

## Excellent Guide For Ansys Newcastle University

*One of the most significant challenges in the development of embedded and cyber-physical systems is the gap between the disciplines of software and control engineering. In a marketplace, where rapid innovation is essential, engineers from both disciplines need to be able to explore system designs collaboratively, allocating responsibilities to software and physical elements, and analyzing trade-offs between them. To this end, this book presents a framework that allows the very different kinds of design models – discrete-event (DE) models of software and continuous time (CT) models of the physical environment – to be analyzed and simulated jointly, based on common scenarios. The individual chapters provide introductions to both sides of this co-simulation technology, and give a step-by-step guide to the methodology for designing and analyzing co-models. They are grouped into three parts: Part I introduces the technical basis for collaborative modeling and simulation with the Crescendo technology. Part II continues with different methodological guidelines for creating co-models and analyzing them in different ways using case studies. Part III then delves into more advanced topics and looks into the potential future of this technology in the area of cyber-physical systems. Finally various appendices provide summaries of the VDM and 20-sim technologies, a number of valuable design patterns applicable for co-models, and an acronym list along with indices and references to other literature. By combining descriptions of the underlying theory with records of real engineers' experience in using the framework on a series of case studies the book appeals to scientists and practitioners alike. It is complemented by tools, examples, videos, and other material on [www.crescendotool.org](http://www.crescendotool.org). Scientists/researchers and graduate students working in embedded and cyber-physical systems will learn the semantic foundations for collaborative modeling and simulation, as well as the current capabilities and limitations of methods and tools in this field. Practitioners will be able to develop an appreciation of the capabilities of the co-modeling techniques, to assess the benefits of more collaborative approaches to modeling and simulation, and will benefit from the included guidelines and modeling patterns.*

*Sustainable Development and Innovations in Marine Technologies includes the papers presented at the 18th International Congress of the Maritime Association of the Mediterranean (IMAM 2019, Varna, Bulgaria, 9-11 September 2019).*

*Sustainable Development and Innovations in Marine Technologies includes a wide range of topics: Aquaculture & Fishing; Construction; Defence & Security; Design; Dynamic response of structures; Degradation/ Defects in structures; Electrical equipment of ships; Human factors; Hydrodynamics; Legal/Social aspects; Logistics; Machinery & Control; Marine environmental protection; Materials; Navigation; Noise; Non-linear motions – manoeuvrability; Off-shore and coastal development; Off-shore renewable energy; Port operations; Prime movers; Propulsion; Safety at sea; Safety of Marine Systems; Sea waves;*

*Seakeeping; Shaft & propellers; Ship resistance; Shipyards; Small & pleasure crafts; Stability; Static response of structures; Structures, and Wind loads. The IMAM series of Conferences started in 1978 when the first Congress was organised in Istanbul, Turkey. IMAM 2019 is the eighteenth edition, and in its nearly forty years of history, this biannual event has been organised throughout Europe. Sustainable Development and Innovations in Marine Technologies is essential reading for academics, engineers and all professionals involved in the area of sustainable and innovative marine technologies.*

*MEMs Materials and Processes Handbook" is a comprehensive reference for researchers searching for new materials, properties of known materials, or specific processes available for MEMS fabrication. The content is separated into distinct sections on "Materials" and "Processes". The extensive Material Selection Guide" and a "Material Database" guides the reader through the selection of appropriate materials for the required task at hand. The "Processes" section of the book is organized as a catalog of various microfabrication processes, each with a brief introduction to the technology, as well as examples of common uses in MEMs.*

*This book gathers the latest research, innovations, and applications in the field of civil engineering, as presented by leading national and international academics, researchers, engineers, and postgraduate students at the AWAM International Conference on Civil Engineering 2019 (AICCE'19), held in Penang, Malaysia on August 21-22, 2019. The book covers highly diverse topics in the main fields of civil engineering, including structural and earthquake engineering, environmental engineering, geotechnical engineering, highway and transportation engineering, water resources engineering, and geomatic and construction management. In line with the conference theme, "Transforming the Nation for a Sustainable Tomorrow", which relates to the United Nations' 17 Global Goals for Sustainable Development, it highlights important elements in the planning and development stages to establish design standards beneficial to the environment and its surroundings. The contributions introduce numerous exciting ideas that spur novel research directions and foster multidisciplinary collaborations between various specialists in the field of civil engineering.*

