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# Neural Algorithm For Solving Differential Equations

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Proceedings of Fourth International Conference on Soft Computing for Problem Solving

Applied Stochastic Differential Equations

Mathematical Methods in Interdisciplinary Sciences

Hydrodynamics

Optical Bistability: Controlling Light With Light

Innovations in Intelligent Machines -3

Artificial Intelligence and Soft Computing

16th International Symposium on Neural Networks, ISNN 2019, Moscow, Russia, July 10-12, 2019, Proceedings, Part I

Volume 1

Harmony Search Algorithm

Proceedings of the 3rd International Conference on Harmony Search Algorithm (ICHSA 2017)

Convergent Cognitive Information Technologies

Augmented Lagrangian and Operator Splitting Methods in Nonlinear Mechanics

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Third International Conference, Convergent 2018, Moscow, Russia, November 29 - December 2, 2018, Revised Selected Papers

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Solving Ordinary Differential Equations

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Intelligent Information and Database Systems

SocProS 2014, Volume 1

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## MARTINEZ MAREN

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*Proceedings of Fourth International Conference on Soft Computing for Problem Solving* John Wiley & Sons

An Introduction to Neural Network Methods for Differential Equations Springer

*Applied Stochastic Differential Equations* Springer Nature

A guide to the new research in the field of fractional order analysis Fractional Order Analysis contains the most recent research findings in fractional order analysis and its applications. The authors—noted experts on the topic—offer an examination of the theory, methods, applications, and the modern tools and techniques in the field of fractional order analysis. The information, tools, and applications presented can help develop mathematical methods and models with better accuracy. Comprehensive in scope, the book covers a range of topics including: new fractional operators, fractional derivatives, fractional differential equations, inequalities for different fractional derivatives and fractional integrals, fractional modeling related to transmission of Malaria, and dynamics of Zika virus with various fractional derivatives, and more. Designed to be an accessible text, several useful, relevant and connected topics can be found in one place, which is crucial for an understanding of the research problems of an applied nature. This book: Contains recent development in fractional calculus Offers a balance of theory, methods, and applications Puts the focus on fractional analysis and its interdisciplinary applications, such as fractional models for biological models Helps make research more relevant to real-life applications Written for researchers, professionals and practitioners, Fractional Order Analysis offers a comprehensive resource to fractional analysis and its many applications as well as information on the newest research.

**Mathematical Methods in Interdisciplinary Sciences** John Wiley & Sons

This book presents the proceedings of the 24th European Conference on Artificial Intelligence (ECAI 2020), held in Santiago de Compostela, Spain, from 29 August to 8 September 2020. The conference was postponed from June, and much of it conducted online due to the COVID-19 restrictions. The conference is one of the principal occasions for researchers and practitioners of AI to meet and discuss the latest trends and challenges in all fields of AI and to demonstrate innovative applications and uses of advanced AI technology. The book also includes the proceedings of the 10th Conference on Prestigious Applications of Artificial Intelligence (PAIS 2020) held at the same time. A record number of more than 1,700 submissions was received for ECAI 2020, of which 1,443 were reviewed. Of these, 361 full-papers and 36 highlight papers were accepted (an acceptance rate of 25% for full-papers and 45% for highlight papers). The book is divided into three sections: ECAI full papers; ECAI highlight papers; and PAIS papers. The topics of these papers cover all aspects of AI, including Agent-based and Multi-agent Systems; Computational Intelligence; Constraints and Satisfiability; Games and Virtual Environments; Heuristic Search; Human Aspects in AI; Information Retrieval and Filtering; Knowledge Representation and Reasoning; Machine Learning; Multidisciplinary Topics and

Applications; Natural Language Processing; Planning and Scheduling; Robotics; Safe, Explainable, and Trustworthy AI; Semantic Technologies; Uncertainty in AI; and Vision. The book will be of interest to all those whose work involves the use of AI technology.

