Kinematics As Mei

The objective of this book is to provide those interested in thefield of flexible robotics with an overview of several scientificand technological advances in the practical field of roboticmanipulation. The different chapters examine various stages thatinvolve a number of robotic devices, particularly those designedfor manipulation tasks characterized by mechanical flexibility.Chapter 1 deals with the general context surrounding the design offunctionally integrated microgripping systems. Chapter 2 focuses onthe dual notations of modal commandability and observability, whichplay a significant role in the control authority of vibratory modesthat are significant for control issues. Chapter 3 presentsdifferent modeling tools that allow the simultaneous use of energyand system structuring notations. Chapter 4 discusses twosensorless methods that could be used for manipulation in confinedor congested environments. Chapter 5 analyzes several appropriateapproaches for responding to the specific needs required byversatile prehension tasks and dexterous manipulation. After aclassification of compliant tactile sensors focusing on dexterousmanipulation, Chapter 6 discusses the development of a complyingtriaxial force sensor based on piezoresistive technology. Chapter 7deals with the constraints imposed by submicrometric precision inrobotic manipulation. Chapter 8 presents the essential stages ofthe modeling, identification and analysis of control laws in thecontext of serial manipulator robots with flexible articulations.Chapter 9 provides an overview of models for deformable bodymanipulators. Finally, Chapter 10 presents a set of contributionsthat have been made with regard to the development of methodologiesfor identification and control of flexible manipulators based onexperimental data. Contents 1. Design of Integrated Flexible Structures forMicromanipulation, Mathieu Grossard, Mehdi Boukallel, StéphaneRégnier and Nicolas Chaillet. 2. Flexible Structures' Representation and Notable Propertiesin Control, Mathieu Grossard, Arnaud Hubert, StéphaneRégnier and Nicolas Chaillet. 3. Structured Energy Approach for the Modeling of FlexibleStructures, Nandish R. Calchand, Arnaud Hubert, Yann Le Gorrec andHector Ramirez Estay. 4. Open-Loop Control Approaches to Compliant Micromanipulators,Yassine Haddab, Vincent Chalvet and Micky Rakotondrabe. 5. Mechanical Flexibility and the Design of Versatile and DexterousGrippers, Javier Martin Amezaga and Mathieu Grossard. 6. Flexible Tactile Sensors for Multidigital Dexterous In-handManipulation, Mehdi Boukallel, Hanna Yousef, Christelle Godin andCaroline Coutier. 7. Flexures for High-Precision Manipulation Robots, Reymond Clavel,Simon Henein and Murielle Richard. 8. Modeling and Motion Control of Serial Robots with FlexibleJoints, Maria Makarov and Mathieu Grossard. 9. Dynamic Modeling of Deformable Manipulators, FrédéricBoyer and Ayman Belkhiri. 10. Robust Control of Robotic Manipulators with StructuralFlexibilities, Houssem Halalchi, Loïc Cuvillon, GuillaumeMercère and Edouard Laroche. About the Authors Mathieu Grossard,

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Collection of selected, peer reviewed papers from the 2013 3rd International Conference on Frontiers of Manufacturing Science and Measuring Technology (ICFMM 2013), July 30-31, 2013, LiJiang, China. Volume is indexed by Thomson Reuters CPCI-S (WoS). The 518 papers are grouped as follows: Chapter 1: Practice of Design Engineering and Researches for Industry; Chapter 2: Applied Materials Engineering; Chapter 3: Measuring Technologies, Signal and Data Processing; Chapter 4: Control, Automation, Communication and Information Technologies; Chapter 5: Environmental Engineering, Urban Development, Transportation and Logistics; Chapter 6: Organization of Manufacture and Engineering Management.

This book presents 53 independently reviewed papers which embody the latest advances in the theory, design, control and application of robotic systems, which are intended for a variety of purposes such as manipulation, manufacturing, automation, surgery, locomotion and biomechanics. Methods used include line geometry, quaternion algebra, screw algebra, and linear algebra. These methods are applied to both parallel and serial multi-degree-of-freedom systems. The contributors are recognised authorities in robot kinematics.

