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Nota di contenuto	Preface -- Part I Background -- Chapter 1 Linear Algebra -- Chapter 2 Optimization -- Part II Basic Algorithms -- Chapter 3 Gradient Methods -- Chapter 4 Conjugate Gradients as Direct Method -- Chapter 5 Gradient Projection -- Chapter 6 From Penalty to Exact Augmented Lagrangians -- Chapter 7 Active Sets with Finite Termination -- Part III Optimal Algorithms -- Chapter 8 Conjugate Gradients as Iterative Method -- Chapter 9 SMALE for Equality Constraints -- Chapter 10 MPRGP for Bound Constraints -- Chapter 11 MPGP and PBBF for Separable QCQP -- Chapter 12 Solvers for Separable and Equality QP/QCQP Problems -- Part IV Case Studies -- Chapter 13 Elliptic Variational Inequalities -- Chapter 14 Contact Problem with Friction --

Chapter 15 Model Predictive Control -- Chapter 16 Support Vector Machines -- Chapter 17 PERMON and ESPRESO Software -- References.

Sommario/riassunto

This book presents cutting-edge algorithms for solving large-scale quadratic programming (QP) and/or QPSQP. While applying these algorithms to the class of QP problems with the spectrum confined to a positive interval, the theory guarantees finding the prescribed precision solution through a uniformly bounded number of simple iterations, like matrix-vector multiplications. Key concepts explored include the active set strategy, spectral gradients, and augmented Lagrangian methods. The book provides a comprehensive quantitative convergence theory, avoiding unspecified constants. Through detailed numerical experiments, the author demonstrates the algorithms' superior performance compared to traditional methods, especially in handling large problems with sparse Hessian. The performance of the algorithms is shown on large-scale (billions of variables) problems of mechanics, optimal control, and support vector machines. Ideal for researchers and practitioners in optimization and computational mathematics, this volume is also an introductory text and a reference for advanced studies in nonlinear programming. Whether you're a scholar in applied mathematics or an engineer tackling complex optimization challenges, this book offers valuable insights and practical tools for your work.