**Hydrodynamics** CRC Press

This book is the second of a two-volume set that constitutes the refereed proceedings of the 17th International Conference on Artificial Neural Networks, ICANN 2007. It features contributions related to computational neuroscience, neurocognitive studies, applications in biomedicine and bioinformatics, pattern recognition, self-organization, text mining and internet applications, signal and times series processing, vision and image processing, robotics, control, and more.

*Optical Bistability: Controlling Light With Light* Frontiers Media SA

This book presents the latest trends in and approaches to computational intelligence research and its application to intelligent systems. It covers a long list of interconnected research areas, such as fuzzy systems, neural networks, evolutionary computation, clustering and classification, machine learning, data mining, cognition and robotics, and deep learning. The individual chapters are based on peer-reviewed contributions presented at the 18th Annual UK Workshop on Computational Intelligence (UKCI-2018), held in Nottingham, UK on September 5-7, 2018. The book puts a special emphasis on novel methods and reports on their use in a wide range of applications areas, thus providing both academics and professionals with a comprehensive and timely overview of new trends in computational intelligence.

*Innovations in Intelligent Machines -3* Springer

Stochastic differential equations are differential equations whose solutions are stochastic processes. They exhibit appealing mathematical properties that are useful in modeling uncertainties and noisy phenomena in many disciplines. This book is motivated by applications of stochastic differential equations in target tracking and medical technology and, in particular, their use in methodologies such as filtering, smoothing, parameter estimation, and machine learning. It builds an intuitive hands-on understanding of what stochastic differential equations are all about, but also covers the essentials of It calculus, the central theorems in the field, and such approximation schemes as stochastic Runge-Kutta. Greater emphasis is given to solution methods than to analysis of theoretical properties of the equations. The book's practical approach assumes only prior understanding of ordinary differential equations. The numerous worked examples and end-of-chapter exercises include application-driven derivations and computational assignments. MATLAB/Octave source code is available for download, promoting hands-on work with the methods.

*Artificial Intelligence and Soft Computing* Springer Science & Business Media

The Proceedings of SocProS 2014 serves as an academic bonanza for scientists and researchers working in the field of Soft Computing. This book contains theoretical as well as practical aspects using fuzzy logic, neural networks, evolutionary algorithms, swarm intelligence algorithms, etc., with many applications under the umbrella of 'Soft Computing'. The book is beneficial for young as well as experienced researchers dealing across complex and intricate real world problems for which

finding a solution by traditional methods is a difficult task. The different application areas covered in the Proceedings are: Image Processing, Cryptanalysis, Industrial Optimization, Supply Chain Management, Newly Proposed Nature Inspired Algorithms, Signal Processing, Problems related to Medical and Healthcare, Networking Optimization Problems, etc.

16th International Symposium on Neural Networks, ISNN 2019, Moscow, Russia, July 10-12, 2019, Proceedings, Part I An Introduction to Neural Network Methods for Differential Equations

This volume deals with the numerical simulation of the behavior of continuous media by augmented Lagrangian and operator-splitting methods.

