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Nota di contenuto	PartI:Advances in Mathematical Modelling and Theory -- The Study of the Transformation Semigroup of the Abelian and Directed Non-Abelian Sandpiles -- On Constructing Finite Automata by Relational

Programming -- Skeleton Key: Subduction Classes in Finite Transformation Semigroups and Green's Relations -- The Attractor-Cycle Notation for Finite Transformations -- Algebraic Applications in Investigation of Musical Symmetry -- Analysis of the Semigroup Related to the Petri Net of a Traffic Roundabout.-PartII:Innovations in Statistical Machine Learning and Stochastic Models -- From Interval-valued Neurons to Convex-polygon-valued Neurons, with Sparsity and Entropy Criteria -- Excursions of Solvable Scalar Diffusions -- Hybrid Impulsive Formation Control of Vehicle Platoons Using Neural Networks -- Pinning impulsive control for synchronization of complex-valued delayed multilayer networks -- Quasi-synchronization of fractional-order multiplex networks with parameter mismatch via intermittent control -- Part III: Mathematical Modelling in Engineering, Physical and Chemical Sciences -- An Optimization-based Approach to Image Fusion using Structural Similarity -- Hamiltonian engineering with time-ordered evolution for unitary control of electron spins in semiconductor quantum dots -- Exploring the use of gradients in the Structural Similarity image quality measure -- Simulated Charge Stability in a MOSFET Linear Quantum Dot Array -- Vreman Stabilization for Nonlinear Greenshield's Model for Traffic Flow -- Computational Modelling of Heat Transport in Kinked Nanowires -- Telling Oil Temperature for Frying from Audio and Video Signals based on Multimodal Learning -- Gravitational Models with State-Dependent Delay: Gravitating Binaries -- Self-similar Heat Transfer in a Turbulent Particle-laden Free Flow -- A Tire Side Slip Model with Dynamic Friction Distribution over the Contact Patch -- Part IV: Mathematical and Statistical Modelling in Biological, Medical and Health Sciences -- Stability and Qualitative Analysis of a Switched SQEIAR- Based Epidemic Model -- The Influence of Refuges, Fear, and Velocities on Predator-prey Dynamics -- A Multiscale Model for Protein Allostery: Side Chain Concerted Motions Initiated by Brownian Kicks -- Near-soma Activated Action Potential in Gonadotropin-releasing Hormone Neurons -- Modeling Patterns of Sex-Dependent Neuroprotection Loss in Alzheimer's Disease -- Deciphering heterogeneity of ATP-induced Ca2+ responses in osteoblasts using the flux-balance model -- Parameter Estimation of Hodgkin-Huxley Model: A Comparative Study of Genetic Algorithm and Artificial Neural Network Approach -- PartV: Mathematics and Computation in Finance, Economics, and Social Sciences -- Credit Risk Modelling with Occupation Times under Nonlinear Local Volatility Models -- Financial News Headlines Sentiment Analysis Enhances Stock Market Prediction -- Self-Exciting Point Processes in Real Estate -- Algebraic Structure and Complexity of Games -- State-Complexity Relations in Evolved Players of the Iterated Prisoners' Dilemma -- The Sparse Grid Combination Method for Multidimensional Black-Scholes Partial Differential Equations -- PartVI: Theory and Computational Methods for Differential Equations -- Input-to-state stability for cascaded impulsive systems and Hcontrol -- Time Filtered Finite Difference Schemes for Linear Hyperbolic Problems -- Computational Considerations for Implementing the Collage Method for ODE Inverse Problems -- Penalty Ensembles for Navier-Stokes with Random Initial Conditions & Forcing -- Explicit Periodic Solutions in a Delay Differential Equation -- Proportional Consistency of Apportionment Methods -- Observer-Based Adaptive Robust Fractional Order Control of a class of Nonlinear Delayed Constrained Systems with Singularity -- Stability criteria of a class of nonlinear impulsive neutral swithcing systems -- pythOS: An operator-splitting library in Python -- Sensitivity and Optimal Control Theory for Linear Complementarity Systems -- History of an Oscillation Criterion for First-Order Delay

Differential Equations -- Observer and Command Filter-Based Prescribed Performance Control for a Class of onlinear Systems with Mismatched Disturbances.

Sommario/riassunto

This proceedings volume features a selection of peer-reviewed papers presented at the 6th AMMCS-International Conference on Applied Mathematics, Modeling, and Computational Science, held in Waterloo, Canada, from August 14–18, 2023. The papers delve into topics where mathematical modeling and applications play a pivotal role, including computational models in physics and chemistry, statistical models in life science, analysis in science and engineering, and finance and social science methods, among others. Since 2011, the AMMCS conference series has provided a unique platform for technical discussions and the exchange of ideas in all areas related to mathematical, statistical, and computational sciences, modeling, and simulation. Esteemed researchers, industrialists, engineers, and students have presented their latest research and engaged with experts in the field, fostering interdisciplinary collaborations that address the challenges of modern science, technology, and society. This book is a valuable resource for academics and practitioners who are interested in the latest developments in these fields.