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KEY=DIAGNOSIS - BRYCEN BOWERS

STRUCTURAL HEALTH MONITORING

AN ADVANCED SIGNAL PROCESSING PERSPECTIVE

Springer This book highlights the latest advances and trends in advanced signal processing (such as wavelet theory, time-frequency analysis, empirical mode decomposition, compressive sensing and sparse representation, and stochastic resonance) for structural health monitoring (SHM). Its primary focus is on the utilization of advanced signal processing techniques to help monitor the health status of critical structures and machines encountered in our daily lives: wind turbines, gas turbines, machine tools, etc. As such, it offers a key reference guide for researchers, graduate students, and industry professionals who work in the field of SHM.

INTELLIGENT FAULT DIAGNOSIS AND REMAINING USEFUL LIFE PREDICTION OF ROTATING MACHINERY

Butterworth-Heinemann Intelligent Fault Diagnosis and Remaining Useful Life Prediction of Rotating Machinery provides a comprehensive introduction of intelligent fault diagnosis and RUL prediction based on the current achievements of the author's research group. The main contents include multi-domain signal processing and feature extraction, intelligent diagnosis models, clustering algorithms, hybrid intelligent diagnosis strategies, and RUL prediction approaches, etc. This book presents fundamental theories and advanced methods of identifying the occurrence, locations, and degrees of faults, and also includes information on how to predict the RUL of rotating machinery. Besides experimental demonstrations, many application cases are presented and illustrated to test the methods mentioned in the book. This valuable reference provides an essential guide on machinery fault diagnosis that helps readers understand basic concepts and fundamental theories. Academic researchers with mechanical engineering or computer science backgrounds, and engineers or practitioners who are in charge of machine safety, operation, and maintenance will find this book very useful. Provides a detailed background and roadmap of intelligent diagnosis and RUL prediction of rotating machinery, involving fault mechanisms, vibration characteristics, health indicators, and diagnosis and prognostics Presents basic theories, advanced methods, and the latest contributions in the field of intelligent fault diagnosis and RUL prediction Includes numerous application cases, and the methods, algorithms, and models introduced in the book are demonstrated by industrial experiences

SIGNAL PROCESSING FOR FAULT DETECTION AND DIAGNOSIS IN ELECTRIC MACHINES AND SYSTEMS

IET This book presents the main advanced signal processing techniques for fault detection and diagnosis in electromechanical systems. It focuses on presenting these advanced tools from time-frequency representation and time-scale analysis to demodulation techniques, including innovative and recently developed approaches.

ROTATING MACHINERY AND SIGNAL PROCESSING

PROCEEDINGS OF THE FIRST WORKSHOP ON SIGNAL PROCESSING APPLIED TO ROTATING MACHINERY DIAGNOSTICS, SIGPROMD'2017, APRIL 09-11, 2017, SETIF, ALGERIA

Springer This book provides readers with a timely snapshot of the potential offered by and challenges posed by signal processing methods in the field of machine diagnostics and condition monitoring. It gathers contributions to the first Workshop on Signal Processing Applied to Rotating Machinery Diagnostics, held in Setif, Algeria, on April 9-10, 2017, and organized by the Applied Precision Mechanics Laboratory (LMPA) at the Institute of Precision Mechanics, University of Setif, Algeria and the Laboratory of Mechanics, Modeling and Manufacturing (LA2MP) at the National School of Engineers of Sfax. The respective chapters highlight research conducted by the two laboratories on the following main topics: noise and vibration in machines; condition monitoring in non-stationary operations; vibro-acoustic diagnosis of machinery; signal processing and pattern recognition methods; monitoring and diagnostic systems; and dynamic modeling and fault detection.

DIGITAL FILTERS AND SIGNAL PROCESSING

BoD – Books on Demand Digital filters, together with signal processing, are being employed in the new technologies and information systems, and are implemented in different areas and applications. Digital filters and signal processing are used with no costs and they can be adapted to different cases with great flexibility and reliability. This book presents advanced developments in digital filters and signal process methods covering different cases studies. They present the main essence of the subject, with the principal approaches to the most recent mathematical models that are being employed worldwide.