Humans have always been fascinated with the concept of artificial life and the construction of machines that look and behave like people. As the field of robotics evolves, it demands continuous development of successful systems with high-performance characteristics for practical applications. Advanced Mechanics in Robotic Systems illustrates original and ambitious mechanical designs and techniques for developing new robot prototypes with successful mechanical operational skills. Case studies are focused on projects in mechatronics that have high growth expectations: humanoid robots, robotics hands, mobile robots, parallel manipulators, and human-centred robots. A good control strategy requires good mechanical design, so a chapter has also been devoted to the description of suitable methods for control architecture design. Readers of Advanced Mechanics in Robotic Systems will discover novel designs for relevant applications in robotic fields, that will be of particular interest to academic and industry-based researchers.

The Second International Conference on Fuzzy Information and Engineering (ICFIE2007) is a major symposium for scientists, engineers and practitioners in China as well as the world to present their latest results, ideas, developments and applications in all areas of fuzzy information and knowledge engineering. It aims to strengthen relations between industry research laboratories and universities, and to create a primary symposium for world scientists.

Computational kinematics is an enthralling area of science with a rich spectrum of problems at the junction of mechanics, robotics, computer science, mathematics, and computer graphics. The covered topics include design and optimization of cable-driven robots, analysis of parallel manipulators, motion planning, numerical methods for

mechanism calibration and optimization, geometric approaches to mechanism analysis and design, synthesis of mechanisms, kinematical issues in biomechanics, construction of novel mechanical devices, as well as detection and treatment of singularities. The results should be of interest for practicing and research engineers as well as Ph.D. students from the fields of mechanical and electrical engineering, computer science, and computer graphics.

Advances in Reconfigurable Mechanisms and Robots I provides a selection of key papers presented in The Second ASME/IFToMM International Conference on Reconfigurable Mechanisms and Robots (ReMAR 2012) held on 9th -11th July 2012 in Tianjin, China. This ongoing series of conferences will be covered in this ongoing collection of books. A total of seventy-eight papers are divided into seven parts to cover the topology, kinematics and design of reconfigurable mechanisms with the reconfiguration theory, analysis and synthesis, and present the current research and development in the field of reconfigurable mechanisms including reconfigurable parallel mechanisms. In this aspect, the recent study and development of reconfigurable robots are further presented with the analysis and design and with their control and development. The bio-inspired mechanisms and subsequent reconfiguration are explored in the challenging fields of rehabilitation and minimally invasive surgery. Advances in Reconfigurable Mechanisms and Robots I further extends the study to deployable mechanisms and foldable devices and introduces applications of reconfigurable mechanisms and robots. The rich-content of Advances in Reconfigurable Mechanisms and Robots I brings together new developments in reconfigurable mechanisms and robots and presents a new horizon for future development in the field of reconfigurable mechanisms and robots.

Masters Theses in the Pure and Applied Sciences was first conceived, published, and disseminated by the Center for Information and Numerical Data Analysis and Synthesis (CINDAS) * at Purdue University in 1957, starting its coverage of theses with the academic year 1955. Beginning with Volume 13, the printing and dissemination phases of the activity were transferred to University Microfilms/Xerox of Ann Arbor, Michigan, with the thought that such an arrangement would be more beneficial to the academic and general scientific and technical community. After five years of this joint undertaking we had concluded that it was in the interest of all con cerned if the printing and distribution of the volumes were handled by an interna tional publishing house to assure improved service and broader dissemination. Hence, starting with Volume 18, Masters Theses in the Pure and Applied Sciences has been disseminated on a worldwide basis by Plenum Publishing Cor poration of New York, and in the same year the coverage was broadened to include Canadian universities. All back issues can also be ordered from Plenum. We have reported in Volume 34 (thesis year 1989) a total of 13,377 theses titles from 26 Canadian and 184 United States universities. We are sure that this broader base for these titles reported will greatly enhance the value of this important annual reference work. While Volume 34 reports theses submitted in 1989, on occasion, certain univer sities do report theses submitted in previous years but not reported at the time.