*Compliant Mechanisms*

*Foundation Design*

*Simulation of Fluid Power Systems with Simcenter Amesim*

*Fuel Cell Handbook (Seventh Edition)*

*Design, Modeling and Control of Nanopositioning Systems*

*Sustainable Buildings and Structures collects the contributions presented at the 1st International Conference on Sustainable Buildings and Structures (Suzhou, China, 29 October-1 November 2016). The book aims to share thoughts and ideas on sustainable approaches to urban planning, engineering design and construction. The topics discussed include:-*

This book introduces the concept, design and application of green biocomposites, with a specific focus on the current demand for green biocomposites for automotive and aerospace components. It discusses the mathematical background, innovative approaches to physical modelling, analysis and design techniques. Including numerous illustrations, tables, case studies and exercises, the text summarises current research in the field. It is a valuable reference resource for researchers, students and scientists working in the field of materials science.

This book presents a comprehensive review of state-of-the-art models for turbulent combustion, with special emphasis on the theory, development and applications of combustion models in practical combustion systems. It simplifies the complex multi-scale and nonlinear interaction between chemistry and turbulence to allow a broader audience to understand the modeling and numerical simulations of turbulent combustion, which remains at the forefront of research due to its industrial relevance. Further, the book provides a holistic view by covering a diverse range of basic and advanced topics—from the fundamentals of turbulence–chemistry interactions, role of high-performance computing in combustion simulations, and optimization and reduction techniques for chemical kinetics, to state-of-the-art modeling strategies for turbulent premixed and nonpremixed combustion and their applications in engineering contexts.

The two volumes LNAI 11649 and LNAI 11650 constitute the refereed proceedings of the 20th Annual Conference "Towards Autonomous Robotics", TAROS 2019, held in London, UK, in July 2019. The 74 full papers and 12 short papers presented were carefully reviewed and selected from 101 submissions. The papers present and discuss significant findings and advances in autonomous robotics research and applications. They are organized in the following topical sections: robotic grippers and manipulation; soft robotics, sensing and mobile robots; robotic learning, mapping and planning; human-robot interaction; and robotic systems and applications.

Proceedings of AICCE'19

Proceedings of the 34th International MATADOR Conference

Ship Resistance and Propulsion

From Energy Conservation to Pollution Reduction

Modeling, Simulation and Optimization of Wind Farms and Hybrid Systems

Prediction of Turbulent Flows

**Volume is indexed by Thomson Reuters CPCI-S (WoS). This work comprises edited versions of papers presented at the 6th Pacific Rim International Conference on Advanced Materials and Processing (PRICM-6), held on Jeju Island, Korea between the 5th and 9th November, 2007.**

**This book presents papers covering a wide spectrum of theory and practice, deeply rooted in engineering problems at a high practical and theoretical level. The contents explore theory, control systems and applications, the heart of the matter in electrical drives.**

**Sustainable Development and Innovations in Marine Technologies**  
Proceedings of the 18th International Congress of the Maritime Association of the Mediterranean (IMAM 2019), September 9–11, 2019, Varna, Bulgaria  
CRC Press

Today's wind energy industry is at a crossroads. Global economic instability has threatened or eliminated many financial incentives that have been important to the development of specific markets. Now more than ever, this essential element of the world energy mosaic will require innovative research and strategic collaborations to bolster the industry as it moves forward. This text details topics fundamental to the efficient operation of modern commercial farms and highlights advanced research that will enable next-generation wind energy technologies. The book is organized into three sections, Inflow and Wake Influences on Turbine Performance, Turbine Structural Response, and Power Conversion, Control and Integration. In addition to fundamental concepts, the reader will be exposed to comprehensive treatments of topics like wake dynamics, analysis of complex turbine blades, and power electronics in small-scale wind turbine systems.

**Green Biocomposites**

**Advances in Wind Power**

**Biosensors for Virus Detection**

Formerly The International Machine Tool Design and Conferences  
Proceedings of the 18th International Congress of the Maritime Association of the Mediterranean (IMAM 2019), September 9–11, 2019, Varna, Bulgaria

**Advances in Condition Monitoring, Optimization and Control for Complex Industrial Processes**

This book focuses on the two-phase flow problems relevant in the automotive and power generation sectors. It includes fundamental studies on liquid–gas two-phase interactions, nucleate and film boiling, condensation, cavitation, suspension flows as well as the latest developments in the field of two-phase problems pertaining to power generation systems. It also discusses the latest analytical, numerical and experimental techniques for investigating the role of two-phase flows in performance analysis of devices like combustion engines, gas turbines, nuclear reactors and fuel cells. The wide scope of applications of this topic makes this book of interest to researchers and professionals alike.