INTERNATIONAL JOURNAL OF PROGNOSTICS AND HEALTH MANAGEMENT VOLUME 2 (COLOR)

Lulu.com

ADVANCED CONDITION MONITORING AND FAULT DIAGNOSIS OF ELECTRIC MACHINES

IGI Global The reliability of induction motors is a major requirement in many industrial applications. It is especially important where an unexpected breakdown might result in the interruption of critical services such as military operations, transportation, aviation, and medical applications. Advanced Condition Monitoring and Fault Diagnosis of Electric Machines is a collection of innovative research on various issues related to machinery condition monitoring, signal processing and conditioning, instrumentation and measurements, and new trends in condition monitoring. It also pays special attention to the fault identification process. While highlighting topics including spectral analysis, electrical engineering, and bearing faults, this book is an ideal reference source for electrical engineers, mechanical engineers, researchers, and graduate-level students seeking current research on various methods of maintaining machinery.

ENGINEERING ASSET MANAGEMENT

PROCEEDINGS OF THE FIRST WORLD CONGRESS ON ENGINEERING ASSET MANAGEMENT (WCEAM) 2006

Springer Science & Business Media It is with great pleasure that we welcome you to the inaugural World Congress on Engineering Asset Management (WCEAM) being held at the Conrad Jupiters Hotel on the Gold Coast from July 11 to 14, 2006. More than 170 authors from 28 countries have contributed over 160 papers to be presented over the first three days of the conference. Day four will be host to a series of workshops devoted to the practice of various aspects of Engineering Asset Management. WCEAM is a new annual global forum on the various multidisciplinary aspects of Engineering Asset Management. It deals with the presentation and publication of outputs of research and development activities as well as the application of knowledge in the practical aspects of: strategic asset management risk management in asset management design and life-cycle integrity of physical assets asset performance and level of service models financial analysis methods for physical assets reliability modelling and prognostics information systems and knowledge management asset data management, warehousing and mining condition monitoring and intelligent maintenance intelligent sensors and devices regulations and standards in asset management human dimensions in integrated asset management education and training in asset management and performance management in asset management. We have attracted academics, practitioners and scientists from around the world to share their knowledge in this important emerging transdiscipline that impacts on almost every aspect of daily life.

ADVANCED AUTOMATION TECHNIQUES IN ADAPTIVE MATERIAL PROCESSING

World Scientific This volume presents the editors' research as well as related recent findings on the applications of modern technologies in electrical and electronic engineering to the automation of some of the common manufacturing processes that have traditionally been handled within the mechanical and material engineering disciplines.In particular, the book includes the latest research results achieved through applied research and development projects over the past few years at the Gintic Institute of Manufacturing Technology, Singapore. It discusses advanced automation technologies such as in-process sensors, laser vision systems, and laser strobe vision, as well as advanced techniques such as sensory signal processing, adaptive process control, fuzzy logic, neural networks, expert systems, laser processing control, etc. The methodologies and techniques are applied to some important material processing applications, including grinding, polishing, machining, and welding. Practical automation solutions, which are complicated by part distortions, tool wear, process dynamics, and variants, are explained.The research efforts featured in the book are driven by industrial needs. They combine theoretical research with practical automation considerations. The techniques developed have been either implemented in the factory or prototyped in the laboratory.

MODERN MECHANICS AND APPLICATIONS

SELECT PROCEEDINGS OF ICOMMA 2020

Springer Nature This proceedings book includes a selection of refereed papers presented at the International Conference on Modern Mechanics and Applications (ICOMMA) 2020, which took place in Ho Chi Minh City, Vietnam, on December 2–4, 2020. The contributions highlight recent trends and applications in modern mechanics. Subjects covered include biological systems; damage, fracture, and failure; flow problems; multiscale multi-physics problems; composites and hybrid structures; optimization and inverse problems; lightweight structures; mechatronics; dynamics; numerical methods and intelligent computing; additive manufacturing; natural hazards modeling. The book is intended for academics, including graduate students and experienced researchers interested in recent trends in modern mechanics and application.

ADVANCED MANUFACTURING TECHNOLOGIES

PROCEEDINGS OF INTERNATIONAL CONFERENCE ON ADVANCED MANUFACTURING TECHNOLOGIES AT CMERI, DURGAPUR DURING 29-30TH NOVEMBER 2007

Allied Publishers Contributed papers presented at the conference organized by Central Mechanical Engineering Research Institute.

