

Mhd Flow Of Micropolar Fluid In A Rectangular Duct With

In recent years, the scientific community's interest towards efficient energy conversion systems has significantly increased. One of the reasons is certainly related to the change in the temperature of the planet, which appears to have increased by $0.76\text{ }^{\circ}\text{C}$ with respect to pre-industrial levels, according to the Intergovernmental Panel on Climate Change (IPCC), and this trend has not yet been stopped. The European Union considers it vital to prevent global warming from exceeding $2\text{ }^{\circ}\text{C}$ with respect to pre-industrial levels, since this phenomenon has been proven to result in irreversible and potentially catastrophic changes. These climate changes are mainly caused by the emissions of greenhouse gasses related to human activities, and can be drastically reduced by employing energy systems, for both heating and cooling of buildings and for power production, characterized by high efficiency levels and/or based on renewable energy sources. This Special Issue, published in the journal *Energies*, includes 12 contributions from across the world, including a wide range of applications, such as HT-PEMFC, district heating systems, a thermoelectric generator for industrial waste, artificial ground freezing, nanofluids, and others.

Since the 1980s, attention has increased in the research of fluid mechanics due to its wide application in industry and phycology. Major advances have occurred in the modeling of key topics such Newtonian and non-Newtonian fluids, nanoparticles, thermal management, and physiological fluid phenomena in biological systems, which have been published in this Special Issue on symmetry and fluid mechanics for *Symmetry*. Although, this book is not a formal textbook, it will be useful for university teachers, research students, and industrial researchers and for overcoming the difficulties that occur when considering the nonlinear governing equations. For such types of equations, obtaining an analytic or even a numerical solution is often more difficult. This book addresses this challenging job by outlining the latest techniques. In addition, the findings of the simulation are logically realistic and meet the standard of sufficient scientific value.

This book gathers the latest advances, innovations, and applications in the field of mechanical engineering, as presented by leading international researchers and engineers at the 2020 International Conference on Mechanical Engineering and Materials (ICMEM), held in Beijing, China on October 16-17, 2020. ICMEM covers all aspects of mechanical engineering and material sciences, such as computer-aided design, virtual design and design visualization, intelligent design, usability design, automobile structure, human-machine interface design, manufacturing engineering, aerospace engineering, automation and robotics, micro-machining, MEMS/ NEMS, composite materials, biomaterials, smart materials, superconducting materials, materials properties and applications, materials manufacturing, nanotechnology, nano-materials and nano-composites, etc. The contributions, which were selected by means of a rigorous international

peer-review process, highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaborations.

This Special Issue of Processes operates on the basis of a rigorous peer-review with a single-blind assessment and at least two independent reviewers, thereby ensuring a high quality final product. I would like to thank our reviewers, for providing the authors with constructive comments, and Editorial Board, for their professional advice that led to the final decision. I am sure that, in coming years, readers of this Special Issue will find the scientific manuscripts interesting and beneficial to their research.

Thin film processes are significantly incorporated in manufacturing display panels, secondary batteries, fuel/solar cells, catalytic films, membranes, adhesives, and other commodity films. This Special Issue on "Thin Film Processes" of Processes listed recent progress on thin-film processes, covering theoretical considerations, experimental observations, and computational techniques. Articles in this Issue consider comprehensive studies on thin film processes and related materials.

This Special Issue contains articles include, but not limited to, empirical, analytical, or design-oriented approaches to the following topics: Monitoring of carrying capacity and mechanisms for managing tourist flows in rural areas; Systems and tools to measure the social, economic, and environmental sustainability of rural tourism; Integration between public tourism policies and private strategies in the promotion and implementation of sustainable practices; Policies for promoting public participation in the planning and development of sustainable rural tourism; The impacts of tourism on traditional agricultural activities; Identity enhancement of the territory and its productions; "Good practices" in the implementation of rural tourism sustainability.

The proceedings of SocProS 2015 will serve 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 will be 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 Health Care, Networking Optimization Problems, etc.