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.

Presented here are 73 refereed papers given at the 34th MATADOR Conference held at UMIST in July 2004. The MATADOR series of conferences covers the topics of Manufacturing Automation and Systems Technology, Applications, Design, Organisation and Management, and Research. The 34th proceedings contains original papers contributed by researchers from many countries on different continents. The papers cover both the technological aspect of manufacturing processes; and the systems, business and management features of manufacturing enterprise. The papers in this volume reflect: - the importance of manufacturing to international wealth creation; - the necessity of responsiveness and agility of manufacturing companies to meet market-led requirements and international change; - the role of information technology and electronic communications in the growth of global manufacturing enterprises; - the impact of new technologies, new materials and processes, on the ability to produce goods of higher quality, more quickly, to meet markets needs at a lower cost. Some of the major generic developments which have taken place in these areas since the 33rd MATADOR conference was held in 2000 are reported in this volume.

These proceedings exchange ideas and knowledge among engineers, designers and managers on how to support real-world value chains by developing additive manufactured series products. The papers from the conference show a holistic, multidisciplinary view.

Proceedings of the 1st International Conference on Sustainable Buildings and Structures (Suzhou, P.R. China, 29 October - 1 November 2015)

Machinery Buyers' Guide

Towards Autonomous Robotic Systems

11th International Symposium and IIW International Conference on Tubular Structures

Design and Applications

Transforming the Nation for a Sustainable Tomorrow

***By presenting current theory on flow prediction, this book addresses the needs of experienced practitioners and researchers in fluid dynamics.***

***This book illustrates numerical simulation of fluid power systems by LMS Amesim Platform covering hydrostatic transmissions, electro hydraulic servo valves, hydraulic servomechanisms for aerospace engineering, speed governors for power machines, fuel injection systems, and automotive servo systems.***

***Tribology is the "science and technology of interacting surfaces in relative motion" and encompasses the study of friction, wear and lubrication. By extension biotribology is usually defined as the tribological phenomena occurring in either the human body or in animals. Therefore, it is possible to consider tribological processes that may occur after implantation of an artificial***

*device in the human body and the tribological processes naturally occurring in or on the tissues and organ of animals. Animals, including humans, possess a wide variety of sliding and frictional interfaces. The authors aim to provide some advances in research in biotribology. They cover several aspects of biotribology such as tribology of synovial joints and artificial replacements; wear of screws and plates in bone fractures repair; wear of denture and restorative materials; friction of the skin and comfort of clothing; wear of replacement heart valves; tribology of contact lenses and ocular tribology; biotribology on the microscale and nanoscale levels, etc. This book can be used as a research text for final undergraduate engineering courses (for example, materials, biomedical, etc.) or for those studying the subject of biotribology at the postgraduate level. It can also serve as a useful reference for academics, biomechanical researchers, biologists, chemists, physicists, biomedical and materials engineers, and other professionals in related engineering, medicine and biomedical industries.*

*Particles at Fluid Interfaces encompasses the processes and formulations that involve the stabilisation of fluid interfaces by adsorbed particles. The prevalence of these multiphase materials underpins their use in a broad range of industries from personal care and food technology to oil and mineral processing. The stabilisation conferred by the adsorbed particles can be transient as found in froth flotation or long-lived as occurs within Pickering Emulsions. The particles can range in size from nanoparticles to millimetre-sized particles, and cover a spectrum from collapsed proteins, polymeric colloids of controlled size and shape to high dispersity mineral particles.*

*Practical Estimation of Propulsive Power*

*Sustainability in Energy and Buildings 2021*

*20th Annual Conference, TAROS 2019, London, UK, July 3–5, 2019, Proceedings, Part I*

*Advanced Materials and Processing*

*Biotribology*

*Multiphase Flow Handbook, Second Edition*

The reduction of greenhouse gas emissions is a major governmental goal worldwide. The main target, hopefully by 2050, is to move away from fossil fuels in the electricity sector and then switch to clean power to fuel transportation, buildings and industry. This book discusses important issues in the expanding field of wind farm modeling and simulation as well as the optimization of

hybrid and micro-grid systems. Section I deals with modeling and simulation of wind farms for efficient, reliable and cost-effective optimal solutions. Section II tackles the optimization of hybrid wind/PV and renewable energy-based smart micro-grid systems.