This book represents the fourth part of a larger work dedicated to the structural synthesis of parallel robots. Part 1 (Gogu 2008a) presented the methodology of structural synthesis and the systematisation of structural solutions of simple and

complex limbs with two to six degrees of connectivity systematically generated by the structural synthesis approach. Part 2 (Gogu 2009a) presented structural solutions of translational parallel robotic manipulators with two and three degrees of mobility. Part 3 (Gogu 2010a) focussed on structural solutions of parallel robotic manipulators with planar motion of the moving platform. This book offers other topologies of parallel robotic manipulators with two and three degrees of freedom systematically generated by using the structural synthesis approach proposed in Part 1. The originality of this work resides in the fact that it combines the new formulae for mobility connectivity, redundancy and overconstraints, and the evolutionary morphology in a unified approach of structural synthesis giving interesting innovative solutions for parallel robotic manipulators. This is the first book of robotics presenting various solutions of coupled, decoupled, uncoupled, fully-isotropic and maximally regular parallel robotic manipulators with two and three degrees of freedom systematically generated by using the structural synthesis approach proposed in Part 1. Non-redundant/redundant, overconstrained/isostatic solutions with simple/complex limbs actuated by linear/rotary actuators with/without idle mobilities are proposed. Many solutions are presented here for the first time in the literature. The author had to make a difficult and challenging choice between protecting these solutions through patents, and releasing them directly into the public domain. The second option was adopted by publishing them in various recent scientific publications and mainly in this book. In this way, the author hopes to contribute to a rapid and widespread implementation of these solutions in future industrial products.

This book constitutes the Proceedings of the Second International Conference of IFToMM ITALY, held in Cassino, Italy, in 2018. The main topics of the workshop include: Computational Kinematics, Dynamics of Machinery, Gearing and Transmissions, Multibody Dynamics, Mechatronics, Mechanism Design, Tribology, Vibration, Industrial and non-Industrial Applications.

Proceedings of the Sixth International Conference on Intelligent System and Knowledge Engineering presents selected papers from the conference ISKE 2011, held December 15-17 in Shanghai, China. This proceedings doesn't only examine original research and approaches in the broad areas of intelligent systems and knowledge engineering, but also present new methodologies and practices in intelligent computing paradigms. The book introduces the current scientific and technical advances in the fields of artificial intelligence, machine learning, pattern recognition, data mining, information retrieval, knowledge-based systems, knowledge representation and reasoning, multi-agent systems, natural-language processing, etc. Furthermore, new computing methodologies are presented, including cloud computing, service computing and pervasive computing with traditional intelligent methods. The proceedings will be beneficial for both researchers and practitioners who want to utilize intelligent methods in their specific research fields. Dr. Yinglin Wang is a professor at the Department of Computer Science and Engineering, Shanghai Jiao Tong University, China; Dr. Tianrui Li is a professor at the School of Information Science and Technology, Southwest Jiaotong University, China. This book constitutes revised selected papers from the thoroughly refereed proceedings of the Third International Human Centered Computing Conference, HCC 2017, that consolidated and further develops the successful ICPCA/SWS conferences on Pervasive Computing and the Networked World, and which was held in Kazan, Russia, in August 2017.The 48 full and 20 short papers presented in this book together with 2 invited keynotes were carefully reviewed and selected from numerous submissions. This proceedings present recent advances in human machine interfaces, wireless and mobile network technologies, and data analytics,

which make computer services truly human-centric.

A few words about the series "Scientific Fundamentals of Robotics" should be said on the occasion of publication of the present monograph. This six-volume series has been conceived so as to allow the readers to master a contemporary approach to the construction and synthesis of con trol for manipulation ~obots. The authors' idea was to show how to use correct mathematical models of the dynamics of active spatial mecha nisms for dynamic analysis of robotic systems, optimal design of their mechanical parts based on the accepted criteria and imposed constraints, optimal choice of actuators, synthesis of dynamic control algorithms and their microcomputer implementation. In authors' oppinion this idea has been relatively successfully realized within the six-volume mono graphic series. Let us remind the readers of the books of this series. Volumes 1 and 2 are devoted to the dynamics and control algorithms of manipulation ro bots, respectively. They form the first part of the series which has a certain topic-related autonomy in the domain of the construction and application of the mathematical models of robotic mechanisms' dynamics.