PRACTICAL MACHINERY VIBRATION ANALYSIS AND PREDICTIVE MAINTENANCE

Elsevier Machinery Vibration Analysis and Predictive Maintenance provides a detailed examination of the detection, location and diagnosis of faults in rotating and reciprocating machinery using vibration analysis. The basics and underlying physics of vibration signals are first examined. The acquisition and processing of signals is then reviewed followed by a discussion of machinery fault

diagnosis using vibration analysis. Hereafter the important issue of rectifying faults that have been identified using vibration analysis is covered. The book also covers the other techniques of predictive maintenance such as oil and particle analysis, ultrasound and infrared thermography. The latest approaches and equipment used together with the latest techniques in vibration analysis emerging from current research are also highlighted. Understand the basics of vibration measurement Apply vibration analysis for different machinery faults Diagnose machinery-related problems with vibration analysis techniques

ADVANCES IN CONDITION MONITORING OF MACHINERY IN NON-STATIONARY OPERATIONS

PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE ON CONDITION MONITORING OF MACHINERY IN NON-STATIONARY OPERATIONS CMMNO 2013

Springer Science & Business Media This book presents the processing of the third edition of the Condition Monitoring of Machinery in Non-Stationary Operations (CMMNO13), which was held in Ferrara, Italy. This yearly event merges an international community of researchers who met – in 2011 in Wroclaw (Poland) and in 2012 in Hammamet (Tunisia) – to discuss issues of diagnostics of rotating machines operating in complex motion and/or load conditions. The growing interest of the industrial world on the topics covered by the CMMNO13 involves the fields of packaging, automotive, agricultural, mining, processing and wind machines in addition to that of the systems for data acquisition. The participation of speakers and visitors from industry makes the event an opportunity for immediate assessment of the potential applications of advanced methodologies for the signal analysis. Signals acquired from machines often contain contributions from several different components as well as noise. Therefore, the major challenge of condition monitoring is to point out the signal content that is related to the state of the monitored component particularly in non-stationary conditions.

ADVANCED INFORMATION NETWORKING AND APPLICATIONS

PROCEEDINGS OF THE 35TH INTERNATIONAL CONFERENCE ON ADVANCED INFORMATION NETWORKING AND APPLICATIONS (AINA-2021), VOLUME 3

Springer Nature This book covers the theory, design and applications of computer networks, distributed computing and information systems. Networks of today are going through a rapid evolution, and there are many emerging areas of information networking and their applications. Heterogeneous networking supported by recent technological advances in low-power wireless communications along with silicon integration of various functionalities such as sensing, communications, intelligence and actuations is emerging as a critically important disruptive computer class based on a new platform, networking structure and interface that enable novel, low-cost and high-volume applications. Several of such applications have been difficult to realize because of many interconnections problems. To fulfill their large range of applications, different kinds of networks need to collaborate, and wired and next-generation wireless systems should be integrated in order to develop high-performance computing solutions to problems arising from the complexities of these networks. The aim of the book "Advanced Information Networking and Applications" is to provide latest research findings, innovative research results, methods and development techniques from both theoretical and practical perspectives related to the emerging areas of information networking and applications.

ADVANCED MECHATRONICS SOLUTIONS

Springer Focusing on the most rapidly changing areas of mechatronics, this book discusses signals and system control, mechatronic products, metrology and nanometrology, automatic control & robotics, biomedical engineering, photonics, design manufacturing and testing of MEMS. It is reflected in the list of contributors, including an international group of 302 leading researchers representing 12 countries. The book is intended for use in academic, government and industry R&D departments, as an indispensable reference tool for the years to come. Thid volume can serve a global community as the definitive reference source in Mechatronics. The book comprises carefully selected 93 contributions presented at the 11th International Conference Mechatronics 2015, organized by Faculty of Mechatronics, Warsaw University of Technology, on September 21-23, in Warsaw, Poland.

FAULT DETECTION

BoD – Books on Demand In this book, a number of innovative fault diagnosis algorithms in recently years are introduced. These methods can detect failures of various types of system effectively, and with a relatively high significance.

SENSOR SIGNAL AND INFORMATION PROCESSING II

MDPI In the current age of information explosion, newly invented technological sensors and software are now tightly integrated with our everyday lives. Many sensor processing algorithms have incorporated some forms of computational intelligence as part of their core framework in problem solving. These algorithms have the capacity to generalize and discover knowledge for themselves and learn new information whenever unseen data are captured. The primary aim of sensor processing is to develop techniques to interpret, understand, and act on information contained in the data. The interest of this book is in developing intelligent signal processing in order to pave the way for smart sensors. This involves mathematical advancement of nonlinear signal processing theory and its applications that extend far beyond traditional techniques. It bridges the boundary between theory and application, developing novel theoretically inspired methodologies targeting both longstanding and emergent signal processing applications. The topic ranges from phishing detection to integration of terrestrial laser scanning, and from fault diagnosis to bio-inspiring filtering. The book will appeal to established practitioners, along with researchers and students in the emerging field of smart sensors processing.