Die vorliegende Arbeit beschäftigt sich mit der Entwicklung eines Wanderbettwärmeübertragers für den Einsatz in solarthermischen Kraftwerken, in denen Partikelschüttungen als Wärmeträger- und -speichermaterial eingesetzt werden. Im Rahmen der Arbeit wurde zunächst eine Charakterisierung geeigneter Materialien vorgenommen. Anschließend wurden mithilfe eines CFD-Mehrphasenmodells Geometrie- und Parameterstudien durchgeführt. Unter Berücksichtigung der Materialeigenschaften wurde daraufhin ein angepasstes Wärmeübertragerdesign für die Zielanwendung entwickelt. Ein auf diesem Entwurf basierender Wärmeübertrager wurde mithilfe von CFD-Berechnungen hinsichtlich des granularen Strömungsverhaltens und der thermischen Leistungsfähigkeit untersucht. Durch Experimente im Labormaßstab wurden die Simulationsergebnisse validiert und gleichzeitig die Funktionalität des Wärmeübertragers nachgewiesen. Das angepasste Design des Wanderbettwärmeübertragers zeigt im Vergleich mit einer herkömmlichen Rohrbündelkonfiguration eine deutliche Verbesserung der thermischen Leistungsfähigkeit. Daraus ergibt sich ein hohes Potential für den Einsatz im solaren Kraftwerksbereich.

This book is a printed edition of the Special Issue "Marine Propulsors" that was published in JMSE

We are delighted to present this book which contains the Proceedings of the Fifth International Conference on Computational Fluid Dynamics (ICCFD5), held in Seoul, Korea from July 7 through 11, 2008. The ICCFD series has established itself as the leading international conference series for scientists, mathematicians, and engineers specialized in the computation of fluid flow. In ICCFD5, 5 Invited Lectures and 3 Keynote Lectures were delivered by renowned researchers in the areas of innovative modeling of flow physics, innovative algorithm development for flow simulation, optimization and control, and advanced multidisciplinary - plications. There were a total of 198 contributed abstracts submitted from 25 countries. The executive committee consisting of C. H. Bruneau (France), J. J. Chattot (USA), D. Kwak (USA), N. Satofuka (Japan), and

myself, was responsible for selection of papers. Each of the members had a separate subcommittee to carry out the evaluation. As a result of this careful peer review process, 138 papers were accepted for oral presentation and 28 for poster presentation. Among them, 5 (3 oral and 2 poster presentation) papers were withdrawn and 10 (4 oral and 6 poster presentation) papers were not presented. The conference was attended by 201 delegates from 23 countries. The technical aspects of the conference were highly beneficial and informative, while the non-technical aspects were fully enjoyable and memorable. In this book, 3 invited lectures and 1 keynote lecture appear first. Then 99 contributed papers are grouped under 21 subject titles which are in alphabetical order.

Industrializing Additive Manufacturing – Proceedings of Additive Manufacturing in Products and Applications – AMPA2017

Design and Practice

Multiphysics Simulation by Design for Electrical Machines, Power Electronics and Drives

Particles at Fluid Interfaces

Transformer Engineering

Pipeline Response to Excavation-induced Ground Movements

The exercises in ANSYS Workbench Tutorial Release 14 introduce you to effective engineering problem solving through the use of this powerful modeling, simulation and optimization software suite. Topics that are covered include solid modeling, stress analysis, conduction/convection heat transfer, thermal stress, vibration, elastic buckling and geometric/material nonlinearities. It is designed for practicing and student engineers alike and is suitable for use with an organized course of instruction or for self-study. The compact presentation includes just over 100 end-of-chapter problems covering all aspects of the tutorials.

The book documents 25 papers collected from the Special Issue “ Advances in Condition Monitoring, Optimization and Control for Complex Industrial Processes ” , highlighting recent research trends in complex industrial processes. The book aims to stimulate the research field and be of benefit to readers from both academic institutes and industrial sectors.

