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C79 - KAELYN COWAN

Engineering Principles of Mechanical Vibration, 4th Edition was written for use in introductory senior level undergraduate and intermediate level graduate mechanical vibration courses. Students who use this textbook should have an understanding of rigid body dynamics and ordinary differential equations. Mechanical vibration concepts presented in this textbook can be used to address real world vibration problems. Ordinary differential equations are developed and solution methods are presented that describe the motions of vibration systems comprised of mass, spring and damping elements. Partial differential equations are developed and solution methods are presented that describe the motions of vibration systems comprised of strings, beams, membranes and thin plates. The solution methods address vibration systems that are excited by system initial conditions and by periodic, complex periodic, non-periodic and random vibration signals. Information is presented that addresses vibration transducers and measurement instrumentation, the digital processing of vibration signals, and analytical and experimental modal analyses. This textbook presents design criteria and concepts and related system components used to develop vibration isolation systems for mechanical equipment in buildings.

This book provides an invaluable reference to Piezoelectric Accelerometers with Integral Electronics (IEPE). It describes the design and performance parameters of IEPE accelerometers and their key elements, PE transducers and FET-input amplifiers. Coverage includes recently designed, low-noise and high temperature IEPE accelerometers. Readers will benefit from the detailed noise analysis of the IEPE accelerometer, which enables estimation of its noise floor and noise limits. Other topics useful for de-

signers of low-noise, high temperature silicon-based electronics include noise analysis of FET amplifiers, experimental investigation and comparison of low-frequency noise in different JFETs and MOSFETs, and ultra-low-noise JFETs (at level of 0.6 nV/√Hz). The discussion also includes ultra-low-noise (at level of 3 ng/√Hz) seismic IEPE accelerometers and high temperature (up to 175°C) triaxial and single axis miniature IEPE accelerometers, along with key factors for their design. • Provides a comprehensive reference to the design and performance of IEPE accelerometers, including low-noise and high temperature IEPE sensors; • Includes noise analysis of the IEPE accelerometer, which enables estimation of the its noise floor and noise limits; • Describes recently design of ultra-low-noise (at level of 3 ng/√Hz) IEPE seismic accelerometers and high temperature (up to 175°C) triaxial and single axis miniature IEPE accelerometers; • Compares low-frequency noise in different JFETs and MOSFETs including measurement results of ultra-low-noise (at level of 0.6 nV/√Hz) JFET; • Presents key factors for design of low-noise and high temperature IEPE accelerometer and their electronics.

Independent living with smart technologies Smart Technology for Aging, Disability, and Independence: The Stateof the Science brings together current research and technologicaldevelopments from engineering, computer science, and therehabilitation sciences, detailing how its applications can promotecontinuing independence for older persons and those withdisabilities. Leading experts from multiple disciplines worldwide havecontributed to this volume, making it the definitive resource. Thetext begins with a thorough introduction that presents importantconcepts, defines key terms, and identifies demographic trends atwork. Using detailed product descriptions, photographs andillustrations, and case studies, subsequent chapters discusscutting-edge technologies, including: * Wearable systems * Human-computer interactions * Assisted vision and hearing * Smart wheelchairs * Hand-held devices and smart phones * Visual sensors * Home automation * Assistive robotics * In-room monitoring systems * Tele-health After considering specific high-technology solutions, the textexamines recent trends in other critical areas, such as basicassistive technologies, driving, transportation and communitymobility, home modifications and design, and changing standards ofelder care. Students and professionals in the rehabilitation sciences, healthcare providers, researchers in computer science and engineering,and non-expert readers will all appreciate this text's thoroughcoverage and clear presentation of the state of the science.

This book provides a dual perspective on the Internet of Things and ubiquitous computing, along with their applications in healthcare and smart cities. It also covers other interdisciplinary aspects of the Internet of Things like big data, embedded Systems and wireless Sensor Networks. Detailed coverage of the underlying architecture, framework, and state-of the art methodologies form the core of the book.

This book explains physical principles, unique benefits, broad categories, implementation aspects, and performance criteria of distributed optical fiber sensors (DOFS). For each kind of sensor, the book highlights industrial applications, which range from oil and gas production to power line monitoring, plant and process engineering, environmental monitoring, industrial fire and leakage de-

tection, and so on. The text also includes a discussion of such key areas as backscattering, launched power limitations, and receiver sensitivity, as well as a concise historical account of the field's development.