VIBRATIONS IN ROTATING MACHINERY

John Wiley & Sons This essential text contains the papers from the 8th international IMechE conference on Vibrations in Rotating

Machinery held at the University of Wales, Swansea in September 2004. The themes of the volume are new developments and industrial applications of current technology relevant to the vibration and noise of rotating machines and assemblies. TOPICS INCLUDE Rotor balancing – including active and automatic balancing Special rotating machines – including micromachines Oil film bearings and dampers Active control methods for rotating machines Smart machine technology Dynamics of assembled rotors Component life predictions and life extension strategies The dynamics of geared systems Cracked rotors – detection, location ad prognosis Chaotic behaviour in machines Experimental methods and discoveries.

ADVANCED INTELLIGENT COMPUTING THEORIES AND APPLICATIONS. WITH ASPECTS OF THEORETICAL AND METHODOLOGICAL ISSUES

FOURTH INTERNATIONAL CONFERENCE ON INTELLIGENT COMPUTING, ICIC 2008 SHANGHAI, CHINA, SEPTEMBER 15-18, 2008 PROCEEDINGS

Springer 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.

ADVANCED COMPUTATIONAL INTELLIGENCE FOR OBJECT DETECTION, FEATURE EXTRACTION AND RECOGNITION IN SMART SENSOR ENVIRONMENTS

MDPI Recent years have seen a vast development in various methodologies for object detection and feature extraction and recognition, both in theory and in practice. When processing images, videos, or other types of multimedia, one needs efficient solutions to perform fast and reliable processing. Computational intelligence is used for medical screening where the detection of disease symptoms is carried out, in prevention monitoring to detect suspicious behavior, in agriculture systems to help with growing plants and animal breeding, in transportation systems for the control of incoming and outgoing transportation, for unmanned vehicles to detect obstacles and avoid collisions, in optics and materials for the detection of surface damage, etc. In many cases, we use developed techniques which help us to recognize some special features. In the context of this innovative research on computational intelligence, the Special Issue "Advanced Computational Intelligence for Object Detection, Feature Extraction and Recognition in Smart Sensor Environments" present an excellent opportunity for the dissemination of recent results and achievements for further innovations and development. It is my pleasure to present this collection of excellent contributions to the research community. - Prof. Marcin Woźniak, Silesian University of Technology, Poland –

MACHINE INTELLIGENCE AND SIGNAL ANALYSIS

Springer The book covers the most recent developments in machine learning, signal analysis, and their applications. It covers the topics of machine intelligence such as: deep learning, soft computing approaches, support vector machines (SVMs), least square SVMs (LSSVMs) and their variants; and covers the topics of signal analysis such as: biomedical signals including electroencephalogram (EEG), magnetoencephalography (MEG), electrocardiogram (ECG) and electromyogram (EMG) as well as other signals such as speech signals, communication signals, vibration signals, image, and video. Further, it analyzes normal and abnormal categories of real-world signals, for example normal and epileptic EEG signals using numerous classification techniques. The book is envisioned for researchers and graduate students in Computer Science and Engineering, Electrical Engineering, Applied Mathematics, and Biomedical Signal Processing.

10TH INTERNATIONAL CONFERENCE ON VIBRATIONS IN ROTATING MACHINERY

11-13 SEPTEMBER 2012, IMECHE LONDON, UK

Elsevier This book presents the papers from the 10th International Conference on Vibrations in Rotating Machinery. This conference, first held in 1976, has defined and redefined the state-of-the-art in the many aspects of vibration encountered in rotating machinery. Distinguished by an excellent mix of industrial and academic participation achieved, these papers present the latest methods of theoretical, experimental and computational rotordynamics, alongside the current issues of concern in the further development of rotating machines. Topics are aimed at propelling forward the standards of excellence in the design and operation of rotating machines. Presents latest methods of theoretical, experimental and computational rotordynamics Covers current issues of concern in the further development of rotating machines

HANDBOOK OF ADVANCED PERFORMABILITY ENGINEERING

Springer Nature This book considers all aspects of performability engineering, providing a holistic view of the activities associated with a product throughout its entire life cycle of the product, as well as the cost of minimizing the environmental impact at each stage, while maximizing the performance. Building on the editor's previous Handbook of Performability Engineering, it explains how performability engineering provides us with a framework to consider both dependability and sustainability in the optimal design of

products, systems and services, and explores the role of performability in energy and waste minimization, raw material selection, increased production volume, and many other areas of engineering and production. The book discusses a range of new ideas, concepts, disciplines, and applications in performability, including smart manufacturing and Industry 4.0; cyber-physical systems and artificial intelligence; digital transformation of railways; and asset management. Given its broad scope, it will appeal to researchers, academics, industrial practitioners and postgraduate students involved in manufacturing, engineering, and system and product development.