**Volume 1** IOS Press

This book describes different mathematical modeling and soft computing techniques used to solve practical engineering problems. It gives an overview of the current state of soft computing techniques and describes the advantages and disadvantages of soft computing compared to traditional hard computing techniques. Through examples and case studies the editors demonstrate and describe how problems with inherent uncertainty can be addressed and eventually solved through the aid of numerical models and methods. The chapters address several applications and examples in bioengineering science, drug delivery, solving inventory issues, Industry 4.0, augmented reality and weather forecasting. Other examples include solving fuzzy-shortest-path problems by introducing a new distance and ranking functions. Because, in practice, problems arise with uncertain data and most of them cannot be solved exactly and easily, the main objective is to develop models that deliver solutions with the aid of numerical methods. This is the reason behind investigating soft numerical computing in dynamic systems. Having this in mind, the authors and editors have considered error of approximation and have discussed several common types of errors and their propagations. Moreover, they have explained the numerical methods, along with convergence and consistence properties and characteristics, as the main objectives behind this book involve considering, discussing and proving related theorems within the setting of soft computing. This book examines dynamic models, and how time is fundamental to the structure of the model and data as well as the understanding of how a process unfolds • Discusses mathematical modeling with soft computing and the implementations of uncertain mathematical models • Examines how uncertain dynamic systems models include uncertain state, uncertain state space and uncertain state's transition functions • Assists readers to become familiar with many soft numerical methods to simulate the solution function's behavior This book is intended for system specialists who are interested in dynamic systems that operate at different time scales. The book can be used by engineering students, researchers and professionals in control and finite element fields as well as all engineering, applied mathematics, economics and computer science interested in dynamic and uncertain systems. Ali Ahmadian is a Senior Lecturer at the Institute of IR 4.0, The National University of Malaysia. Soheil Salahshour is an associate professor at Bahcesehir University.

Harmony Search Algorithm SIAM

For the past several years the Division of Applied Mathematics at Brown University has been teaching an extremely popular sophomore level differential equations course. The immense success of this course is due primarily to two factors. First, and foremost, the material is presented in a manner which is rigorous enough for our mathematics and applied mathematics majors, but yet

intuitive and practical enough for our engineering, biology, economics, physics and geology majors. Secondly, numerous case histories are given of how researchers have used differential equations to solve real life problems. This book is the outgrowth of this course. It is a rigorous treatment of differential equations and their applications, and can be understood by anyone who has had a two semester course in Calculus. It contains all the material usually covered in a one or two semester course in differential equations. In addition, it possesses the following unique features which distinguish it from other textbooks on differential equations.

Proceedings of the 3rd International Conference on Harmony Search Algorithm (ICHSA 2017) LAP Lambert Academic Publishing

This book constitutes the refereed proceedings of the Third International Conference on Convergent Cognitive Information Technologies, Convergent 2018, held in Moscow, Russia, in December 2018. The 26 revised full papers and 9 short papers were carefully reviewed and selected from 147 submissions. The papers of this volume are organized in topical sections on theoretical questions of computer science, computational mathematics, computer science and cognitive information technologies; cognitive information technologies in control systems; big data and applications; the Internet of Things (IoT): standards, communication and information technologies, network applications; smart cities: standards, cognitive-information technologies and their applications.- cognitive information technologies in the digital economics.- digital transformation of transport.

**Convergent Cognitive Information Technologies** World Scientific

An examination of the use of transputers in numerical computing and neural networks. Topics covered include linear systems of equations and programming, fluid and molecular dynamics simulation, transformations, Kalman filtering and general numerical problems. Neural networks are discussed in terms of algorithms and simulation.

Augmented Lagrangian and Operator Splitting Methods in Nonlinear Mechanics Springer Nature

The 2010 Asian Conference on Intelligent Information and Database Systems (ACIIDS) was the second event of the series of international scientific conferences for research and applications in the field of intelligent information and database systems. The aim of ACIIDS 2010 was to provide an international forum for scientific research in the technologies and applications of intelligent information, database systems and their applications. ACIIDS 2010 was co-organized by Hue University (Vietnam) and Wroclaw University of Technology (Poland) and took place in Hue city (Vietnam) during March 24-26, 2010. We received almost 330 papers from 35 countries. Each paper was peer reviewed by at least two members of the International Program Committee and International Reviewer Board. Only 96 best papers were selected for oral presentation and publication in the two volumes of the ACIIDS 2010 proceedings. The papers included in the proceedings cover the following topics: artificial social systems, case studies and reports on deployments, collaborative learning, collaborative systems and applications, data warehousing and data mining, database management technologies, database models and query languages, database security and integrity,- business, e-commerce, e-finance, e-learning systems, information modeling and - requirements engineering, information retrieval systems, intelligent agents and multi-agent systems, intelligent information systems, intelligent internet systems, intelligent optimization techniques, object-relational DBMS, ontologies and information sharing, semi-structured and XML database

systems, unified modeling language and unified processes, Web services and Semantic Web, computer networks and communication systems.