This topical book contains the latest scientific and engineering developments in the field of tubular steel structures, as presented at the "11th International Symposium and IIW International Conference on Tubular Structures". The International Symposium on Tubular Structures (ISTS) has a long-standing reputation for being the principal showcase for manufactured tubing and the prime international forum for discussion of research, developments and applications in this field. Various key and emerging subjects in the field of hollow structural sections are covered, such as: novel applications and case studies, static and fatigue behaviour of connections/joints, concrete-filled and composite tubular members, earthquake resistance, specification and code developments, material properties and structural reliability, impact resistance and brittle fracture, fire resistance, casting and fabrication innovations. Research and

development issues presented in this book are applicable to buildings, bridges, offshore structures, entertainment rides, cranes, towers and various mechanical and agricultural equipment. This book is thus a pertinent reference source for architects, civil and mechanical engineers, designers, steel fabricators and contractors, manufacturers of hollow sections or related construction products, trade associations involved with tubing, owners or developers of tubular structures, steel specification committees, academics and research students. The conference presentations herein include two keynote lectures (the International Institute of Welding Houdremont Lecture and the ISTS Kurobane Lecture), plus finalists in the CIDECT Student Papers Competition. The 11th International Symposium and IIW International Conference on Tubular Structures – ISTS11 – took place in Qu é bec City, Canada from August 31 to September 2, 2006.

Presents applied theory and advanced simulation techniques for electric machines and drives  
This book combines the knowledge of experts from both academia and the software industry to present theories of multiphysics simulation by design for electrical machines, power electronics, and drives. The comprehensive design approach described within supports new applications required by technologies sustaining high drive efficiency. The highlighted framework considers the electric machine at the heart of the entire electric drive. The book also emphasizes the simulation by design concept—a concept that frames the entire highlighted design methodology, which is described and illustrated by various advanced simulation technologies. Multiphysics Simulation by Design for Electrical Machines, Power Electronics and Drives begins with the basics of electrical machine design and manufacturing tolerances. It also discusses fundamental aspects of the state of the art design process and includes examples from industrial practice. It explains FEM-based analysis techniques for electrical machine design—providing details on how it can be employed in ANSYS Maxwell software. In addition, the book covers advanced magnetic material modeling capabilities employed in numerical computation; thermal analysis; automated optimization for electric machines; and power electronics and drive systems. This valuable resource: Delivers the multi-physics know-how based on practical electric machine design methodologies Provides an extensive overview of electric machine design optimization and its integration with power electronics and drives Incorporates case studies from industrial practice and research and development projects Multiphysics Simulation by Design for Electrical Machines, Power Electronics and Drives is an incredibly helpful book for design engineers, application and system engineers, and technical professionals. It will also benefit graduate engineering students with a strong interest in electric machines and drives.

Modeling and Simulation of Turbulent Combustion

W ä rmeauskopplung aus hei ß en Partikelsch ü ttungen zur Dampferzeugung

Collaborative Design for Embedded Systems

Theory and Practice

High Temperature Air Combustion

Co-modelling and Co-simulation

Maximize efficiency and minimize pollution: the breakthrough technology of high temperature air combustion (HiTAC) holds the potential to overcome the limitations of conventional combustion and allow engineers to finally meet this long-standing imperative. Research has shown that HiTAC technology can provide simultaneous reduction of CO<sub>2</sub> and nitric oxide emissions and reduce energy consumption for a specific process or requirement. High Temperature Air Combustion: From Energy Conservation to Pollution Reduction provides the first comprehensive exposition of the principles and practice of HiTAC. With a careful balance of theory and practice, it reviews the historical background, clearly describes HiTAC combustion phenomena, and shows how to simulate and apply the technology for significant energy savings,

reduced equipment size, and lower emissions. It offers design guidelines for high performance industrial furnaces, presents field trials of practical furnaces, and explores potential applications of HiTAC in other fields, including the conversion of solid waste fuels to cleaner fuels, stationary gas turbine engines, internal combustion engines, and other advanced energy-to-power conversion systems. Developed through an intensive research project sponsored by the Japanese government, HiTAC now promises to revolutionize our paradigm for using all kinds of fossil, alternative, waste, and derived fuels for energy conversion and utilization in industry. This book is your opportunity to understand its principles, learn about the technology, and begin to use it to the benefit of your application, your company, and the environment.

