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Formal Foundations for Software Engineering Methods GPU Solutions to Multi-scale Problems in Science and Engineering Advanced Computational Methods in Science and Engineering Advances in Mechanical Engineering Lightning Recent Advances in Engineering Science Applied Physics, System Science and Computers III Automated Solution of Differential Equations by the Finite Element Method Data Mining and Applications in Genomics Performance Engineering Scientific Modeling and Simulations Sparse Grids and Applications Parallel Computing in Science and Engineering High-Dimensional Partial Differential Equations in Science and Engineering Multiscale Modelling and Simulation Software Engineering for Self-Adaptive Systems Reflection and Software Engineering Applied Science and Technological Progress Engineering Self-Organising Systems High-Performance Polymers for Engineering-Based Composites Meshfree Methods for Partial Differential Equations II IAENG Transactions on Engineering Sciences Urban Science and Engineering A Framework for K-12 Science Education Mechanical Engineering Science Proceedings of the International Conference on Industrial and Manufacturing Systems (CIMS-2020) Physics for Students of Science and Engineering Functional Polymer Blends and Nanocomposites Advances in Mechanical Engineering The Leprechauns of Software Engineering Dynamics of Gambling: Origins of Randomness in Mechanical Systems Applied Research on Polymer Composites Key Technologies in Polymer Chemistry Applications of Biodegradable and Bio-Based Polymers for Human Health and a Cleaner Environment Polymers and Polymeric Composites Advances in Mechanical Engineering The Assessment of Learning in Engineering Education Advances in Mechanical Engineering Advances in Mechanical Engineering Engineering Science

Advances in Mechanical Engineering Sep 27 2019 This book draws together the most interesting recent results to emerge in mechanical engineering in Russia, providing a fascinating overview of the state of the art in the field in that country which will be of interest to a wide readership. A broad range of topics and issues in modern engineering are discussed, including dynamics of machines, materials engineering, structural strength and tribological behavior, transport technologies, machinery quality and innovations. The book comprises selected papers presented at the 8th conference "Modern Engineering: Science and Education", held at the Saint Petersburg State Polytechnic University in May 2019 with the support of the Russian Engineering Union. The authors are experts in various fields of engineering, and all of the papers have been carefully reviewed. The book will be of interest to mechanical engineers, lecturers in engineering disciplines and engineering graduates.

Reflection and Software Engineering Aug 19 2021 This book presents the state of the art of research and development of computational reflection in the context of software engineering. Reflection has attracted considerable attention recently in software engineering, particularly from object-oriented researchers and professionals. The properties of transparency, separation of concerns, and extensibility supported by reflection have largely been accepted as useful in software development and design; reflective features have been included in successful software development technologies such as the Java language. The book offers revised versions of papers presented first at a workshop held during OOPSLA'99 together with especially solicited contributions. The papers are organized in topical sections on reflective and software engineering foundations, reflective software adaptability and evolution, reflective middleware, engineering Java-based reflective languages, and dynamic reconfiguration through reflection.

Dynamics of Gambling: Origins of Randomness in Mechanical Systems Jun 04 2020 Our everyday life is influenced by many unexpected (difficult to predict) events usually referred as a chance. Probably, we all are as we are due to the accumulation point of a multitude of chance events. Gambling games that have been known to human beings nearly from the beginning of our civilization are based on chance events. These chance events have created the dream that everybody can easily become rich. This pursuit made gambling so popular. This book is devoted to the dynamics of the mechanical randomizers and we try to solve the problem why mechanical device (roulette) or a rigid body (a coin or a die) operating in the way described by the laws of classical mechanics can behave in such a way and produce a pseudorandom outcome. During mathematical lessons in primary school we are taught that the outcome of the coin tossing experiment is random and that the probability that the tossed coin lands heads (tails) up is equal to 1/2. Approximately, at the same time during physics lessons we are told that the motion of the rigid body (coin is an example of such a body) is fully deterministic.

Typically, students are not given the answer to the question Why this duality in the interpretation of the simple mechanical experiment is possible? Trying to answer this question we describe the dynamics of the gambling games based on the coin toss, the throw of the die, and the roulette run.