ADVANCES IN ASSET MANAGEMENT AND CONDITION MONITORING

COMADEM 2019

Springer Nature This book gathers select contributions from the 32nd International Congress and Exhibition on Condition Monitoring and Diagnostic Engineering Management (COMADEM 2019), held at the University of Huddersfield, UK in September 2019, and jointly organized by the University of Huddersfield and COMADEM International. The aim of the Congress was to promote awareness of the rapidly emerging interdisciplinary areas of condition monitoring and diagnostic engineering management. The contents discuss the latest tools and techniques in the multidisciplinary field of performance monitoring, root cause failure modes analysis, failure diagnosis, prognosis, and proactive management of industrial systems. There is a special focus on digitally enabled asset management and covers several topics such as condition monitoring, maintenance, structural health monitoring, non-destructive testing and other allied areas. Bringing together expert contributions from academia and industry, this book will be a valuable resource for those interested in latest condition monitoring and asset management techniques.

ELECTRIC MACHINES

MODELING, CONDITION MONITORING, AND FAULT DIAGNOSIS

CRC Press With countless electric motors being used in daily life, in everything from transportation and medical treatment to military operation and communication, unexpected failures can lead to the loss of valuable human life or a costly standstill in industry. To prevent this, it is important to precisely detect or continuously monitor the working condition of a motor. Electric Machines: Modeling, Condition Monitoring, and Fault Diagnosis reviews diagnosis technologies and provides an application guide for readers who want to research, develop, and implement a more effective fault diagnosis and condition monitoring scheme—thus improving safety and reliability in electric motor operation. It also supplies a solid foundation in the fundamentals of fault cause and effect. Combines Theoretical Analysis and Practical Application Written by experts in electrical engineering, the book approaches the fault diagnosis of electrical motors through the process of theoretical analysis and practical application. It begins by explaining how to analyze the fundamentals of machine failure using the winding functions method, the magnetic equivalent circuit method, and finite element analysis. It then examines how to implement fault diagnosis using techniques such as the motor current signature analysis (MCSA) method, frequency domain method, model-based techniques, and a pattern recognition scheme. Emphasizing the MCSA implementation method, the authors discuss robust signal processing techniques and the implementation of reference-frame-theory-based fault diagnosis for hybrid vehicles. Fault Modeling, Diagnosis, and Implementation in One Volume Based on years of research and development at the Electrical Machines & Power Electronics (EMPE) Laboratory at Texas A&M University, this book describes practical analysis and implementation strategies that readers can use in their work. It brings together, in one volume, the fundamentals of motor fault conditions, advanced fault modeling theory, fault diagnosis techniques, and low-cost DSP-based fault diagnosis implementation strategies.

DATA MINING: CONCEPTS, METHODOLOGIES, TOOLS, AND APPLICATIONS

CONCEPTS, METHODOLOGIES, TOOLS, AND APPLICATIONS

IGI Global Data mining continues to be an emerging interdisciplinary field that offers the ability to extract information from an existing data set and translate that knowledge for end-users into an understandable way. Data Mining: Concepts, Methodologies, Tools, and Applications is a comprehensive collection of research on the latest advancements and developments of data mining and how it fits into the current technological world.

ADVANCES IN CONDITION MONITORING OF MACHINERY IN NON-STATIONARY OPERATIONS

PROCEEDINGS OF THE 6TH INTERNATIONAL CONFERENCE ON CONDITION MONITORING OF MACHINERY IN NON-STATIONARY OPERATIONS, CMMNO'2018, 20-22 JUNE 2018, SANTANDER, SPAIN

Springer This book is aimed at researchers, industry professionals and students interested in the broad ranges of disciplines related to condition monitoring of machinery working in non-stationary conditions. Each chapter, accepted after a rigorous peer-review process, reports on a selected, original piece of work presented and discussed at the International Conference on Condition Monitoring of Machinery in Non-stationary Operations, CMMNO'2018, held on June 20 – 22, 2018, in Santander, Spain. The book describes both theoretical developments and a number of industrial case studies, which cover different topics, such as: noise and vibrations in machinery, conditioning monitoring in non-stationary operations, vibro-acoustic diagnosis of machinery, signal processing, application of pattern recognition and data mining, monitoring and diagnostic systems, faults detection, dynamics of structures and machinery, and mechatronic machinery diagnostics.