In *Foundation Design: Theory and Practice*, Professor N. S. V. Kameswara Rao covers the key aspects of the subject, including principles of testing, interpretation, analysis, soil-structure interaction modeling, construction guidelines, and applications to rational design. Rao presents a wide array of numerical methods used in analyses so that readers can employ and adapt them on their own. Throughout the book the emphasis is on practical application, training readers in actual design procedures using the latest codes and standards in use throughout the world. Presents updated design procedures in light of revised codes and standards, covering: American Concrete Institute (ACI) codes Eurocode 7 Other British Standard-based codes including Indian codes Provides background materials for easy understanding of the topics, such as: Code provisions for reinforced concrete Pile design and construction Machine foundations and construction practices Tests for obtaining the design parameters Features subjects not covered in other foundation design texts: Soil-structure interaction approaches using analytical, numerical, and finite element methods Analysis and design of circular and annular foundations Analysis and design of piles and groups subjected to general loads and movements Contains worked out examples to illustrate the analysis and design Provides several problems for practice at the end of each chapter Lecture materials for instructors available on the book's companion website

*Foundation Design* is designed for graduate students in civil engineering and geotechnical engineering. The book is also ideal for advanced undergraduate students, contractors, builders, developers, heavy machine manufacturers, and power plant engineers. Students in mechanical engineering will find the chapter on machine foundations helpful for structural engineering applications. Companion website for instructor resources: [www.wiley.com/go/rao](http://www.wiley.com/go/rao)

Fuel cells are one of the cleanest and most efficient technologies for generating electricity. Since there is no combustion, there are none of the pollutants commonly produced by boilers and furnaces. For systems designed to consume hydrogen directly, the only products are electricity, water and heat. Fuel cells are an important technology for a potentially wide variety of applications including on-site electric power for households and commercial buildings; supplemental or auxiliary power to support car, truck and aircraft systems; power for personal, mass and commercial transportation; and the modular addition by utilities of new power generation closely tailored to meet growth in power consumption. These applications will be in a large number of industries worldwide. In this Seventh Edition of the *Fuel Cell Handbook*, we have discussed the Solid State Energy Conversion Alliance Program (SECA) activities. In addition, individual fuel cell technologies and other supporting materials have been updated.

The *Multiphase Flow Handbook, Second Edition* is a thoroughly updated and reorganized revision of the late Clayton Crowe's work, and provides a detailed look at the basic concepts and the wide range of applications in this important area of thermal/fluids engineering. Revised by the new editors, Efstathios E. (Stathis) Michaelides and John D. Schwarzkopf, the new Second Edition begins with two chapters covering fundamental concepts and methods that pertain to all the types and applications of multiphase flow. The remaining chapters cover the applications and engineering systems that are relevant to all the types of multiphase flow and heat transfer. The twenty-one chapters and several sections of the book include the basic science as well as the contemporary engineering and technological applications of multiphase flow in a comprehensive way that is easy to follow and be understood. The editors created a common set of nomenclature that is used throughout the book, allowing readers to easily compare fundamental theory with currently developing concepts and applications. With contributed chapters from sixty-two leading experts around the world, the *Multiphase Flow Handbook, Second Edition* is an essential reference for all researchers, academics and engineers working with complex thermal and fluid systems.

Best papers from the International Conference on Electrical Machines ICEM'04  
MEMS Materials and Processes Handbook  
Recent Developments of Electrical Drives  
ANSYS Workbench Tutorial Release 14  
Computational Fluid Dynamics 2008  
Tubular Structures XI

Biosensors have been employed for numerous applications from medical diagnosis, environmental monitoring, pharmaceutical analysis, food quality testing to defence and security purposes. Their development encompasses chemistry, physics, materials science, nanotechnology, and engineering. Being at the intersection of these multiple disciplines, this book is suitable for academic, clinical, and commercial researchers, as well as graduate students. This book reviews the latest studies and developments in the use of a range of biosensor platforms for the analysis of viral infections.