The Assessment of Learning in Engineering Education Nov 29 2019 Explores how we judge engineering education in order to effectively redesign courses and programs that will prepare new engineers for various professional and academic careers Shows how present approaches to assessment were shaped and what the future holds Analyzes the validity of teaching and judging engineering education Shows the integral role that assessment plays in curriculum design and implementation Examines the sociotechnical system's impact on engineering curricula

Formal Foundations for Software Engineering Methods Jan 04 2023 In this book, Hussmann builds a bridge between the pragmatic methods for the design of information systems and the formal, mathematical background. Firstly, the principal feasibility of an integration of the different methods is demonstrated. Secondly, the formalism is used as a systematic semantic analysis of the concepts in SSADM, a British standard structured software engineering method. Thirdly, a way of obtaining a hybrid formal-pragmatic specification using a combination of SSADM notations and formal (SPECTRUM) specifications is shown. This well-written book encourages scientists and software engineers to apply formal methods to practical software development problems.

Key Technologies in Polymer Chemistry Apr 02 2020 With contributions from experts from both the industry and academia, this book presents the latest developments in polymer products and chemical processes. It incorporates appropriate case studies, explanatory notes, and schematics for more clarity and better understanding. This new book: • Features a collection of articles that highlight some important areas of current interest in polymer products and chemical processes • Gives an up-to-date and thorough exposition of the present state of the art of polymer chemistry • Familiarizes readers with new aspects of the techniques used in the examination of polymers, including chemical, physicochemical, and purely physical methods of examination • Describes the types of techniques now available to the polymer chemist and technician, and discusses their capabilities, limitations, and applications • Provides a balance between materials science and mechanics aspects, basic and applied research, and high-technology and high-volume (low-cost) composite development

Multiscale Modelling and Simulation Oct 21 2021 In August 2003, ETHZ Computational Laboratory (CoLab), together with the Swiss Center for Scientific Computing in Manno and the Universit della Svizzera Italiana (USI), organized the Summer School in "Multiscale Modelling and Simulation" in Lugano, Switzerland. This summer school brought together experts in different disciplines to exchange ideas on how to link methodologies on different scales. Relevant examples of practical interest include: structural analysis of materials, flow through porous media, turbulent transport in high Reynolds number flows, large-scale molecular dynamic simulations, ab-initio physics and chemistry, and a multitude of others. Though multiple scale models are not new, the topic has recently taken on a new sense of urgency. A number of hybrid approaches are now created in which ideas coming from distinct disciplines or modelling approaches are unified to produce new and computationally efficient techniques

Automated Solution of Differential Equations by the Finite Element Method May 28 2022 This book is a tutorial written by researchers and developers behind the FEniCS Project and explores an advanced, expressive approach to the development of mathematical software. The presentation spans mathematical background, software design and the use of FEniCS in applications. Theoretical aspects are complemented with computer code which is available as free/open source software. The book begins with a special introductory tutorial for beginners. Following are chapters in Part I addressing fundamental aspects of the approach to automating the creation of finite element solvers. Chapters in Part II address the design and implementation of the FEniCS software. Chapters in Part III present the application of FEniCS to a wide range of applications, including fluid flow, solid mechanics, electromagnetics and geophysics.

Functional Polymer Blends and Nanocomposites Sep 07 2020 This book details original, theoretical, and important experimental results that use non-routine methodologies often unfamiliar to most readers. It also includes papers on novel applications of more familiar experimental techniques and analyses of composite problems. The book provides comprehensive coverage on the latest developments of research in the ever-expanding area of composite materials and their applications to broad scientific fields spanning physics, chemistry, biology, materials, and more.

Applied Physics, System Science and Computers III Jun 28 2022 This book reports on advanced theories and methods in three related fields of research: applied physics, system science and computers. The first part covers applied physics topics, such as lasers and accelerators; fluid dynamics, optics and spectroscopy, among others. It also addresses astrophysics, security, and medical and biological physics. The second part focuses on advances in computers, such as those in the area of social networks, games, internet of things, deep learning models and more. The third part is especially related to systems science, covering swarm intelligence, smart cities, complexity and more. Advances in and application of computer communication, artificial intelligence, data analysis, simulation and modeling are also addressed. The book offers a collection of contributions presented at the 3rd International Conference on Applied Physics, System Science and Computers (APSAC), held in Dubrovnik, Croatia on September 26–28, 2018. Besides presenting new methods, it is also intended to promote collaborations between different communities working on related topics at the interface between physics, computer science and engineering.

The Leprechauns of Software Engineering Jul 06 2020 The software profession has a problem, widely recognized but which nobody seems willing to do anything about; a variant of the well known "telephone game", where some trivial rumor is repeated from one person to the next until it has become distorted beyond recognition and blown up out of all proportion. Unfortunately, the objects of this telephone game are generally considered cornerstone truths of the discipline, to the point that their acceptance now seems to hinder further progress. This book takes a look at some of those "ground truths" the claimed 10x variation in productivity between developers; the "software crisis"; the cost-of-change curve; the "cone of uncertainty"; and more. It assesses the real weight of the evidence behind these ideas - and confronts the scary prospect of moving the state of the art forward in a discipline that has had the ground kicked from under it.

