form a subclass of interior point methods follow the central path which is an analytic curve defined by the problem Relatively simple and elegant proofs for polynomiality are given The theory is illustrated using several explicit examples Moreover an overview of other classes of IPMs is given It is shown that all these methods rely on the same notion as the path following methods all these methods use the central path implicitly or explicitly as a reference path to go to the optimum For specialists in IPMs as well as those seeking an introduction to IPMs The book is accessible to any mathematician with basic mathematical programming knowledge

Proceedings of the Conference on Applied Mathematics and Scientific Computing Zlatko Drmac, Miljenko Marusic, Zvonimir Tutek, 2005-12-05 This book brings together contributed papers presenting new results covering different areas of applied mathematics and scientific computing Firstly

four invited lectures give state of the art presentations in the fields of numerical linear algebra shape preserving approximation and singular perturbation theory Then an overview of numerical solutions to skew Hamiltonian and Hamiltonian eigenvalue problems in system and control theory is given by Benner Kressner and Mehrmann The important issue of structure preserving algorithms and structured condition numbers is discussed Costantini and Sampoli review the basic ideas of the abstract schemes and show that they can be used to solve any problem concerning the construction of spline curves subject to local constraints Kvasov presents a novel approach in solving the problem of shape preserving spline interpolation Formulating this problem as a differential multipoint boundary value problem for hyperbolic and biharmonic tension splines he considers its finite difference approximation Miller and Shishkin consider the Black Scholes equation that for some values of the parameters may be a singularly perturbed problem They construct a new numerical method on an appropriately fitted piecewise uniform mesh which is parameter uniformly convergent

Topics in Semidefinite and Interior-Point Methods Panos M. Pardalos, Henry Wolkowicz, 1998 This volume presents refereed papers presented at the workshop Semidefinite Programming and Interior Point Approaches for Combinatorial Problems held at The Fields Institute in May 1996 Semidefinite programming SDP is a generalization of linear programming LP in that the non negativity constraints on the variables is replaced by a positive semidefinite constraint on matrix variables Many of the elegant theoretical properties and powerful solution techniques follow through from LP to SDP In particular the primal dual interior point methods which are currently so successful for LP can be used to efficiently solve SDP problems In addition to the theoretical and algorithmic questions SDP has found many important applications in combinatorial optimization control theory and other areas of mathematical programming The papers in this volume cover a wide spectrum of recent developments in SDP The volume would be suitable as a textbook for advanced courses in optimization It is intended for graduate students and researchers in mathematics computer science engineering and operations

Control and Dynamic Systems V30: Advances in Algorithms and Computational Techniques in Dynamic System Control Part 3 of 3 C.T. Leonides, 2012-12-02 Control and Dynamic Systems Advances in Theory in Applications Volume 30 Advances in Algorithms and Computational Techniques in Dynamic Systems Control Part 3 of 3 discusses developments in algorithms and computational techniques for control and dynamic systems This volume begins with the issue of decision making or optimal control in the natural environment It then discusses large scale systems composed of multiple sensors algorithms for systems with multiplicative noise stochastic differential games Markovian targets low cost microcomputer and true digital control systems and algorithms for the design of teleoperated systems This book is an important reference for practitioners in the field who want a comprehensive source of techniques with significant applied implications

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