Ultra-precision machining is a promising solution for achieving excellent machined surface quality and sophisticated micro/-nano-structures that influence the applications of components and devices. Further, given the ultrathin layer of material removed, it is a highly coupled process between cutting tool and material. In this book, scientists in the fields of mechanical engineering and materials science from China, Ukraine, Japan, Singapore present their latest research findings regarding the simulation and experiment of material-oriented ultra-precision machining. Covering various machining methods (cutting, grinding, polishing, ion beam and laser machining) and materials (metal, semiconductor and hard-brittle ceramics), it mainly focuses on the evaluation of the fundamental mechanisms and their implementation in processing optimization for different materials. It is of significant theoretical and practical value for guiding the fabrication of ultra-smooth and functional surfaces using ultra-precision machining.

Within the past few decades, several micro and nano-electromechanical (MEMS and NEMS) accelerometers, magnetometers and vibration sensors utilizing various actuation and sensing mechanisms have been developed and demonstrated. These sensors are integral to various geographical, industrial, military, environmental and biomedical applications. Although these sensors based on MEMS technology have been successfully commercialized and are widely used, this dissertation focuses on novel approaches to enhance the performance of such sensors drastically. In most cases for the MEMS accelerometer, the large power consumption of MEMS sensors is attributed to the analog front end needed for reading, processing, and analog to digital conversion of the sensor output, which is typically responsible for most to all the power consumption of the whole sensor. The proposed effort in this dissertation aims at development of a new class of digitally readable MEMS accelerometers allowing significant power reduction by eliminating the need for the analog front-end. Conventional magnetometers that offer high sensitivities for fields smaller than a few nT's are not MEMS compatible and cannot undergo miniaturization. MEMS Magnetometers have an edge over conventional counterparts due to their unique features such as small size, low cost, lower power consumption and simplicity of operation. Such properties offer unrivalled advantages, especially when it comes to medical applications, such as magneto-encephalography, where compact arrays of ultra-sensitive sensors are desirable. This dissertation demonstrates ultra-high sensitivities (noise floor in $pT/\sqrt{Hz}$) for a Lorentz force resonant MEMS magnetometer enabled by internal-thermal piezoresistive vibration amplification. A detailed model of the magneto-thermo-electro-mechanical internal amplification is also developed and studied. Frequency modulation of a Lorentz force MEMS magnetometer for enhanced sensitivity using a leverage mechanism has also been explored. Currently, no low cost, low power, and compact vibration sensor solution exists that can provide frequency distribution data for the measured vibrations This dissertation implements and characterizes building blocks of a low-power miniaturized vibration spec-

trum analyzer with a resolution of 1mg over a wide frequency range (0-10kHz) using an existing Texas Instruments CMOS process, without adding any complex post processing fabrication steps.

This basic source for identification of U.S. manufacturers is arranged by product in a large multi-volume set. Includes: Products & services, Company profiles and Catalog file.

Specific, practical guidance for every individual involved with solving process machinery problems. The single source reference for explanations of fundamental machinery behavior, static and dynamic measurements, plus data acquisition, processing and interpretation. A variety of lateral and torsional analytical procedures, and physical tests are presented and discussed.

Vols. for 1970-71 includes manufacturers' catalogs.

This book presents best selected papers presented at the 4th International Conference on Smart Computing and Informatics (SCI 2020), held at the Department of Computer Science and Engineering, Vasavi College of Engineering (Autonomous), Hyderabad, Telangana, India. It presents advanced and multi-disciplinary research towards the design of smart computing and informatics. The theme is on a broader front which focuses on various innovation paradigms in system knowledge, intelligence and sustainability that may be applied to provide realistic solutions to varied problems in society, environment and industries. The scope is also extended towards the deployment of emerging computational and knowledge transfer approaches, optimizing solutions in various disciplines of science, technology and health care.

Exciting new developments are enabling sensors to go beyond the realm of simple sensing of movement or capture of images to deliver information such as location in a built environment, the sense of touch, and the presence of chemicals. These sensors unlock the potential for smarter systems, allowing machines to interact with the world around them in more intelligent and sophisticated ways. Featuring contributions from authors working at the leading edge of sensor technology, Technologies for Smart Sensors and Sensor Fusion showcases the latest advancements in sensors with biotechnology, medical science, chemical detection, environmental monitoring, automotive, and industrial applications. This valuable reference describes the increasingly varied number of sensors that can be integrated into arrays, and examines the growing availability and computational power of communication devices that support the algorithms needed to reduce the raw sensor data from multiple sensors and convert it into the information needed by the sensor array to enable rapid transmission of the results to the required point. Using both SI and US units, the text: Provides a fundamental and analytical understanding of the underlying technology for smart sensors Discusses groundbreaking software and sensor systems as well as key issues surrounding sensor fusion Exemplifies the richness and diversity of development work in the world of smart sensors and sensor fusion Offering fresh insight into the sensors of the future, Technologies for Smart Sensors and Sensor Fusion not only exposes readers to trends but also inspires innovation in smart sensor and sensor system development.