Deep Learning in Introductory Physics: Exploratory Studies of Model?Based Reasoning is concerned with the broad question of how students learn physics in a model?centered classroom. The diverse, creative, and sometimes unexpected ways students construct models, and deal with intellectual conflict, provide valuable insights into student learning and cast a new vision for physics teaching. This book is the first publication in several years to thoroughly address the "coherence versus fragmentation" debate in science education, and the first to advance and explore the hypothesis that deep science learning is regressive and revolutionary. Deep Learning in Introductory Physics also contributes to a growing literature on the use of history and philosophy of science to confront difficult theoretical and practical issues in science teaching, and addresses current international concern over the state of science education and appropriate standards for science teaching and learning. The book is divided into three parts. Part I introduces the framework, agenda, and educational context of the book. An initial study of student modeling raises a number of questions about the nature and goals of physics education. Part II presents the results of four exploratory case studies. These studies reproduce the results of Part I with a more diverse sample of students; under new conditions (a public debate, peer discussions, and group interviews); and with new research prompts (model?building software, bridging tasks, and elicitation strategies). Part III significantly advances the emergent themes of Parts I and II through historical analysis and a review of physics education research. ENDORSEMENTS: "In Deep Learning in Introductory Physics, Lattery describes his extremely innovative course in which students' ideas about motion are elicited, evaluated with peers, and revised through experiment and discussion. The reader can see the students' deep engagement in constructive scientific modeling, while students deal with counter-intuitive ideas about motion that challenged Galileo in many of the same ways. Lattery captures students engaging in scientific thinking skills, and building difficult conceptual understandings at the same time. This is the 'double outcome' that many science educators have been searching for. The case studies provide inspiring examples of innovative course design, student sensemaking and reasoning, and deep conceptual change." ~ John Clement, University of Massachusetts—Amherst, Scientific Reasoning Research Institute "Deep Learning in Introductory Physics is an extraordinary book and an important intellectual achievement in many senses. It offers new perspectives on science education that will be of interest to practitioners, to education researchers, as well as to philosophers and historians of science. Lattery combines insights into model-based thinking with instructive examples from the history of science, such as Galileo's struggles with understanding accelerated motion, to introduce new ways of teaching science. The book is based on first-hand experiences with innovative teaching methods, reporting student's ideas and discussions about motion as an illustration of how modeling and model-building can help understanding science. Its lively descriptions of

these experiences and its concise presentations of insights backed by a rich literature on education, cognitive science, and the history and philosophy of science make it a great read for everybody interested in how models shape thinking processes." ~ Dr. Jürgen Renn, Director, Max Planck Institute for the History of Science

This two-volume set (CCIS 905 and CCIS 906) constitutes the refereed proceedings of the Second International Conference on Advances in Computing and Data Sciences, ICACDS 2018, held in Dehradun, India, in April 2018. The 110 full papers were carefully reviewed and selected from 598 submissions. The papers are centered around topics like advanced computing, data sciences, distributed systems organizing principles, development frameworks and environments, software verification and validation, computational complexity and cryptography, machine learning theory, database theory, probabilistic representations.