CONDITION MONITORING OF MACHINERY IN NON-STATIONARY OPERATIONS

PROCEEDINGS OF THE SECOND INTERNATIONAL CONFERENCE "CONDITION MONITORING OF MACHINERY IN NON-STATIONNARY OPERATIONS" CMMNO'2012

Springer Science & Business Media Condition monitoring of machines in non-stationary operations (CMMNO) can be seen as the major challenge for research in the field of machinery diagnostics. Condition monitoring of machines in non-stationary operations is the title of the presented book and the title of the Conference held in Hammamet - Tunisia March 26 – 28, 2012. It is the second conference under this title, first took place in Wroclaw - Poland , March 2011. The subject CMMNO comes directly from industry needs and observation of real objects. Most monitored and diagnosed objects used in industry works in non-stationary operations condition. The non-stationary operations come from fulfillment of machinery tasks, for which they are designed for. All machinery used in different kind of mines, transport systems, vehicles like: cars, buses etc, helicopters, ships and battleships and so on work in non-stationary operations. The papers included in the book are shaped by the organizing board of the conference and authors of the papers. The papers are divided into five sections, namely: Condition monitoring of machines in non-stationary operations Modeling of dynamics and fault in systems Signal processing and Pattern recognition Monitoring and diagnostic systems Noise and vibration of machines The presented book gives the back ground to the main objective of the CMMNO 2012 conference that is to bring together scientific community to discuss the major advances in the field of machinery condition monitoring in non-stationary conditions.

ADVANCES IN CONDITION MONITORING OF MACHINERY IN NON-STATIONARY OPERATIONS

PROCEEDINGS OF THE FOURTH INTERNATIONAL CONFERENCE ON CONDITION MONITORING OF MACHINERY IN NON-STATIONARY OPERATIONS, CMMNO'2014, LYON, FRANCE DECEMBER 15-17

Springer The book provides readers with a snapshot of recent research and technological trends in the field of condition monitoring of machinery working under a broad range of operating conditions. Each chapter, accepted after a rigorous peer-review process, reports on an original piece of work presented and discussed at the 4th International Conference on Condition Monitoring of Machinery in Non-stationary Operations, CMMNO 2014, held on December 15-16, 2014, in Lyon, France. The contributions have been grouped into three different sections according to the main subfield (signal processing, data mining or condition monitoring techniques) they are related to. The book includes both theoretical developments as well as a number of industrial case studies, in different areas including, but not limited to: noise and vibration; vibro-acoustic diagnosis; signal processing techniques; diagnostic data analysis; instantaneous speed identification; monitoring and diagnostic systems; and dynamic and fault modeling. This book not only provides a valuable resource for both academics and professionals in the field of condition monitoring, it also aims at facilitating communication and collaboration between the two groups.

DATA SCIENCE

5TH INTERNATIONAL CONFERENCE OF PIONEERING COMPUTER SCIENTISTS, ENGINEERS AND EDUCATORS, ICPCSEE 2019, GUILIN, CHINA, SEPTEMBER 20–23, 2019, PROCEEDINGS, PART I

Springer Nature This two volume set (CCIS 1058 and 1059) constitutes the refereed proceedings of the 5th International Conference of Pioneering Computer Scientists, Engineers and Educators, ICPCSEE 2019 held in Guilin, China, in September 2019. The 104 revised full papers presented in these two volumes were carefully reviewed and selected from 395 submissions. The papers cover a wide range of topics related to basic theory and techniques for data science including data mining; data base; net work; security; machine learning; bioinformatics; natural language processing; software engineering; graphic images; system; education; application.

NEURAL COMPUTING FOR ADVANCED APPLICATIONS

SECOND INTERNATIONAL CONFERENCE, NCAA 2021, GUANGZHOU, CHINA, AUGUST 27-30, 2021, PROCEEDINGS

Springer Nature This book presents refereed proceedings of the Second International Conference Neural Computing for Advanced Applications, NCAA 2021, held in Guangzhou, China, in August, 2021. The 54 full papers papers were thoroughly reviewed and selected from a total of 144 qualified submissions. The papers are organized in topical sections on neural network theory, cognitive sciences, neuro-system hardware implementations, and NN-based engineering applications; machine learning, data mining, data security and privacy protection, and data-driven applications; neural computing-based fault diagnosis, fault forecasting, prognostic management, and system modeling; computational intelligence, nature-inspired optimizers, and their engineering applications; fuzzy logic, neuro-fuzzy systems, decision making, and their applications in management sciences; control systems, network synchronization, system integration, and industrial artificial intelligence; computer vision, image processing, and their industrial applications; cloud/edge/fog computing, the Internet of Things/Vehicles(IoT/IoV), and their system optimization; spreading dynamics, forecasting, and other intelligent techniques against coronavirus disease (COVID-19).