Advances in Mechanical Engineering Oct 01 2022 This book draws together the most interesting recent results to emerge in mechanical engineering in Russia, providing a fascinating overview of the state of the art in the field in that country which will be of interest to a wide readership. A broad range of topics and issues in modern engineering are discussed, including dynamics of machines, materials engineering, structural strength and tribological behavior, transport technologies, machinery quality and innovations. The book comprises selected papers presented at the 7th conference "Modern Engineering: Science and Education", held at the Saint Petersburg State Polytechnic University in May 2018 with the support of the Russian Engineering Union. The authors are experts in various fields of engineering, and all of the papers have been carefully reviewed. The book will be of interest to mechanical engineers, lecturers in engineering disciplines and engineering graduates.

Urban Science and Engineering Feb 10 2021 This book comprises select proceedings of the First International Conference on Urban Science and Engineering. The focus of the conference was on the milieu of urban planning while applying technology which ensures better urban life, coupled with sensitivity to depleting natural resources and focus on sustainable development. The contents focus on sustainable infrastructure, mobility and planning, urban water and sanitization, green construction materials, optimization and innovation in structural design, and more. This book aims to provide up-to-date and authoritative knowledge from both industrial and academic worlds, sharing best practice in the field of urban science and engineering. This book is beneficial to students, researchers, and professionals working in the field of smart materials and sustainable development. ^

GPU Solutions to Multi-scale Problems in Science and Engineering Dec 03 2022 This book covers the new topic of GPU computing with many applications involved, taken from diverse fields such as networking, seismology, fluid mechanics, nano-materials, data-mining, earthquakes, mantle convection, visualization. It will show the public why GPU computing is important and easy to use. It will offer a reason why GPU computing is useful and how to implement codes in an everyday situation.

A Framework for K-12 Science Education Jan 12 2021 Science, engineering, and technology permeate nearly every facet of modern life and hold the key to solving many of humanity's most pressing current and future challenges. The United States' position in the global economy is declining, in part because U.S. workers lack fundamental knowledge in these fields. To address the critical issues of U.S. competitiveness and to better prepare the workforce, A Framework for K-12 Science Education proposes a new approach to K-12 science education that will capture students' interest and provide them with the necessary foundational knowledge in the field. A Framework for K-12 Science Education outlines a broad set of expectations for students in science and engineering in grades K-12. These expectations will inform the development of new standards for K-12 science education and, subsequently, revisions to curriculum, instruction, assessment, and professional development for educators. This book identifies three dimensions that convey the core ideas and practices around which science and engineering education in these grades should be built. These three dimensions are: crosscutting concepts that unify the study of science through their common application across science and engineering; scientific and engineering practices; and disciplinary core ideas in the physical sciences, life sciences, and earth and space sciences and for engineering, technology, and the applications of science. The overarching goal is for all high school graduates to have sufficient knowledge of science and engineering to engage in public discussions on science-related issues, be careful consumers of scientific and technical information, and enter the careers of their choice. A Framework for K-12 Science Education is the first step in a process that can inform state-level decisions and achieve a research-grounded basis for improving science instruction and learning across the country. The book will guide standards developers, teachers, curriculum designers, assessment developers, state and district science administrators, and educators who teach science in informal environments.

Data Mining and Applications in Genomics Apr 26 2022 Data Mining and Applications in Genomics contains the data mining algorithms and their applications in genomics, with frontier case studies based on the recent and current works at the University of Hong Kong and the Oxford University Computing Laboratory, University of Oxford. It provides a systematic introduction to the use of data mining algorithms as an investigative tool for applications in genomics. Data Mining and Applications in Genomics offers state of the art of tremendous advances in data mining algorithms and applications in genomics and also serves as an excellent reference work for researchers and graduate students working on data mining algorithms and applications in genomics.

Scientific Modeling and Simulations Feb 22 2022 Although computational modeling and simulation of material deformation was initiated with the study of structurally simple materials and inert environments, there is an increasing demand for predictive simulation of more realistic material structure and physical conditions. In particular, it is recognized that applied mechanical force can plausibly alter chemical reactions inside materials or at material interfaces, though the fundamental reasons for this chemomechanical coupling are studied in a material-specific manner. Atomistic-level simulations can provide insight into the unit processes that facilitate kinetic reactions within complex materials, but the typical nanosecond timescales of such simulations are in contrast to the second-scale to hour-scale timescales of experimentally accessible or technologically relevant timescales. Further, in complex materials these key unit processes are “rare events” due to the high energy barriers associated with those processes. Examples of such rare events include unbinding between two proteins that tether biological cells to extracellular materials [1], unfolding of complex polymers, stiffness and bond breaking in amorphous glass fibers [2], and diffusive hops of point defects within crystalline alloys [3].