To understand plasma physics intuitively one need to master the MHD behaviors. As sciences advance, gap between published textbooks and cutting-edge researches gradually develops. Connection from textbook knowledge to up-to-dated research results can often be tough. Review articles can help. This book contains eight topical review papers on MHD. For magnetically confined fusion

one can find toroidal MHD theory for tokamaks, magnetic relaxation process in spheromaks, and the formation and stability of field-reversed configuration. In space plasma physics one can get solar spicules and X-ray jets physics, as well as general sub-fluid theory. For numerical methods one can find the implicit numerical methods for resistive MHD and the boundary control formalism. For low temperature plasma physics one can read theory for Newtonian and non-Newtonian fluids etc.

This volume is the first of two containing selected papers from the International Conference on Advances in Mathematical Sciences (ICAMS), held at the Vellore Institute of Technology in December 2017. This meeting brought together researchers from around the world to share their work, with the aim of promoting collaboration as a means of solving various problems in modern science and engineering. The authors of each chapter present a research problem, techniques suitable for solving it, and a discussion of the results obtained. These volumes will be of interest to both theoretical- and application-oriented individuals in academia and industry. Papers in Volume I are dedicated to active and open areas of research in algebra, analysis, operations research, and statistics, and those of Volume II consider differential equations, fluid mechanics, and graph theory.

This book comprises selected papers from the International Conference on Numerical Heat Transfer and Fluid Flow (NHTFF 2018), and presents the latest developments in computational methods in heat and mass transfer. It also discusses numerical methods such as finite element, finite difference, and finite volume applied to fluid flow problems. Providing a good balance between computational methods and analytical results applied to a wide variety of problems in heat transfer, transport and fluid mechanics, the book is a valuable resource for students and researchers working in the field of heat transfer and fluid dynamics.

Proceedings of the 20th International Conference. The Conferences on Boundary Element and Meshless Techniques are devoted to fostering the continued involvement of the research community in identifying new problem areas, mathematical procedures, innovative applications, and novel solution techniques as applied to the Boundary Element Method and Meshless Techniques. Previous conferences devoted to were held in London, UK (1999), New Jersey, USA (2001), Beijing, China (2002), Granada, Spain (2003), Lisbon, Portugal (2004), Montreal, Canada (2005), Paris, France (2006), Naples, Italy (2007), Seville, Spain (2008), Athens, Greece (2009), Berlin, Germany (2010), Brasilia, Brazil (2011), Prague, Czech Republic (2012), Paris, France (2013), Florence, Italy (2014), Valencia, Spain (2015), Ankara, Turkey (2016), Bucharest, Romania (2017) and Malaga Spain (2018).

This book features extended versions of selected papers from the International Conference on Computer Communication and Internet of Things (ICCCIoT 2020). Presenting recent research addressing new trends and challenges, and

promising technologies and developments, it covers various topics related to IoT (Internet of Things) and communications, and machine learning for applications such as energy management systems, smart asthma alerts, smart irrigation systems, cloud healthcare systems, preventing side channel attacks, and cooperative spectrum sensing in cognitive radio networks.

Publisher's note: This is a 2nd edition due to an article retraction.

The 29th volume of the International Journal of Engineering Research in Africa presents the articles which describe the results of engineering research and solutions in the fields of structural materials, building materials and construction technologies, applied dynamics of fluid and flow, chemical engineering, and engineering management of modern production. The articles will be useful for professionals concerned with mechanical engineering, materials science, chemical engineering, engineering management and for students and academic teachers of the related specialties.

A collection of self contained state-of-the art surveys. The authors have made an effort to achieve readability for mathematicians and scientists from other fields, for this series of handbooks to be a new reference for research, learning and teaching. - written by well-known experts in the field - self contained volume in series covering one of the most rapid developing topics in mathematics

Giants of Engineering Science is a biographical monograph examining the life and works of ten of the world's leading engineering scientists.