The International Conference on Intelligent Computing (ICIC) was formed to p- vide an annual forum dedicated to the emerging and

challenging topics in artificial intelligence, machine learning, bioinformatics, and computational biology, etc. It aims to bring together researchers and practitioners from both academia and ind- try to share ideas, problems and solutions related to the multifaceted aspects of intelligent computing. ICIC 2008, held in Shanghai, China, September 15–18, 2008, constituted the 4th International Conference on Intelligent Computing. It built upon the success of ICIC 2007, ICIC 2006 and ICIC 2005 held in Qingdao, Kunming and Hefei, China, 2007, 2006 and 2005, respectively. This year, the conference concentrated mainly on the theories and methodologies as well as the emerging applications of intelligent computing. Its aim was to unify the picture of contemporary intelligent computing techniques as an integral concept that highlights the trends in advanced computational intelligence and bridges theoretical research with applications. Therefore, the theme for this conference was "Emerging Intelligent Computing Technology and Applications". Papers focusing on this theme were solicited, addressing theories, methodologies, and applications in science and technology.

The two-volume set IFIP AICT 566 and 567 constitutes the refereed proceedings of the International IFIP WG 5.7 Conference on Advances in Production Management Systems, APMS 2019, held in Austin, TX, USA. The 161 revised full papers presented were carefully reviewed and selected from 184 submissions. They discuss globally pressing issues in smart manufacturing, operations management, supply chain management, and Industry 4.0. The papers are organized in the following topical sections: lean production; production management in food supply chains; sustainability and reconfigurability of manufacturing systems; product

and asset life cycle management in smart factories of industry 4.0; variety and complexity management in the era of industry 4.0; participatory methods for supporting the career choices in industrial engineering and management education; blockchain in supply chain management; designing and delivering smart services in the digital age; operations management in engineer--to-order manufacturing; the operator 4.0 and the Internet of Things, services and people; intelligent diagnostics and maintenance solutions for smart manufacturing; smart supply networks; production management theory and methodology; data-driven production management; industry 4.0 implementations; smart factory and IIOT; cyber-physical systems; knowledge management in design and manufacturing; collaborative product development; ICT for collaborative manufacturing; collaborative technoloy; applications of machine learning in production management; and collaborative technology.

The urgent need to keep pace with the accelerating globalization of manufacturing in the 21st century has produced rapid advancements in manufacturing technology, research and expertise. This book presents the proceedings of the 14th International Conference on Manufacturing Research (ICMR 2016), entitled Advances in Manufacturing Technology XXX. The conference also incorporated the 31st National Conference on Manufacturing Research, and was held at Loughborough University, Loughborough, UK, in September 2016. The ICMR conference is renowned as a friendly and inclusive environment which brings together a broad community of researchers who share the common goal of developing and managing the technologies and operations key to sustaining the success of manufacturing businesses. The proceedings is di-

vided into 14 sections, including: Manufacturing Processes; Additive Manufacturing; Manufacturing Materials; Advanced Manufacturing Technology; Product Design and Development, as well as many other aspects of manufacturing management and innovation. It contains 92 papers, which represents an acceptance rate of 75%. With its comprehensive overview of current developments, this book will be of interest to all those involved in manufacturing today.

The electromechanical coupling effect introduced by piezoelectric vibration energy harvesting (PVEH) presents serious modeling challenges. This book provides close-form accurate mathematical modeling and experimental techniques to design and validate dual function PVEH vibration absorbing devices as a solution to mitigate vibration and maximize operational efficiency. It includes in-depth experimental validation of a PVEH beam model based on the analytical modal analysis method (AMAM), precisely identifying electrical loads that harvest maximum power and induce maximum electrical damping. The author's detailed analysis will be useful for researchers working in the rapidly emerging field of vibration based energy harvesting, as well as for students investigating electromechanical devices, piezoelectric sensors and actuators, and vibration control engineering.

