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Collana	Differential-Algebraic Equations Forum, , 2199-840X
Disciplina	515.35
Soggetti	Differential equations Numerical analysis Computer simulation Mathematical models Differential Equations Numerical Analysis Computer Modelling Mathematical Modeling and Industrial Mathematics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Part 1 Analysis and Decoupling -- A Projector Based Decoupling of Daes Obtained from the Derivative Array -- Basic Characteristics of Differential-Algebraic Operators -- Part 2 Numerical Methods and Model Order Reduction -- Inter/Extrapolation-Based Multirate Schemes: A Dynamic-Iteration Perspective -- Least-Squares Collocation for Higher-Index DAEs: Global Approach and Attempts Towards a Time-Stepping Version -- Exponential Integrators for Semi-Linear Parabolic Problems with Linear Constraints -- Improvement of Rosenbrock-Wanner Method RODASP -- Data-Driven Model Reduction for a Class of Semi-Explicit DAEs Using the Loewner Framework -- Part 3 Closed-Loop and Optimal Control -- Vector Relative Degree and Funnel Control for Differential-Algebraic Systems -- Observers for Differential-Algebraic Systems with Lipschitz or Monotone Nonlinearities -- Error Analysis for the Implicit Euler Discretization of Linear-Quadratic Control Problems with Higher Index DAEs and Bang–

Bang Solutions -- Part 4 Applications -- Port-Hamiltonian Modeling of District Heating Networks -- Coupled Systems of Linear Differential-Algebraic and Kinetic Equations with Application to the Mathematical Modelling of Muscle Tissue -- Generalized Circuit Elements -- Singularities of the Robotic Arm DAE.

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## Sommario/riassunto

This book contains articles presented at the 9th Workshop on Differential-Algebraic Equations held in Paderborn, Germany, from 17–20 March 2019. The workshop brought together more than 40 mathematicians and engineers from various fields, such as numerical and functional analysis, control theory, mechanics and electromagnetic field theory. The participants focussed on the theoretical and numerical treatment of “descriptor” systems, i.e., differential-algebraic equations (DAEs). The book contains 14 contributions and is organized into four parts: mathematical analysis, numerics and model order reduction, control as well as applications. It is a useful resource for applied mathematicians with interest in recent developments in the field of differential algebraic equations but also for engineers, in particular those interested in modelling of constraint mechanical systems, thermal networks or electric circuits.

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