The volume set LNAI 11740 until LNAI 11745 constitutes the proceedings of the 12th International Conference on Intelligent Robotics and Applications, ICIRA 2019, held in Shenyang, China, in August 2019. The total of 378 full and 25 short papers presented in these proceedings was carefully reviewed and selected from 522 submissions. The papers are organized in topical sections as follows: Part I: collective and social robots; human biomechanics and human-centered robotics; robotics for cell manipulation and characterization; field robots; compliant mechanisms; robotic grasping and manipulation with incomplete information and strong disturbance; human-centered robotics; development of high-performance joint drive for robots; modular robots and other mechatronic systems; compliant manipulation learning and control for lightweight robot. Part II: power-assisted system and control; bio-inspired wall climbing robot; underwater acoustic and optical signal processing for environmental cognition; piezoelectric actuators and micro-nano manipulations; robot vision and scene understanding; visual and motional learning in robotics; signal processing and underwater bionic robots; soft locomotion robot; teleoperation robot; autonomous control of unmanned aircraft systems. Part III: marine bio-inspired robotics and soft robotics: materials, mechanisms, modelling, and control; robot intelligence technologies and system integration; continuum mechanisms and robots; unmanned underwater vehicles; intelligent robots for environment detection or fine manipulation; parallel robotics; human-robot collaboration; swarm intelligence and multi-robot cooperation; adaptive and learning control system; wearable and assistive devices and robots for healthcare; nonlinear systems and control. Part IV: swarm intelligence unmanned system; computational intelligence inspired robot navigation and SLAM; fuzzy modelling for automation, control, and robotics; development of ultra-thin-film, flexible sensors, and tactile sensation; robotic technology for deep space exploration; wearable sensing based limb motor function rehabilitation; pattern recognition and machine learning; navigation/localization. Part V: robot legged locomotion; advanced measurement and machine vision system; man-machine interactions; fault detection, testing and diagnosis; estimation and identification; mobile robots and intelligent autonomous systems; robotic vision, recognition and reconstruction; robot mechanism and design. Part VI: robot motion analysis and planning; robot design, development and control; medical robot; robot intelligence, learning and linguistics; motion control; computer integrated manufacturing; robot cooperation; virtual and augmented reality; education in mechatronics engineering; robotic drilling and sampling technology; automotive systems; mechatronics in energy systems; human-robot interaction.

Writing or managing a scientific book, as it is known today, depends on a series of

major activities, such as regrouping researchers, reviewing chapters, informing and exchanging with contributors, and at the very least, motivating them to achieve the objective of publication. The idea of this book arose from many years of work in biomechanics, health disease, and rehabilitation. Through exchanges with authors from several countries, we learned much from each other, and we decided with the publisher to transfer this knowledge to readers interested in the current understanding of the impact of biomechanics in the analysis of movement and its optimization. The main objective is to provide some interesting articles that show the scope of biomechanical analysis and technologies in human behavior tasks. Engineers, researchers, and students from biomedical engineering and health sciences, as well as industrial professionals, can benefit from this compendium of knowledge about biomechanics applied to the human body.

A thorough understanding of the interaction of waves and currents with offshore structures has now become a vital factor in the safe and economical design of various offshore technologies. There has been a significant increase in the research efforts to meet this need. Although considerable progress has been made in the offshore industry and in the understanding of the interaction of waves, currents, and wind with ocean structures, most of the available books concentrate only on practical applications without a grounding in the physics. This text integrates an understanding of the physics of ocean-structure interactions with numerous applications. This more complete understanding will allow the engineer and designer to solve problems heretofore not encountered, and to design new and innovative structures. The intent of this book is to serve the needs of future generations of engineers designing more sophisticated structures at ever increasing depths.

The ?rst International Meeting of Advances in Robot Kinematics, ARK, occurred in September 1988, by invitation to Ljubljana, Slovenia, of a group of 20 int- nationally recognized researchers, representing six different countries from three continents. There were 22 lectures and approximately 150 attendees. This success of bringing together excellent research and the international community, led to the formation of a Scienti?c Committee and the decision to repeat the event biannually. The meeting was made open to all individuals with a critical peer review process of submitted papers. The meetings have since been continuously supported by the Jozef ? Stefan Institute and since 1992 have come under patronage of the Inter- tionalFederationforthePromotionofMechanismandMachineScience(IFToMM). Springer published the ?rst book of the series in 1991 and since 1994 Kluwer and Springer have published a book of the presented papers every two years. The papers in this book present the latest topics and methods in the kinem- ics, control and design of robotic manipulators. They consider the full range of - botic systems, including serial, parallel and cable driven manipulators, both planar and spatial. The systems range from being less than fully mobile to kinematically redundant to overconstrained. The meeting included recent advances in emerging areas such as the design and control of humanoids and humanoid subsystems, the analysis, modeling and simulation of human body motion, the mobility analysis of protein molecules and the development of systems which integrate man and - chine.