*VLSI Implementation of a Cellular Neural Network for Solving Partial Differential Equations* IOS Press Brings mathematics to bear on your real-world, scientific problems *Mathematical Methods in Interdisciplinary Sciences* provides a practical and usable framework for bringing a mathematical approach to modelling real-life scientific and technological problems. The collection of chapters Dr. Snehashish Chakraverty has provided describe in detail how to bring mathematics, statistics, and computational methods to the fore to solve even the most stubborn problems involving the intersection of multiple fields of study. Graduate students, postgraduate students, researchers, and professors will all benefit significantly from the author's clear approach to applied mathematics. The book covers a wide range of interdisciplinary topics in which mathematics can be brought to bear on challenging problems requiring creative solutions. Subjects include: Structural static and vibration problems Heat conduction and diffusion problems Fluid dynamics problems The book also covers topics as diverse as soft computing and machine intelligence. It concludes with examinations of various fields of application, like infectious diseases, autonomous car and monotone inclusion problems.

Contributions Presented at the 18th UK Workshop on Computational Intelligence, September 5-7, 2018, Nottingham, UK BoD – Books on Demand

This book consists of select proceedings of the National Conference on Wave Mechanics and Vibrations (WMVC 2018). It covers recent developments and cutting-edge methods in wave mechanics and vibrations applied to a wide range of engineering problems. The book presents analytical and computational studies in structural mechanics, seismology and earthquake engineering, mechanical engineering, aeronautics, robotics and nuclear engineering among others. This book can be useful for students, researchers, and professionals interested in the wide-ranging applications of wave mechanics and vibrations.

Advances in Neural Networks – ISNN 2019 Springer

*Optical Bistability: Controlling Light with Light* focuses on optical bistability in nonlinear optical systems. Emphasis is on passive (non-laser) systems that exhibit reversible bistability with input intensity as the hysteresis variable, along with the physics and the potential applications of such systems for nonlinear optical signal processing. This book consists of seven chapters and begins with a historical overview of optical bistability in lasers and passive systems. The next chapter describes steady-state theories of optical bistability, including the Bonifacio-Lugiato model, as well as the boundary conditions of an optical cavity and the coupled Maxwell-Bloch equations. Both intrinsic and hybrid experiments are then described, along with light-by-light control, pulse reshaping, and external switching. The transient phenomena that arise either from instabilities in the bistable systems themselves or from fluctuations in the number of nonlinear atoms or in the number of intracavity photons are also considered. The final chapter examines the characteristics and fundamental limitations of an ideal device, the prospect of improving devices by identifying giant nonlinearities, and the utilization of the full power of optics by parallel processing. This monograph is intended for new entrants and active workers in the field of optical bistability.

Third International Conference, Convergent 2018, Moscow, Russia, November 29 – December 2,

2018, Revised Selected Papers CRC Press

This book is the proceedings of the Third Annual Conference on Fuzzy Information and Engineering (ACFIE2008) from Dec. 5-10, 2008 in Haikou, China. The conference proceedings is published by Springer-Verlag (Advances in Soft Computing, ISSN: 1615-3871). This year, we have received 155 submissions. Each paper has undergone a rigorous review process. Only high-quality papers are included. The Third Annual Conference on Fuzzy Information and Engineering (ACFIE2008), built on the success of previous conferences, the ACFIE2005 (Guangzhou, China), is a major symposium for scientists, engineers and practitioners in China to present their updated results, ideas, developments and applications in all areas of fuzzy information and engineering. It aims to strengthen relations between industry research laboratories and universities, and to create a primary symposium for world scientists in fuzzy fields as follows: 1) Fuzzy intelligence, neural networks and optimal; 2) Fuzzy algebra; 3) Fuzzy analysis; 4) Fuzzy systems and logic; 5) Fuzzy topology and measure; 6) Fuzzy probability, control, forecasting and decision-making; 7) Fuzzy clustering and fuzzy algorithms; 8) Application in fuzzy sets; 9) Rough sets and its application; etc. This book contains 80 papers, divided into nine main parts: In Section I, we have 9 papers on “fuzzy intelligence, neural networks and optimal”. In Section II, we have 11 papers on “fuzzy algebra”. In Section III, we have 9 papers on “fuzzy analysis”. In Section IV, we have 9 papers on “fuzzy systems and logic”. In Section V, we have 9 papers on “fuzzy topology and measure”.