This book comprises selected peer-reviewed proceedings of the International Conference on Applications of Fluid Dynamics (ICAFD 2018) organized by the School of Advanced Sciences, Vellore Institute of Technology, India, in association with the University of Botswana and the Society for Industrial and Applied Mathematics (SIAM), USA. With an aim to identify the existing challenges in the area of applied mathematics and mechanics, the book emphasizes the importance of establishing new methods and algorithms to address these challenges. The topics covered include diverse applications of fluid dynamics in aerospace dynamics and propulsion, atmospheric sciences, compressible flow, environmental fluid dynamics, control structures, viscoelasticity and mechanics of composites. Given the contents, the book is a useful resource for students, researchers as well as practitioners.

This book focuses on the recent development of methodologies and computation methods in mathematical and statistical modelling, computational science and applied mathematics. It emphasizes the development of theories and applications, and promotes interdisciplinary endeavour among mathematicians, statisticians, scientists, engineers and researchers from other disciplines. The book provides ideas, methods and tools in mathematical and statistical modelling that have been developed for a wide range of research fields, including medical, health sciences, biology, environmental science, engineering, physics and chemistry, finance, economics and social sciences. It presents original results addressing real-world problems. The contributions are products of a highly successful meeting held in August 2017 on the main campus of Wilfrid Laurier University, in Waterloo, Canada, the International Conference on Applied Mathematics, Modeling and Computational Science (AMMCS-2017). They make this book a valuable resource for readers interested not only in a broader overview of the methods, ideas and tools in mathematical and statistical approaches, but also in how they can attain valuable insights into problems arising in other disciplines.

This book is a product of the Third International Conference on Computing, Mathematics and Statistics (iCMS2017) to be held in Langkawi in November 2017. It is divided into four sections according to the thrust areas: Computer Science, Mathematics, Statistics, and Multidisciplinary

Applications. All sections sought to confront current issues that society faces today. The book brings collectively quantitative, as well as qualitative, research methods that are also suitable for future research undertakings. Researchers in Computer Science, Mathematics and Statistics can use this book as a sourcebook to enrich their research works.

This book presents select proceedings of the International Conference on Recent Advances in Mechanical Engineering Research and Development (ICRAMERD 2020). The contents focus on latest research and current problems in various branches of mechanical engineering. Some of the topics discussed here include fracture and failure analysis, fuels and alternative fuels, combustion and IC engines, advanced manufacturing technologies, powder metallurgy and rapid prototyping, industrial engineering and automation, supply chain management, design of mechanical systems, vibrations and control engineering, automobile engineering, fluid mechanics and machines, heat transfer, composite materials, micro and nano-engineering for energy storage and conversion, and modeling and simulations. The wide range of topics presented in this book can make it useful for beginners, researchers as well as professionals in mechanical engineering.

Nowadays mathematical modeling and numerical simulations play an important role in life and natural science. Numerous researchers are working in developing different methods and techniques to help understand the behavior of very complex systems, from the brain activity with real importance in medicine to the turbulent flows with important applications in physics and engineering. This book presents an overview of some models, methods, and numerical computations that are useful for the applied research scientists and mathematicians, fluid tech engineers, and postgraduate students.

This volume of the journal "Defect and Diffusion Forum" presents to readers the next 8th special issue from the series "Transfer Phenomena in Fluid and Heat Flows" which contains articles covering theoretical and practical aspects of modeling and numerical investigation of the diffusive convection and magnetohydrodynamic mixed convective flows, heat transfer phenomena in different media and engineering objects, solving other engineering problems related to heat and mass transfer phenomena.

Abstract: We investigate the dual solutions for the MHD flow of micropolar fluid over a stretching/shrinking sheet with heat transfer. Suitable relations transform the partial differential equations into the ordinary differential equations. Closed forms solutions are also obtained in terms of confluent hypergeometric function. This is the first attempt to determine the exact solutions for the non-linear equations of MHD micropolar fluid model. It is demonstrated that the microrotation parameter helps in increasing Nusselt number and the dual solutions exist for all fluid flow parameters under consideration. The dual behavior of dimensionless velocity, temperature, microrotation, skin-friction coefficient, local Nusselt number is displayed on graphs and examined.