Human motion analysis or gait analysis is used throughout the country and the world in clinics for pre-surgical planning and postsurgical follow-up. Only recently have

technological advances truly begun to meet medical needs by supplying more accurate analytical data from which to make educated assessments of dynamic foot and ankle pathology. A comprehensive overview of current and emerging methods is necessary for practitioners to effectively integrate the new techniques into better pre-treatment planning, surgical and rehabilitative care, and post-treatment follow-up. Originating as a one-day workshop sponsored by the Shriner's Hospitals and the National Institutes of Health, Foot and Ankle Motion Analysis: Clinical Treatment and Technology provides a single source reference for the latest technologies and their clinical applications. With contributions from an international panel of experts from orthopaedic, rehabilitation, engineering, academic, medical-industrial, and clinical disciplines, this text focuses on the relevant scientific advances with an emphasis on applications, limitations, and problems to be solved. Divided into two parts, the text begins by presenting basic and advanced clinical applications and opportunities in foot and ankle motion analysis in both pediatric and adult cases. The second part introduces the technological advances themselves from a quantitative perspective. Modeling concepts, seminal developments, and novel approaches are described along with emerging horizons related to mechanical paradigms, imaging, kinetics, robotics and simulation, tri-planar force sensing, and more. The book also includes a chapter of references and sources of support for future research and development prospects. Clinical and research applications in motion analysis have resulted in better functional assessment, fewer, more effective surgeries, and longer-term follow-up care. Foot and Ankle Motion Analysis: Clinical Treatment and Technology provides a basis for expanding these contributions to the broader community of practitioners caring for both adult and pediatric patients.

This is a comprehensive, state-of-the-art, treatise on the energetic mechanics of Lagrange and Hamilton, that is, classical analytical dynamics, and its principal applications to constrained systems (contact, rolling, and servoconstraints). It is a book on advanced dynamics from a unified viewpoint, namely, the kinetic principle of virtual work, or principle of Lagrange. As such, it continues, renovates, and expands the grand tradition laid by such mechanics masters as Appell, Maggi, Whittaker, Heun, Hamel, Chetaev, Synge, Pars, Luré, Gantmacher, Neimark, and Fufaev. Many completely solved examples complement the theory, along with many problems (all of the latter with their answers and many of them with hints). Although written at an advanced level, the topics covered in this 1400-page volume (the most extensive ever written on analytical mechanics) are eminently readable and inclusive. It is of interest to engineers, physicists, and mathematicians; advanced undergraduate and graduate students and teachers; researchers and professionals; all will find this encyclopedic work an extraordinary asset; for classroom use or self-study. In this edition, corrections (of the original edition, 2002) have been incorporated. Contents:IntroductionBackground: Basic Concepts and Equations of Particle and Rigid-Body MechanicsKinematics of Constrained SystemsKinetics of Constrained SystemsImpulsive MotionNonlinear Nonholonomic ConstraintsDifferential Variational Principles, and Associated Generalized Equations of Motion of