High-Performance Polymers for Engineering-Based Composites May 16 2021 High-Performance Polymers for Engineering-Based Composites presents a selection of investigations and innovative research in polymer chemistry and advanced materials. The book includes case studies in the field of nanocomposites. The volume provides coverage of new research in polymer science and engineering with applications in chemical engineering, materials science, and chemistry. In addition to synthetic polymer chemistry, it also looks at the properties of polymers in various states (solution, melt, solid). The chapters provide a survey of the important categories of polymers including commodity thermoplastics and fibers, elastomers and thermosets, and engineering and specialty polymers. Basic polymer processing principles are explained as well as in-depth descriptions of the latest polymer applications in different industrial sectors. This new book reviews the field’s current state and emerging advances. With contributions from experts from both the industry and academia, this book presents the latest developments in polymer products and chemical processes.

Meshfree Methods for Partial Differential Equations II Apr 14 2021 The numerical treatment of partial differential equations with particle methods and meshfree discretization techniques is a very active research field both in the mathematics and engineering community. Due to their independence of a mesh, particle schemes and meshfree methods can deal with large geometric changes of the domain more easily than classical discretization techniques. Furthermore, meshfree methods offer a promising approach for the coupling of particle models to continuous models. This volume of LNCSE is a collection of the papers from the proceedings of the Second International Workshop on Meshfree Methods held in September 2003 in Bonn. The articles address the different meshfree methods (SPH, PUM, GFEM, EFGM, RKPM, etc.) and their application in applied mathematics, physics and engineering. The volume is intended to foster this new and exciting area of interdisciplinary research and to present recent advances and results in this field.

Software Engineering for Self-Adaptive Systems Sep 19 2021 The carefully reviewed papers in this state-of-the-art survey describe a wide range of approaches coming from different strands of software engineering, and look forward to future challenges facing this ever-resurgent and exacting field of research.

