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	Nota di contenuto	Foreword -- Preface -- Acknowledgements -- List of Contributors -- PART I Numerical Analysis -- Computational Issues for Optimal Shape Design in Hemodynamics, by Olivier Pironneau -- Functional A Posteriori Error Estimate for a Nonsymmetric Stationary Diffusion Problem, by Olli Mali -- Error Estimates of Uzawa Iteration Method for a Class of Bingham Fluids, by Marjaana Nokka and Sergey Repin -- An Automatic Differentiation Based Approach to the Level Set Method, by Jukka I. Toivanen -- PART II Mathematical Modeling in Mechanics -- Differential Fluid Mechanics Harmonization of Analytical, Numerical and Laboratory Models of Flows, by Yuli D. Chashechkin -- Effect of Friction in Sliding Contact of a Sphere over a Viscoelastic Halfspace, by Irina Goryacheva, Fedor Stepanov, and Elena Torskaya -- Stability of a Tensioned Axially Moving Plate Subjected to Cross-Direction Potential Flow, by Juha Jeronen, Tytti Saksa, and Tero Tuovinen -- Multiaxial fatigue criteria and durability of titanium compressor disks in low- and very-high-cycle fatigue modes, by Nikolay Burago and Ilia Nikitin --

Dynamic Analysis for Axially Moving Viscoelastic PoyntingThompson Beams, by Tytti Saksa and Juha Jeronen -- A projection approach to analysis of natural vibrations for beams with nonsymmetric cross sections, by Vasily Saurin and Georgy Kostin -- On bifurcation analysis of implicitly given functionals in the theory of elastic stability, by Nikolay Banichuk, Alexander Barsuk, Juha Jeronen, Pekka Neittaanmäki, and Tero Tuovinen -- PART III Optimization -- Proximal Bundle Method for Nonsmooth and Nonconvex Multiobjective Optimization, by Marko M. Mäkelä, Napsu Karmitsa and Outi Wilppu -- Efficient Parallel Nash Genetic Algorithm for solving Inverse Problems in Structural Engineering, by Jacques Périaux and David Greiner -- Efficient variational design sensitivity analysis, by Franz-Joseph Barthold, Nikolai Gerzen, Wojciech Kijanski, and Daniel Materna -- A Variational Approach to Modelling and Optimization in Elastic Structure Dynamics, by Georgy Kostin and Vasily Saurin -- Contact Optimization Problems for Stationary and Sliding Conditions, by István Páczelt, Attila Baksa, and Zenon Mroz -- Some Problems of Multipurpose Optimization for Deformed Bodies and Structures, by Alexander Sinitsin, Svetlana Ivanova, Evgeniy Makeev and Nikolay Banichuk.

Sommario/riassunto	This volume contains selected papers in three closely related areas: mathematical modeling in mechanics, numerical analysis, and optimization methods. The papers are based upon talks presented on the International Conference for Mathematical Modeling and Optimization in Mechanics, held in Jyväskylä, Finland, March 6-7, 2014 dedicated to Prof. N. Banichuk on the occasion of his 70th birthday. The articles are written by well-known scientists working in computational mechanics and in optimization of complicated technical models. Also, the volume contains papers discussing the historical development, the state of the art, new ideas, and open problems arising in modern continuum mechanics and applied optimization problems. Several papers are concerned with mathematical problems in numerical analysis, which are also closely related to important mechanical models. The main topics treated include: * Computer simulation methods in mechanics, physics, and biology; * Variational problems and methods; minimization algorithms; * Optimal control problems with distributed and discrete control; * Shape optimization and shape design problems in science and engineering; * Sensitivity analysis and parameters optimization of complex systems.