WAVELET TRANSFORM AND SOME OF ITS REAL-WORLD APPLICATIONS

BoD – Books on Demand The book contains six chapters. The use of the progressive regressive strategy for biometrical authentication through the use of human gait and face images was investigated. A new lossy image compression technique that uses singular value decomposition and wavelet difference reduction technique was proposed. The best wavelet packet based selection algorithm and its application in image denoising was discussed. The scaling factor threshold estimator in different color models using a discrete wavelet transform for steganographic algorithms was presented. The extraction of features appearing in current signal using wavelet analysis when there is rotor fault of eccentricity and broken rotor bar was debated. The application of the empirical wavelet transform for seismic anomalies detection in ultralow-frequency geomagnetic signals was illustrated.

FAULT DIAGNOSIS AND DETECTION

BoD – Books on Demand Mass production companies have become obliged to reduce their production costs and sell more products with lower profit margins in order to survive in competitive market conditions. The complexity and automation level of machinery are continuously growing. This development calls for some of the most critical issues that are reliability and dependability of automatic systems. In the future, machines will be monitored remotely, and computer-aided techniques will be employed to detect faults in the future, and also there will be unmanned factories where machines and systems communicate to each other, detect their own faults, and can remotely intercept their faults. The pioneer studies of such systems are fault diagnosis studies. Thus, we hope that this book will contribute to the literature in this regard.

DESIGN OF AN INTELLIGENT EMBEDDED SYSTEM FOR CONDITION MONITORING OF AN INDUSTRIAL ROBOT

Springer This thesis introduces a successfully designed and commissioned intelligent health monitoring system, specifically for use on any industrial robot, which is able to predict the onset of faults in the joints of the geared transmissions. However the developed embedded wireless condition monitoring system leads itself very well for applications on any power transmission equipment in which the loads and speeds are not constant, and access is restricted. As such this provides significant scope for future development. Three significant achievements are presented in this thesis. First, the development of a condition monitoring algorithm based on vibration analysis of an industrial robot for fault detection and diagnosis. The combined use of a statistical control chart with time-domain signal analysis for detecting a fault via an arm-mounted wireless processor system represents the first stage of fault detection. Second, the design and development of a sophisticated embedded microprocessor base station for online implementation of the intelligent condition monitoring algorithm, and third, the implementation of a discrete wavelet transform, using an artificial neural network, with statistical feature extraction for robot fault diagnosis in which the vibration signals are first decomposed into eight levels of wavelet coefficients.

BEARING DEFECT SIGNATURE ANALYSIS USING ADVANCED NONLINEAR SIGNAL ANALYSIS IN A CONTROLLED ENVIRONMENT

ROTOR SYSTEMS

ANALYSIS AND IDENTIFICATION

CRC Press The purpose of this book is to give a basic understanding of rotor dynamics phenomena with the help of simple rotor models and subsequently, the modern analysis methods for real life rotor systems. This background will be helpful in the identification of rotor-bearing system parameters and its use in futuristic model-based condition monitoring and, fault diagnostics and prognostics. The book starts with introductory material for finite element methods and moves to linear and non-linear vibrations, continuous systems, vibration measurement techniques, signal processing and error analysis, general identification techniques in engineering systems, and MATLAB analysis of simple rotors. Key Features: • Covers both transfer matrix methods (TMM) and finite element methods (FEM) • Discusses transverse and torsional vibrations • Includes worked examples with simplicity of mathematical background and a modern numerical method approach • Explores the concepts of instability analysis and dynamic balancing • Provides a basic understanding of rotor dynamics phenomena with the help of simple rotor models including modern analysis methods for real life rotor systems.