Individuals with disabilities often have difficulty accomplishing tasks, living independently, and utilizing information technologies; simple aspects of daily life taken for granted by non-disabled individuals. Assistive Technologies: Concepts, Methodologies, Tools, and Applications presents a comprehensive collection of research, developments, and knowledge on technologies that enable disabled individuals to function effectively and accomplish otherwise impossible tasks. These volumes serve as a crucial reference source for experts in fields as diverse as healthcare, information science, education, engineering, and human-computer interaction, with applications bridging multiple disciplines.

This book comprises select proceedings of the National Conference on Recent Advances in Traffic Engineering (RATE 2018) with technical papers on the themes of traffic operation control and management, traffic safety and vulnerable road users, and sustainable transportation. It covers a wide range of topics, including advanced traffic data collection methods, big data analysis, mix-traffic characterization and modelling, travel time reliability, scenario of pedestrian and non-motorised vehicles (NMVs) traffic, regional traffic growth modelling, and applications of intelligent transportation systems (ITS) in traffic management. The contents of this book offer up-to-date and practical knowledge on different aspects of traffic engineering, which is useful for students, researchers as well as practitioners.

This book provides an insight into the 'hot' field of Radio Frequency Identification (RFID) Systems In this book, the authors provide an insight into the field of RFID systems with an emphasis on networking aspects and research challenges related to passive Ultra High Frequency (UHF) RFID systems. The book reviews various algorithms, protocols and design solutions that have been developed within the area, including most recent advances. In addition, authors cover a wide range of recognized problems in RFID industry, striking a balance between theoretical and practical coverage. Limitations of the technology and state-of-the-art solutions

are identified and new research opportunities are addressed. Finally, the book is authored by experts and respected researchers in the field and every chapter is peer reviewed. Key Features: Provides the most comprehensive analysis of networking aspects of RFID systems, including tag identification protocols and reader anti-collision algorithms Covers in detail major research problems of passive UHF systems such as improving reading accuracy, reading range and throughput Analyzes other "hot topics" including localization of passive RFID tags, energy harvesting, simulator and emulator design, security and privacy Discusses design of tag antennas, tag and reader circuits for passive UHF RFID systems Presents EPCGlobal architecture framework, middleware and protocols Includes an accompanying website with PowerPoint slides and solutions to the problems http://www.site.uottawa.ca/~mbolic/RFIDBook/ This book will be an invaluable guide for researchers and graduate students in electrical engineering and computer science, and researchers and developers in telecommunication industry.

This book contains a number of articles concerning the artificial perception of reality, as can be perceived by a sensor, and its interaction with natural human perception through the senses. For the first time, a link between the sensor's field and the more general perception theory is attempted. Besides, the book offers a unique insight provided by the research on sensors and microsystems currently being carried out in Italy. It covers the typical area of sensors and microsystems: chemical and biological sensors, physical sensors and micromechanics.

Some years ago, silicon-based mechanical sensors, like pressure sensors, accelerometers and gyroscopes, started their successful advance. Every year, hundreds of millions of these devices are sold, mainly for medical and automotive applications. The airbag sensor on which research already started several decades ago at Stanford University can be found in every new car and has saved already numerous lives. Pressure sensors are also used in modern electronic blood pressure equipment. Many other mechanical sensors, mostly invisible to the public, perform useful functions in countless industrial and consumer products. The underlying physics and technology of silicon-based mechanical sensors is rather complex and is treated in numerous publications scattered throughout the literature. Therefore, a clear need existed for a handbook that thoroughly and systematically reviews the present basic knowledge on these devices. After a short introduction, Professor Bao discusses the main issues relevant to silicon-based mechanical sensors. First a thorough treatment of stress and strain in diaphragms and beams is presented. Next, vibration of mechanical structures is illuminated, followed by a chapter on air damping. These basic chapters are then succeeded by chapters in which capacitive and piezoresistive sensing techniques are amply discussed. The book concludes with chapters on commercially available pressure sensors, accelerometers and resonant sensors in which the above principles are applied. Everybody, involved in designing silicon-based mechanical sensors, will find a wealth of useful information in the book, assisting the designer in obtaining highly optimized devices.

This two volume set LNCS 9642 and LNCS 9643 constitutes the refereed proceedings of the 21st International Conference on Database Systems for Advanced Applications, DASFAA 2016, held

in Dallas, TX, USA, in April 2016. The 61 full papers presented were carefully reviewed and selected from a total of 183 submissions. The papers cover the following topics: crowdsourcing, data quality, entity identification, data mining and machine learning, recommendation, semantics computing and knowledge base, textual data, social networks, complex queries, similarity computing, graph databases, and miscellaneous, advanced applications.