1. Record Nr. UNINA9911003586703321

Titolo	New Trends in the Applications of Differential Equations in Sciences : NTADES 2024, Saints Constantine and Helena, Bulgaria, July 7–10 / / edited by Angela Slavova
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2025
ISBN	9783031833984
Edizione	[1st ed. 2025.]
Descrizione fisica	1 online resource (X, 529 p. 74 illus., 55 illus. in color.)
Collana	Springer Proceedings in Mathematics & Statistics, , 2194-1017 ; ; 488
Disciplina	515.35
Soggetti	Differential equations Mathematical physics Neural networks (Computer science) Biomathematics Differential Equations Mathematical Methods in Physics Mathematical Models of Cognitive Processes and Neural Networks Mathematical and Computational Biology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Part1.Applications in Mathematical Physics -- Ground states of Schrödinger-Poisson-Slater equations with linear non-local terms -- Interpolation of Sobolev spaces for Laplace operator with contact interaction.-Exact travelling wave solutions to several fully nonlinear PDE and radial solutions of boundary value problem to the Liouville equation in circular domains in the plane -- Recent developments in the methodology of the Simple Equations Method (SEsM) for obtaining exact solutions of nonlinear differential equations -- Forward stability conditions and applications -- Exact solutions of the Troesch’s problem -- Pavlina Atanasova, Valentin Georgiev, On the special cases of the Jacobi elliptic function solutions of the (2+1)-dimensional Sine-Gordon equation -- An application of the method of simplest equation for exact real solutions of the model for spatial - time interaction of populations -- A characterization of the K-functional for the algebraic version of the trigonometric Jackson integrals Gs,n in generalized

weighted integral metric -- Mixed semicontinuous fully nonlinear evolution inclusions -- Nonlinear waves in the diffusion-advection-reaction model of interacting populations incorporating nonlocal effects and long range diffusion -- Physic informed neural networks for solving nonstandard initial-boundary value problem for second order hyperbolic equation -- Approximate solution of the optimal control problem with the Hukuhara derivative equation with rapidly fluctuating coefficients on a finite interval -- Travelling wave solutions of the Wu-Zhang system of PDE -- Physics informed neural networks for solving predator-prey models -- Part2. Applications in Mechanics -- On nonlinear waves in microtubules generated by means of a linear simple equation -- On a mathematical model describing pollution processes in a channel -- On nonlinear waves in microtubules generated by means of simple equation of Bernoulli kind -- Analysis of non-periodic buckling in an axisymmetric thin uniform shell -- On nonlinear waves in microtubules -- An education facility for design and mathematical modeling of 4 bar linkage mechanism -- Part3. Applications in Numerical Methods and Computer Science -- An improved interpolation error estimate from a new Taylor-like formula: Application to finite element method -- Mixed finite element method applied to sixth-order eigenvalue problem -- Advanced unbiased Monte Carlo for multidimensional Fredholm integral equations -- Novel stochastic sequences for multidimensional air pollution modelling -- Advanced stochastic method for linear algebraic systems -- Stochastic approaches for the mutidimensional Volterra integral equation -- Numerical analysis of a difference scheme family for solving semilinear hyperbolic PDEs -- Numerical solution of switched systems with delay -- Part4. Applications in Financial Mathematics -- Multicriteria optimization approach for investment project financing evaluation and decision making -- Application of weighted t-tests for loss-given-default forecasts validation -- A comparison of deep neural network and convolutional neural network for credit card fraud detection -- Studying the dependency between household income and consumption of basic food commodities in Bulgaria -- Accurate lattice-based models for pricing European options -- Advanced Monte Carlo optimizations for multidimensional European style options -- Part5. Applications in Mathematical Biology -- Comparison of exact solutions of model equations connected to the SIS and SIR model of epidemics spread -- Comparison of exact solutions of model equations connected to the SIR and SEIR model of epidemic spread -- Part6. Applications in Fractional Analysis -- Ulam type stability of Volterra fractional integral equations of variable-order -- Exact solitary wave solutions of the time-fractional fifth-order KdV-type equation via extended Simple Equations Method (SEsM) -- Existence for a nonlinear boundary value problem for Riemann-Liouville fractional differential equations of variable order.

Sommario/riassunto

This volume compiles selected papers focusing on the applications of differential equations across various scientific domains, presented at the International Conference "New Trends in the Applications of Differential Equations in Sciences" (NTADES), which took place in Saints Constantine and Helena, Bulgaria, in July 2024. The book is organized around several key themes, including applications in mathematical physics, mathematical biology, financial mathematics, fractional analysis, numerical methods, and neuroscience. The covered applications encompass diverse topics such as mechanics, neural networks in insurance, credit portfolios, predator-prey systems with fractional derivatives, recent findings regarding COVID-19 epidemic waves, memristive cellular nonlinear networks, and more. By promoting fundamental research in mathematics, this book aims to develop new

methods and techniques that can effectively address real-life challenges through the application of differential equations.