IAENG Transactions on Engineering Sciences Mar 14 2021 Two large international conferences on Advances in Engineering Sciences were held in Hong Kong, March 12–14, 2014, under the International MultiConference of Engineers and Computer Scientists (IMECS 2014), and in London, UK, 2–4 July, 2014, under the World Congress on Engineering 2014 (WCE 2014) respectively. This volume contains 37 revised and extended research articles written by prominent researchers participating in the conferences. Topics covered include engineering mathematics, computer science, electrical engineering, manufacturing engineering, industrial engineering, and industrial applications. The book offers tremendous state-of-the-art advances in engineering sciences and also serves as an excellent reference work for researchers and graduate students working with/on engineering sciences. Contents: Switching Boundaries for Flexible Management of Natural Resource Investment under Uncertainty (T Tarnopolskaya, W Chen and C Bao) Using Exotic Option Prices as Control Variates in Monte Carlo Pricing Under a Local-Stochastic Volatility Model (Geoffrey Lee, Zili Zhu and Yu Tian) Multi-period Dynamic Portfolio Optimization through Least Squares Learning (C Bao, Z Zhu, N Langrené and G Lee) On General Solution of Incompressible and Isotropic Newtonian Fluid Equations (A A Maknickas) On the Inversion of Vandermonde Matrix via Partial Fraction Decomposition (Yiu Kwong Man) Fractal Fourier Coefficients with Application to Identification Protocols (Nadia M G Al-Saidi, Arkan J Mohammed, Elisha A Ogada and Adil M Ahmed) Scheduling Algorithm with Inserted Idle Time for Problem P_{prec}/C_{max} (N S Grigoreva) Iterative Scheme for a Common Solutions of Equilibrium Problems, Variational Inequality Problems and Fixed Point Problems (Wichan Khongtham) Three-steps Iterative Method for Common Fixed Points, Variational Inclusions, and Equilibrium Problems (Yaowaluck Khongtham) Euler's Constant: A Proof of its Irrationality and Transcendence by means of Minus One Factorial (Okoh Ufuoma) Solution of Problem on Heat and Mass Transfer with Chemical Reaction over an Exponentially Accelerated Infinite Vertical Plate (A Ahmed, M N Sarki and M Ahmad) Improving Human Resource Security of a Data Centre: Case Study of a Hong Kong Wines and Spirits Distribution Company (Hon Keung Yau and Alison Lai Fong Cheng) Model to Measure University's Readiness for Establishing Spin-offs: Comparison Study (Wahyudi Sutopo, Rina Wiji Astuti, Yuniarstanto, Agus Purwanto and Muhammad Nizam) Preliminary Study of Solar Electricity using Comparative Analysis (Wahyudi Sutopo, Dwi Indah Maryanie, Agus Purwanto and Muhammad Nizam) Tactile Memory for Different Shapes: Implications for Shape Coding in Man-machine Interfaces (Annie W Y Ng and Alan H S Chan) Ergonomics Recommendations for Control Station Work with Head Rotation (Steven N H Tsang, Stefanie X Q Kang and Alan H S Chan) A Methodological Approach to Affective Design (Youngil Cho and Sukyoung Kim) Data Analysis by Diminishing Rates of Change and $\frac{1}{2}$ Approximation (I C Demetriou and S S Papakonstantinou) Comparing Naïve-Bayes Network Structures over Multiple Dataset (Haruna Chiroma, Abdulsalam Ya'u Gital, Adamu I Abubakar, Sanah Abdullahi Muaz, Jaafar Z Maitama and Tutut Herawan) Route Recommendation Method Based on Driver's Estimated Intention Considering Route Selection with Car Navigation (Keisuke Hamada, Shinsuke Nakajima, Daisuke Kitayama and Kazutoshi Sumiya) Adaption of the Inertia Weight using a Novel Sine-based Chaotic Map for Particle Swarm Optimization (Yu-Huei Cheng) Fast Characterization of Intravascular Tissue by Subspace Method using Target Tissue's Neighborhood Information (Shota Furukawa, Eiji Uchino, Shinichi Miwa and Noriaki Suetake) Swarm Intelligent Control Object's Movement Simulation in Net-centric Environment using Neural Networks (Viacheslav Abrosimov) The Concept of Project Time Management with the Fuzzy Buffers Approach (B?aszczyk Pawe? and B?aszczyk Tomasz) Data Driven Methods for Adaptation of ASR Systems (Akella Amarendra Babu, Yellasiri Ramadevi and Akepogu Ananda Rao) Semantic Web Improved by Including Class Information with the TFIDF Algorithm (Jyoti Gautam and Ela Kumar) Urban Drainage in the Metropolitan Region of Belém, Brazil: An Urbanistic Study (Juliano Pamplona Ximenes Ponte and Ana Júlia Domingues Das Neves Brandão) Finger Based Techniques for Nonvisual Touchscreen Text Entry (Mohammed Fakrudeen, Sufian Yousef, Mahdi H Miraz and Abdelrahman Hamza Hussein) LTE Downlink and Uplink Physical Layer (Temitope O Takpor and Francis E Idachaba) New Dielectric Modulated Graphene (DMG) FET-Based Sensor for High-performance Biomolecule Sensing Applications (Faycal Djeflal, Abdelhamid Benhaya, Khalil Tamersit and Mohamed Meguellati) Modelling and Optimization of Avalanche Photodiode Electrical Parameters using Multiobjective Genetic Algorithm (Toufik Bendib, Lucio Pancheri, Faycal Djeflal and Gian-Franco Dalla Betta) Experimental Study of Impact of Ship Electric Power Plant Configuration and Load Variation on Power Quality in the Ship Power Systems (Tomasz Tarasiuk, Andrzej Pilat, Mariusz Szweda, Mariusz Gorniak and Zenon Troka) Studying of Electroencephalographic Signal Changes Induced by Odor Exposure (Rita Jorge Cerqueira Pinto, Isabel Patrícia Pinheiro Peixoto Xavier, Maria Do Rosário Alves Calado and Sílvio José Pinto Simões Mariano) DC Motor Speed Control using FGPA (Ahmed Telba) Pellistor Gas Sensor Performance: Interface Circuitry Analysis (Hauwa Talatu Abdulkarim) Extended Research on Prefilter Bandwidth Effects in Asynchronous Sequential Symbol Synchronizers based on Pulse Comparison by both Transitions at Half Bit Rate (Antonio D Reis, Jose F Rocha, Atilio S Gameiro and Jose P Carvalho) Models of Organizational Change for Modernizing Pollution Warning Services (Anca Daniela Ionita and Mariana Mocanu) Readership: Professionals, academics and graduate students in electrical & electronic engineering, computer engineering, industrial engineering and mathematics. Key Features: This volume contains revised and extended research articles written by prominent researchers participating in the conferences. The book offers the state of art of tremendous advances in engineering sciences. The book can also serve as an excellent reference work for researchers and graduate students working with/on engineering sciences. Keywords: Engineering Mathematics; Computer Science; Electrical Engineering; Manufacturing Engineering; Industrial Engineering; Industrial Applications