Fluid-Structure Interaction (FSI), also known as engineering fluid mechanics, deals with mutual interaction between fluid and structural components. Fluid flow depending on the structural shape, motion, surface, and structural roughness, acts as mechanical forces on the structure. FSI can be seen everywhere in medicine, engineering, aerospace, the sciences, and even our daily life. This book provides the basic concept of fluid flow behavior in interaction with structures, which is crucial for almost all engineering disciplines. Along with the

fundamental principles, the book covers a variety of FSI problems ranging from fundamentals of fluid mechanics to plasma physics, wind turbines and their turbulence, heat transfer, magnetohydrodynamics, and dam-reservoir systems. Over the past two decades, there has been increased attention in the research of nanofluid due to its widely expanded domain in many industrial and technological applications. Major advances in the modeling of key topics such as nanofluid, MHD, heat transfer, convection, porous media, Newtonian/non-Newtonian fluids have been made and finally published in the special issue on recent developments in nanofluids for Applied Sciences. The present attempt is to edit the special issue in a book form. Although, this book is not a formal textbook even than it will definitely be useful for research students and university teachers in overcoming the difficulties occurring in the said topic while dealing with the nonlinear governing equations. On one side the real world problems in mathematics, physics, biomechanics, engineering and other disciplines of sciences are mostly described by the set of nonlinear equations whereas on the other hand, it is often more difficult to get an analytic solution or even a numerical one. This book has successfully handled this challenging job with latest techniques. In addition the findings of the simulation are logically realistic and meet the standard of sufficient scientific value.

This book contains original research papers presented at the International Conference on Mathematical Modelling, Applied Analysis and Computation, held at JECRC University, Jaipur, India, on 6-8 July, 2018. Organized into 20 chapters, the book focuses on theoretical and applied aspects of various types of mathematical modelling such as equations of various types, fuzzy mathematical models, automata, Petri nets and bond graphs for systems of dynamic nature and the usage of numerical techniques in handling modern problems of science, engineering and finance. It covers the applications of mathematical modelling in physics, chemistry, biology, mechanical engineering, civil engineering, computer science, social science and finance. A wide variety of dynamical systems like deterministic, stochastic, continuous, discrete or hybrid, with respect to time, are discussed in the book. It provides the mathematical modelling of various problems arising in science and engineering, and also new efficient numerical approaches for solving linear and nonlinear problems and rigorous mathematical theories, which can be used to analyze a different kind of mathematical models. The conference was aimed at fostering cooperation among students and researchers in areas of applied analysis, engineering and computation with the deliberations to inculcate new research ideas in their relevant fields. This volume will provide a comprehensive introduction to recent theories and applications of mathematical modelling and numerical simulation, which will be a valuable resource for graduate students and researchers of mathematical modelling and industrial mathematics.

Applications of Heat, Mass and Fluid Boundary Layers brings together the latest research on boundary layers where there has been remarkable advancements in

recent years. This book highlights relevant concepts and solutions to energy issues and environmental sustainability by combining fundamental theory on boundary layers with real-world industrial applications from, among others, the thermal, nuclear and chemical industries. The book's editors and their team of expert contributors discuss many core themes, including advanced heat transfer fluids and boundary layer analysis, physics of fluid motion and viscous flow, thermodynamics and transport phenomena, alongside key methods of analysis such as the Merk-Chao-Fagbenle method. This book's multidisciplinary coverage will give engineers, scientists, researchers and graduate students in the areas of heat, mass, fluid flow and transfer a thorough understanding of the technicalities, methods and applications of boundary layers, with a unified approach to energy, climate change and a sustainable future. Presents up-to-date research on boundary layers with very practical applications across a diverse mix of industries Includes mathematical analysis to provide detailed explanation and clarity Provides solutions to global energy issues and environmental sustainability This book presents a very useful and readable collection of chapters in nanotechnologies for energy conversion, storage, and utilization, offering new results which are sure to be of interest to researchers, students, and engineers in the field of nanotechnologies and energy. Readers will find energy systems and nanotechnology very useful in many ways such as generation of energy policy, waste management, nanofluid preparation and numerical modelling, energy storage, and many other energy-related areas. It is also useful as reference book for many energy and nanofluid-related courses being taken up by graduate and undergraduate students. In particular, this book provides insights into various forms of renewable energy, such as biogas, solar energy, photovoltaic, solar cells, and solar thermal energy storage. Also, it deals with the CFD simulations of various aspects of nanofluids/hybrid nanofluids.