Flexure hinges hold several advantages over classical rotation joints, including no friction losses, no need for lubrication, no hysteresis, compactness, capacity to be utilized in small-scale applications, ease of fabrication, virtually no assembly, and no required maintenance. *Compliant Mechanisms: Design of Flexure Hinges* provides practical answers to the present and future needs of efficient design, analysis, and optimization of devices that incorporate flexure hinges. With a highly original approach the text: Discusses new and classical types of flexure hinges (single-, two- and multiple-axis) for two- and three-dimensional applications Addresses a wide range of industrial applications, including micro- and nano-scale mechanisms Quantifies flexibility, precision of rotation, sensitivity to parasitic loading, energy consumption, and stress limitations through closed-form compliance equations Offers a unitary presentation of individual flexure hinges as fully-compliant members by means of closed-form compliance (spring rates) equations Fully defines the lumped-parameter compliance, inertia and damping properties of flexure hinges Develops a finite element approach to compliant mechanisms by giving the elemental formulation of new flexure hinge line elements Incorporates more advanced topics dedicated to flexure hinges including large deformations, buckling, torsion, composite flexures, shape optimization and thermal effects *Compliant Mechanisms: Design of Flexure Hinges* provides practical answers and directions to the needs of efficiently designing, analyzing, and optimizing devices that include flexure hinges. It contains ready-to-use plots and simple equations describing several flexure types for the professional that needs quick solutions to current applications. The book also provides self-contained, easy-to-apply mathematical tools that provide sufficient guidance for real-time problem solving of further applications.

This book contains the proceedings of the 13th KES International Conference on Sustainability and Energy in Buildings 2021 (SEB2021) held in Split, Croatia, during 15–17 September 2021 organized by KES International. SEB21 invited contributions on a range of topics related to sustainable buildings and explored innovative themes regarding sustainable energy systems. The conference formed an exciting chance to present, interact and learn about the latest research and practical developments on the subject. The conference attracted submissions from around the world. Submissions for the Full-Paper Track were subjected to a blind peer-review process. Only the best of these were selected for presentation at the conference and publication in these proceedings. It is intended that this book provides a useful and informative snapshot of recent research developments in the important and vibrant area of sustainability in energy and buildings. Covering the complete design cycle of nanopositioning systems, this is the first comprehensive text on the topic. The book first introduces concepts associated with nanopositioning stages and outlines their application in such tasks as scanning probe microscopy, nanofabrication, data storage, cell surgery and precision optics. Piezoelectric transducers, employed ubiquitously in nanopositioning applications are then discussed in detail including practical considerations and constraints on transducer response. The reader is then given an overview of the types of

nanopositioner before the text turns to the in-depth coverage of mechanical design including flexures, materials, manufacturing techniques, and electronics. This process is illustrated by the example of a high-speed serial-kinematic nanopositioner. Position sensors are then catalogued and described and the text then focuses on control. Several forms of control are treated: shunt control, feedback control, force feedback control and feedforward control (including an appreciation of iterative learning control). Performance issues are given importance as are problems limiting that performance such as hysteresis and noise which arise in the treatment of control and are then given chapter-length attention in their own right. The reader also learns about cost functions and other issues involved in command shaping, charge drives and electrical considerations. All concepts are demonstrated experimentally including by direct application to atomic force microscope imaging. Design, Modeling and Control of Nanopositioning Systems will be of interest to researchers in mechatronics generally and in control applied to atomic force microscopy and other nanopositioning applications. Microscope developers and mechanical designers of nanopositioning devices will find the text essential reading.

Official Reference Book and Buyers' Guide

Design of Flexure Hinges

Sustainable Buildings and Structures

Two-Phase Flow for Automotive and Power Generation Sectors

Marine Propulsors

Optimization of Heat and Mass Exchange

***Ship Resistance and Propulsion provides a comprehensive approach to evaluating ship resistance and propulsion. Informed by applied research, including experimental and CFD techniques, this book provides guidance for the practical estimation of ship propulsive power for a range of ship types. Published standard series data for hull resistance and propeller performance enables practitioners to make ship power predictions based on material and data contained within the book. Fully worked examples illustrate applications of the data and powering methodologies; these include cargo and container ships, tankers and bulk carriers, ferries, warships, patrol craft, work boats, planing craft and yachts. The book is aimed at a broad readership including practising naval architects and marine engineers, seagoing officers, small craft designers, undergraduate and postgraduate students. Also useful for those involved in transportation, transport efficiency and ecologistics who need to carry out reliable estimates of ship power requirements.***

***This reference illustrates the interaction and operation of transformer and system components and spans more than two decades of technological advancement to provide an updated perspective on the increasing demands and requirements of the modern transformer industry. Guiding engineers through everyday design challenges and difficulties such as stray loss estimation and control, prediction of winding hot spots, and calculation of various stress levels and performance figures, the book propagates the use of advanced computational tools for the optimization and quality enhancement of power system transformers and encompasses every key aspect of transformer function, design, and engineering. Sustainable Development and Innovations in Marine Technologies***