Applied Science and Technological Progress Jul 18 2021

High-Dimensional Partial Differential Equations in Science and Engineering Nov 21 2021 High-dimensional spatio-temporal partial differential equations are a major challenge to scientific computing of the future. Up to now deemed prohibitive, they have recently become manageable by combining recent developments in numerical techniques, appropriate computer implementations, and the use of computers with parallel and even massively parallel architectures. This opens new perspectives in many fields of applications. Kinetic plasma physics equations, the many body Schrodinger equation, Dirac and Maxwell equations for molecular electronic structures and nuclear dynamic computations, options pricing equations in mathematical finance, as well as Fokker-Planck and fluid dynamics equations for complex fluids, are examples of equations that can now be handled. The objective of this volume is to bring together contributions by experts of international stature in that broad spectrum of areas to confront their approaches and possibly bring out common problem formulations and research directions in the numerical solutions of high-dimensional partial differential equations in various fields of science and engineering with special emphasis on chemistry and physics. Information for our distributors: Titles in this series are co-published with the Centre de Recherches Mathématiques.

Parallel Computing in Science and Engineering Dec 23 2021 It was the aim of the conference to present issues in parallel computing to a community of potential engineering/scientific users. An overview of the state-of-the-art in several important research areas is given by leading scientists in their field. The classification question is taken up at various points, ranging from parametric characterizations, communication structure, and memory distribution to control and execution schemes. Central issues in multiprocessing hardware and operation, such as scalability, techniques of overcoming memory latency and synchronization overhead, as well as fault tolerance of communication networks are discussed. The problem of designing and debugging parallel programs in a user-friendly environment is addressed and a number of program transformations for enhancing vectorization and parallelization in a variety of program situations are described. Two different algorithmic techniques for the solution of certain classes of partial differential equations are discussed. The properties of domain-decomposition algorithms and their mapping onto a CRAY-XMP-type architecture are investigated and an overview is given of the merit of various approaches to exploiting the acceleration potential of multigrid methods. Finally, an abstract performance modeling technique for the behavior of applications on parallel and vector architectures is described.

Engineering Science Aug 26 2019 Comprehensive engineering science coverage that is fully in line with the latest vocational course requirements. New chapters on heat transfer and fluid mechanics. Topic-based approach ensures that this text is suitable for all vocational engineering courses. Coverage of all the mechanical, electrical and electronic principles within one volume provides a comprehensive exploration of scientific principles within engineering. Engineering Science is a comprehensive textbook suitable for all vocational and pre-degree courses. Taking a subject-led approach, the essential scientific principles engineering students need for their studies are topic-by-topic based in presentation. Unlike most of the textbooks available for this subject, Bill Bolton goes beyond the core science to include the mechanical, electrical and electronic principles needed in the majority of courses. A concise and accessible text is supported by numerous worked examples and problems, with a complete answer section at the back of the book. Now in its sixth edition, the text has been fully updated in line with the current BTEC National syllabus and will also prove an essential reference for students embarking on Higher National engineering qualifications and Foundation Degrees.

Sparse Grids and Applications Jan 24 2022 In the recent decade, there has been a growing interest in the numerical treatment of high-dimensional problems. It is well known that classical numerical discretization schemes fail in more than three or four dimensions due to the curse of dimensionality. The technique of sparse grids helps overcome this problem to some extent under suitable regularity assumptions. This discretization approach is obtained from a multi-scale basis by a tensor product construction and subsequent truncation of the resulting multiresolution series expansion. This volume of LNCSE is a collection of the papers from the proceedings of the workshop on sparse grids and its applications held in Bonn in May 2011. The selected articles present recent advances in the mathematical understanding and analysis of sparse grid discretization. Aspects arising from applications are given particular attention.