Advances in Artificial Systems for Logistics Engineering Springer Science & Business Media

This book introduces a variety of neural network methods for solving differential equations arising in science and engineering. The emphasis is placed on a deep understanding of the neural network techniques, which has been presented in a mostly heuristic and intuitive manner. This approach will enable the reader to understand the working, efficiency and shortcomings of each neural network technique for solving differential equations. The objective of this book is to provide the reader with a sound understanding of the foundations of neural networks and a comprehensive introduction to neural network methods for solving differential equations together with recent developments in the techniques and their applications. The book comprises four major sections. Section I consists of a brief overview of differential equations and the relevant physical problems arising in science and engineering. Section II illustrates the history of neural networks starting from their beginnings in the 1940s through to the renewed interest of the 1980s. A general introduction to neural networks and learning technologies is presented in Section III. This section also includes the description of the multilayer perceptron and its learning methods. In Section IV, the different neural network methods for solving differential equations are introduced, including discussion of the most recent developments in the field. Advanced students and researchers in mathematics, computer science and various disciplines in science and engineering will find this book a valuable reference source.

**17th International Conference, Porto, Portugal, September 9-13, 2007, Proceedings, Part II** Springer Nature

LNCS volumes 2073 and 2074 contain the proceedings of the International Conference on Computational Science, ICCS 2001, held in San Francisco, California, May 27-31, 2001. The two volumes consist of more than 230 contributed and invited papers that reflect the aims of the conference to bring together researchers and scientists from mathematics and computer science as

basic computing disciplines, researchers from various application areas who are pioneering advanced application of computational methods to sciences such as physics, chemistry, life sciences, and engineering, arts and humanitarian fields, along with software developers and vendors, to discuss problems and solutions in the area, to identify new issues, and to shape future directions for research, as well as to help industrial users apply various advanced computational techniques.

**Artificial Neural Networks for Engineers and Scientists** Springer Nature

This book presents state-of-the-art technical contributions based around one of the most successful evolutionary optimization algorithms published to date: Harmony Search. Contributions span from novel technical derivations of this algorithm to applications in the broad fields of civil engineering, energy, transportation & mobility and health, among many others and focus not only on its cross-domain applicability, but also on its core evolutionary operators, including elements inspired from

other meta-heuristics. The global scientific community is witnessing an upsurge in groundbreaking, new advances in all areas of computational intelligence, with a particular flurry of research focusing on evolutionary computation and bio-inspired optimization. Observed processes in nature and sociology have provided the basis for innovative algorithmic developments aimed at leveraging the inherent capability to adapt characterized by various animals, including ants, fireflies, wolves and humans. However, it is the behavioral patterns observed in music composition that motivated the advent of the Harmony Search algorithm, a meta-heuristic optimization algorithm that over the last decade has been shown to dominate other solvers in a plethora of application scenarios. The book consists of a selection of the best contributions presented at ICHSA, a major biannual event where leading global experts on meta-heuristic optimization present their latest findings and discuss the past, present, and future of the exciting field of Harmony Search optimization. It provides a valuable reference resource for researchers working in the field of optimization meta-heuristics, and a solid technical base for frontline investigations around this algorithm.

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