Nielsen, Tsenov, et al.Time-Integral Theorems and Variational PrinciplesIntroduction to Hamiltonian/Canonical Methods: Equations of Hamilton and Routh; Canonical Formalism Readership: Students and researchers in engineering, physics, and applied mathematics. Key Features:No book of this scope (comprehensiveness and state-of-the-art level) has ever been written, in any language, there are no real competitors. This (like the author's other books) is an entirely original work; several of its topics are based on the author's own research, and appear for the first time in book formReadability ("reader friendliness") in spite of its advanced levelEconomy of thinking: Unified treatment based on Lagrange's kinetic principle of virtual workSuperior and clear notation: both indicial and direct notations for vectors, Cartesian tensors etc.Self-contained exposition: All background mathematics and mechanics are summarized in the handbook like chapter 1Keywords:Analytical Mechanics;Classical Mechanics;Classical Dynamics;Theoretical Mechanics;Advanced Engineering Dynamics;Applied MechanicsReviews: "A monumental treatise … which is going to become a reference book on the subject … It should not be missed by anybody working in the area of analytical dynamics or only wanting to understand major problems of the subject … This landmark reference source … [is] the most comprehensive exposition available of the advanced engineering-oriented dynamics." Zentralblatt für Math. "This unique treatise should be part of every scientific library and scholarly collection in engineering science." IEEE Control Systems Magazine "I recommend without hesitation Prof Papastravridis' treatise as a reference source to be acquired by every library of Mathematics, Physics, or Mechanical/Aeronautical/Electrical Engineering department. It is a different book, especially in our Internet era where instant satisfaction is often the primary (sometimes sole) goal of the student or researcher. Putting together 1392 (!!) pages of carefully prepared text and 172 figures (which then become somehow sparse) represents a major effort, to say the least." Bulletin of the American Mathematical Society "Recipient of the annual competition award, in engineering, of the Association of American Publishers." The Outstanding Professional and Scholarly Titles of 2002 (March 2003) "Unique in Contents and Perspective … has no Competition in Depth and Breadth." Dr George Simitses Professor of Engineering Science, Mechanics, and Aerospace Engineering University of Cincinatti and Georgia Institute of Technology, USA "Probably the best of its kind and likely to become standard reference." Dr Alex Dalgarno FRS, member of US National Academy of Sciences, and "father of molecular astrophysics" and Phillips Professor of Astronomy, Harvard University, and Harvard-Smithsonian Center for Astrophysics, USA "The reviewer shares the author's statement that this book with its almost 1,400 pages is unique among the comparable treatises in the breadth and the depth of the covered material. Regarding technicalities — the students and the young scientists will find a lot of interesting examples and solved up to their very end problems. I recommend you to read this special book in analytical mechanics. It is a useful tool to undergraduate and graduate

students, professors and researchers in the area of applied mechanics, engineering science, and mechanical, aerospace, and structural engineering, as well for the physicists and applied mathematicians." Journal of Geometry and Symmetry in Physics

Water wave kinematics is a central field of study in ocean and coastal engineering. The wave forces on structures as well as sand erosion both on coastlines and in the ocean are to a large extent governed by the local distribution of velocities and accelerations of the water particles. Our knowledge of waves has generally been derived from measurements of the water surface elevations. The reason for this is that the surface elevations have been of primary interest and fairly cheap and reliable instruments have been developed for such measurements. The water wave kinematics has then been derived from the surface elevation information by various theories. However. the different theories for the calculation of water particle velocities and acceleration have turned out to give significant differences in the calculated responses of structures. In recent years new measurement techniques have made it possible to make accurate velocity measurements. Hence. the editors deemed it to be useful to bring together a group of experts working actively as researchers in the field of water wave kinematics. These experts included theoreticians as well as experimentalists on wave kinematics. It was also deemed useful to include experts on the response of structures to have their views from a structural engineering point of view on what information is really needed on water wave kinematics.

In the last few years, concerns about dancers' health and the consequences of physical training have increased considerably. The physical requirements and type of training dancers need to achieve to reach their highest level of performance while decreasing the rate of severe injuries has awakened the necessity of more scientific knowledge concerning the area of dance, in part considering its several particularities. Scientific Perspectives and Emerging Developments in Dance and the Performing Arts is a pivotal reference source that provides vital research designed to reduce the gap between the scientific theory and the practice of dance. While highlighting topics such as burnout, mental health, and sport psychology, this publication explores areas such as nutrition, psychology, and education, as well as methods of maintaining the general wellbeing and quality of the health, training, and performance of dancers. This book is ideally designed for dance experts, instructors, sports psychologists, researchers, academicians, and students.

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