Physics for Students of Science and Engineering Oct 09 2020 Physics for Students of Science and Engineering is a calculus-based textbook of introductory physics. The book reviews standards and nomenclature such as units, vectors, and particle kinetics including rectilinear motion, motion in a plane, relative motion. The text also explains particle dynamics, Newton's three laws, weight, mass, and the application of Newton's laws. The text reviews the principle of conservation of energy, the conservative forces (momentum), the nonconservative forces (friction), and the fundamental quantities of momentum (mass and velocity). The book examines changes in momentum known as impulse, as well as the laws in momentum conservation in relation to explosions, collisions, or other interactions within systems involving more than one particle. The book considers the mechanics of fluids, particularly fluid statics, fluid dynamics, the characteristics of fluid flow, and applications of fluid mechanics. The text also reviews the wave-particle duality, the uncertainty principle, the probabilistic interpretation of microscopic particles (such as electrons), and quantum theory. The book is an ideal source of reference for students and professors of physics, calculus, or related courses in science or engineering.

Proceedings of the International Conference on Industrial and Manufacturing Systems (CIMS-2020) Nov 09 2020 In order to deal with the societal challenges novel technology plays an important role. For the advancement of technology, Department of Industrial and Production Engineering under the aegis of NIT Jalandhar is organizing an “International Conference on Industrial and Manufacturing Systems” (CIMS-2020) from 26th -28th June, 2020. The present conference aims at providing a leading forum for sharing original research contributions and real-world developments in the field of Industrial and Manufacturing Systems so as to contribute its share for technological advancements. This volume encloses various manuscripts having its roots in the core of industrial and production engineering. Globalization provides all around development and this development is impossible without technological contributions. CIMS-2020, gathered the spirits of various academicians, researchers, scientists and practitioners, answering the vivid issues related to optimisation in the various problems of industrial and manufacturing systems.

Polymers and Polymeric Composites Jan 30 2020 This volume highlights the latest developments and trends in advanced polyblends and their structures. It presents the developments of advanced polyblends and respective tools to characterize and predict the material properties and behavior. The book

provides important original and theoretical experimental results that use non-routine methodologies often unfamiliar to many readers. Furthermore chapters on novel applications of more familiar experimental techniques and analyses of composite problems are included, which indicate the need for the new experimental approaches that are presented. Technical and technological development demands the creation of new materials that are stronger, more reliable, and more durable—materials with new properties. Up-to-date projects in creation of new materials go along the way of nanotechnology. With contributions from experts from both the industry and academia, this book presents the latest developments in the identified areas. This book incorporates appropriate case studies, explanatory notes, and schematics for more clarity and better understanding. The book is designed as a textbook for postgraduate students, as a teaching support for the faculty, as a reference book for early research career beginners, and as a reference book for the scientific community at large for understanding the significance of modern materials and chemical engineering. This book will be useful for chemists, chemical engineers, technologists, and students interested in advanced nano-polymers with complex behavior and their applications This new book: • Gives an up-to-date and thorough exposition of the present state of the art of polyblends and composites • Familiarizes the reader with new aspects of the techniques used in the examination of polymers, including chemical, physicochemical, and purely physical methods of examination • Describes the types of techniques now available to the polymer chemist and technician and discusses their capabilities, limitations, and applications • Provides a balance between materials science and mechanics aspects, basic and applied research, and high-technology and high-volume (low-cost) composite development

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Lightning Aug 31 2022 This book highlights the essential theoretical and practical aspects of lightning, lightning protection, safety and education. Additionally, several auxiliary topics that are required to understand the core themes are also included. The main objective of the contents is to enlighten the scientists, researchers, engineers and social activists (including policy makers) in developing countries regarding the key information related to lightning and thunderstorms. A majority of developing countries are in tropics where the lightning characteristics are somewhat different from those in temperate regions. The housing structures and power/communication networks, and human behavioural patterns(that depends on socio-economic parameters) in these countries are also different from those in the developed world. As the existing books on similar themes address only those scenarios in developed countries, this book serves a vast spectrum of readership in developing world who seek knowledge in the principles of lightning and a practical guidance on lightning protection and safety education.

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Applications of Biodegradable and Bio-Based Polymers for Human Health and a Cleaner Environment Mar 02 2020 The world faces significant challenges as the population and consumption continue to grow while nonrenewable fossil fuels and other raw materials are depleted at ever-increasing rates. This informative volume provides a technical approach to address these issues using green design and analysis. It takes an interdisciplinary look at concepts that can be applied across engineering disciplines in the development of products, processes, and systems to minimize environmental impacts across all life cycle phases. Topics include polymers for pollutant removal, wood-based biopolymers, bio-based polymers for drug formulations, biomaterial-based medical implants, biodegradability of biopolymer materials, bio-based polymers for food packaging applications, biodegradable polymers for tissue engineering applications, and more.