INTERNATIONAL JOURNAL OF PROGNOSTICS AND HEALTH MANAGEMENT VOLUME 3 (B&W)

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CONDITION MONITORING WITH VIBRATION SIGNALS

COMPRESSIVE SAMPLING AND LEARNING ALGORITHMS FOR ROTATING MACHINES

John Wiley & Sons Provides an extensive, up-to-date treatment of techniques used for machine condition monitoring Clear and concise throughout, this accessible book is the first to be wholly devoted to the field of condition monitoring for rotating machines using vibration signals. It covers various feature extraction, feature selection, and classification methods as well as their applications to machine vibration datasets. It also presents new methods including machine learning and compressive sampling, which help to improve safety, reliability, and performance. Condition Monitoring with Vibration Signals: Compressive Sampling and Learning Algorithms for Rotating Machines starts by introducing readers to Vibration Analysis Techniques and Machine Condition Monitoring (MCM). It then offers readers sections covering: Rotating Machine Condition Monitoring using Learning Algorithms; Classification Algorithms; and New Fault Diagnosis Frameworks designed for MCM. Readers will learn signal processing in the time-frequency domain, methods for linear subspace learning, and the basic principles of the learning method Artificial Neural Network (ANN). They will also discover recent trends of deep learning in the field of machine condition monitoring, new feature learning frameworks based on compressive sampling, subspace learning techniques for machine condition monitoring, and much more. Covers the fundamental as well as the state-of-the-art approaches to machine condition monitoringguiding readers from the basics of rotating machines to the generation of knowledge using vibration signals Provides new methods, including machine learning and compressive sampling, which offer significant improvements in accuracy with reduced computational costs Features learning algorithms that can be used for fault diagnosis and prognosis Includes previously and recently developed dimensionality reduction techniques and classification algorithms Condition Monitoring with Vibration Signals: Compressive Sampling and Learning Algorithms for Rotating Machines is an excellent book for research students, postgraduate students, industrial practitioners, and researchers.

ENGINEERING ASSET MANAGEMENT - SYSTEMS, PROFESSIONAL PRACTICES AND CERTIFICATION

PROCEEDINGS OF THE 8TH WORLD CONGRESS ON ENGINEERING ASSET MANAGEMENT (WCEAM 2013) & THE 3RD INTERNATIONAL CONFERENCE ON UTILITY MANAGEMENT & SAFETY (ICUMAS)

Springer This proceeding represents state-of-the-art trends and developments in the emerging field of engineering asset management as presented at the Eight World Congress on Engineering Asset Management (WCEAM). The Proceedings of the WCEAM 2013 is an excellent reference for practitioners, researchers and students in the multidisciplinary field of asset management, covering topics such as: Asset condition monitoring and intelligent maintenance, 2. Asset data warehousing, data mining and fusion, 3. Asset performance and level-of-service models, 4. Design and life-cycle integrity of physical assets, 5. Deterioration and preservation models for assets, 6. Education and training in asset management, 7. Engineering standards in asset management, 8. Fault diagnosis and prognostics, 9. Financial analysis methods for physical assets, 10. Human dimensions in integrated asset management, 11. Information quality management, 12. Information systems and knowledge management, 13. Intelligent sensors and devices, 14. Maintenance strategies in asset management, 15. Optimisation decisions in asset management, 16. Risk management in asset management, 17. Strategic asset management, 18. Sustainability in asset management. King WONG served as Congress Chair for WCEAM 2013 and ICUMAS 2013 is the President of the Hong Kong Institute of Utility Specialists (HKIUS) and Convener of International Institute of Utility Specialists (IIUS). Peter TSE is the Director of the Smart Engineering Asset Management laboratory (SEAM) at the City University of Hong Kong and served as the Chair of WCEAM 2013 Organising Committee. Joseph MATHEW served as the Co-Chair of WCEAM 2013 is also WCEAM's General Chair. He is the Chief Executive Officer of Asset Institute, Australia.

CRYOGENIC SYSTEMS

ADVANCED MONITORING, FAULT DIAGNOSTICS, AND PREDICTIVE MAINTENANCE

Momentum Press In this book, advanced methods and techniques of monitoring, fault diagnostics, and predictive maintenance for cryogenics are illustrated. In Part I on Background, mainstreams in the related research are reviewed. In Part II of Methods, for monitoring helium distribution and consumption in cryogenic systems for particle accelerators, a virtual flowmeter is presented. Then, for fault diagnostics, two methods, for fault detection on a compressor, and for distributed diagnostics based on a micro-genetic algorithm, are described. Finally, for predictive maintenance, a metaheuristic optimization scheduling algorithm is illustrated. In Part III of Application examples, several practical case studies are described for highlighting the application of the previous methods to cryogenics of particle accelerators at CERN.