The special issue "Transfer Phenomena in Fluid and Heat Flows IV" of the journal "Defect and Diffusion Forum" presents papers covering theoretical and practical aspects of modeling and numerical investigation of the diffusive convection, magnetohydrodynamic mixed convective flows and heat transfer phenomena in different media and engineering objects.

This book presents best selected research papers presented at the First International Conference on Integrated Intelligence Enable Networks and Computing (IIENC 2020), held from May 25 to May 27, 2020, at the Institute of Technology, Gopeshwar, India (Government Institute of Uttarakhand Government and affiliated to Uttarakhand Technical University). The book includes papers in the field of intelligent computing. The book covers the areas of machine learning and robotics, signal processing and Internet of things, big data and renewable energy sources.

This first volume of the three-volume set (CCIS 1193, CCIS 1194, and CCIS 1195) constitutes the refereed proceedings of the First International Conference on Applied Technologies, ICAT 2019, held in Quito, Ecuador, in December 2019. The 124 full papers were carefully reviewed and selected from 328 submissions. The papers are organized according to the following topics: technology trends; computing; intelligent systems; machine vision; security; communication; electronics; e-learning; e-government; e-participation.

This book contains original research papers presented at the International Conference on

Mathematical Modelling and Scientific Computing, held at the Indian Institute of Technology Indore, India, on 19–21 July 2018. Organized into 30 chapters, the book presents the recent progress and the most advanced innovations, trends, and real-world challenges encountered and solutions embraced in the applications of mathematics and scientific computing. The book will be of interests to a wide variety of researchers, students and the practicing engineers working in diverse areas of science and engineering, ranging from applied and computational mathematics, vibration problem, computer science, and numerical optimization to physics, chemistry, biology, electrical, civil, mechanical, chemical, seismology, aerospace, and medical sciences. The aim of the conference is to bring together leading academicians, scientists, researchers, engineers, and industry partners from all over the globe to exchange and share their experiences and research results on various aspects of applied mathematics and scientific computation, like, differential equation, modeling, simulation, dynamical systems, numerical analysis, matrix theory, inverse problems, and solid and fluid mechanics, computational engineering.

This book comprises select proceedings of the 63rd Congress of the Indian Society of Theoretical and Applied Mechanics (ISTAM) held in Bangalore, in December 2018. Latest research in computational, experimental, and applied mechanics is presented in the book. The chapters are broadly classified into two sections - (i) fluid mechanics and (ii) solid mechanics. Each section covers computational and experimental studies on various contemporary topics such as aerospace dynamics and propulsion, atmospheric sciences, boundary layers, compressible flow, environmental fluid dynamics, control structures, fracture and crack, viscoelasticity, and mechanics of composites. The contents of this book will serve as a useful reference to students, researchers, and practitioners interested in the broad field of mechanics. This book presents and discusses current research in the study of magnetohydrodynamics. Topics discussed include consideration of the problems of gravitational optics and dark matter based on the crystal model of the vacuum; origin of the Saturn rings; high speed flowfield analysis for satellite launch vehicle and re-entry capsule; MHD flow of a micropolar fluid with asymmetric wall temperatures; Na and Hansen's procedure for solving the MHD flow around a cylinder in cross electric and magnetic fields; and, a unified approach to analytical solution of an unsteady MHD generalised couette flow with transpiration.

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