Advanced Computational Methods in Science and Engineering Nov 02 2022 The aim of the present book is to show, in a broad and yet deep way, the state of the art in computational science and engineering. Examples of topics addressed are: fast and accurate numerical algorithms, model-order reduction, grid computing, immersed-boundary methods, and specific computational methods for simulating a wide variety of challenging problems, problems such as: fluid-structure interaction, turbulent flames, bone-fracture healing, micro-electro-mechanical systems, failure of composite materials, storm surges, particulate flows, and so on. The main benefit offered to readers of the book is a well-balanced, up-to-date overview over the field of computational science and engineering, through in-depth articles by specialists from the separate disciplines.

Performance Engineering Mar 26 2022 Initially, computer systems performance analyses were carried out primarily because of limited resources. Due to ever increasing functional complexity of computational systems and user requirements, performance engineering continues to play a major role in software development. This book assesses the state of the art in performance engineering. Besides revised chapters drawn from two workshops on performance engineering held in 2000, additional chapters were solicited in order to provide complete coverage of all relevant aspects. The first part is devoted to the relation between software engineering and performance engineering; the second part focuses on the use of models, measures, and tools; finally, case studies with regard to concrete technologies are presented. Researchers, professional software engineers, and advanced students interested in performance analysis will find this book an indispensable source of information and reference.

Mechanical Engineering Science Dec 11 2020

Recent Advances in Engineering Science Jul 30 2022 The 25th Anniversary Meeting of the Society of Engineering Science was held as a joint conference with the Applied Mechanics Division of the American Society of Mechanical Engineers at the University of California, Berkeley from June 20-22, 1988. With the encouragement and support of the SES, we decided to organize a symposium in honor of A. C. Eringen: the founding president of the Society of Engineering Science who provided pioneering leadership during the critical first decade of the Society's existence. We felt that there was no better way to do this than with a Symposium on Engineering Science -- the field that A. C. Eringen has devoted his life to. Professor Eringen had the foresight, even in his own early work, to see the need for an intimate amalgamation of engineering and science (transcending the bounds of the traditional engineering disciplines) to address unsolved problems of technological importance. Sustained by the belief that there was the need to provide a forum for researchers who had embraced this broader interdisciplinary approach, Professor Eringen founded the Society of Engineering Science and the International Journal of Engineering Science in 1963. Since that time, he has made countless contributions to the advancement of engineering science through his research, educational and organizational activities. The participants in the Symposium were former students and colleagues of Professor Eringen who have been strongly influenced by his professional activities and research in engineering science.

Applied Research on Polymer Composites May 04 2020 This new volume presents leading-edge research in the rapidly changing and evolving field of polymer science as well as on chemical processing. The topics in the book reflect the diversity of research advances in the production and application of modern polymeric materials and related areas, focusing on the preparation, characterization, and applications of polymers. Also covered are various manufacturing techniques. The book helps to fill the gap between theory and practice in industry. The book introduces current state-of-the-art technology in modern materials with an emphasis on the rapidly growing technologies. It takes a unique approach by presenting specific materials and then progresses into a discussion of the ways in which these materials and processes are integrated into today's functioning manufacturing industry. Readers will also discover how material properties relate to the process variables in a given process as well as how to perform quantitative engineering analysis of manufacturing processes.

Advances in Mechanical Engineering Oct 28 2019 This book draws together the most interesting recent results to emerge in mechanical engineering in Russia, providing a fascinating overview of the state of the art in the field in that country which will be of interest to a wide readership. A broad range of topics and issues in modern engineering are discussed, including dynamics of machines, materials engineering, structural strength, transport technologies, machinery quality and innovations. The book comprises selected papers presented at the 9th conference "Modern Engineering: Science and Education", held at the Peter the Great Saint Petersburg Polytechnic University in June 2020 with the support of the Russian Engineering Union. The authors are experts in various fields of engineering, and all of the papers have been carefully reviewed. The book will be of interest to mechanical engineers, lecturers in engineering disciplines and engineering graduates.

Engineering Self-Organising Systems Jun 16 2021 Self-organisation, self-regulation, self-repair, and self-maintenance are promising conceptual approaches to deal with the ever increasing complexity of distributed interacting software and information handling systems. Self-organising applications are able to dynamically change their functionality and structure without direct user intervention to respond to changes in requirements and the environment. This book comprises revised and extended papers presented at the International Workshop on Engineering Self-Organising Applications, ESOA 2004, held in New York, NY, USA in July 2004 at AAMAS as well as invited papers from leading researchers. The papers are organized in topical sections on state of the art, synthesis and design methods, self-assembly and robots, stigmergy and related topics, and industrial applications.

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