

Fuzzy Logic Application In Civil Engineering

The emergence of fuzzy logic and its applications has dramatically changed the face of industrial control engineering. Over the last two decades, fuzzy logic has allowed control engineers to meet and overcome the challenges of developing effective controllers for increasingly complex systems with poorly defined dynamics. Today's engineers need a working knowledge of the principles and techniques of fuzzy logic-Intelligent Control provides it. The author first introduces the traditional control techniques and contrasts them with intelligent control. He then presents several methods of representing and processing knowledge and introduces fuzzy logic as one such method. He highlights the advantages of fuzzy logic over other techniques, indicates its limitations, and describes in detail a hierarchical control structure appropriate for use in intelligent control systems. He introduces a variety of applications, most in the areas of robotics and mechatronics but with others including air conditioning and process/production control. One appendix provides discussion of some advanced analytical concepts of fuzzy logic, another describes a commercially available software system for developing fuzzy logic application. Intelligent Control is filled with worked examples, exercises, problems, and references. No prior knowledge of the subject nor advanced mathematics are needed to comprehend much of the book, making it well-suited as a senior undergraduate or first-year graduate text and a convenient reference tool for practicing professionals.

This report contains 27 papers related to the state-of-the-art of civil engineering at the outset of the 21st century, as well as to commemorate the ASCE's Sesquicentennial. Written by the leading practitioners, educators, and researchers of civil engineering, each of these peer-reviewed papers explores a particular aspect of civil engineering knowledge and practice. Each paper explores the development of a particular civil engineering specialty, including milestones and future barriers, constraints, and opportunities. The papers celebrate the history, heritage, and accomplishments of the profession in all facets of practice, including construction facilities, special structures, engineering mechanics, surveying and mapping, irrigation and water quality, forensics, computing, materials, geotechnical engineering, hydraulic engineering, and transportation engineering. While each paper is unique, collectively they provide a snapshot of the profession while offering thoughtful predictions of likely developments in the years to come. Together the papers illuminate the mounting complexity facing civil engineering stemming from rapid growth in scientific knowledge, technological development, and human populations, especially in the last 50 years. An overarching theme is the need for systems-level approaches and consideration from undergraduate education through advanced engineering materials, processes, technologies, and design methods and tools. These papers speak to the need for civil engineers of all specialties to recognize and embrace the growing interconnectedness of the global infrastructure, economy, society, and the need to work for more sustainable, life-cycle-oriented solutions. While embracing the past and the present, the papers collected here clearly have an eye on the future needs of ASCE and the civil engineering profession.

The use of a multi-criteria, decision-making theory was first studied in the 1970s. Its application in civil and environmental engineering is a new approach which can be enormously helpful for manufacturing companies, students, managers, engineers, etc. The purpose of this book is to provide a resource for students and researchers that includes current application of a multi-criteria, decision-making theory in various fields such as: environment, healthcare and engineering. In addition, practical application are shown for students manually. In real life problems there are many critical parameters (criteria) that can directly or indirectly affect the consequences of different decisions. Application of a multi-criteria, decision-making theory is basically the use of computational methods that incorporate several criteria and order of preference in evaluating and selecting the best option among many alternatives based on the desired outcome.

With low computational complexity and relatively short development time, Fuzzy Logic is an indispensable tool for engineering applications. The field is growing at an unprecedented rate, and there is a need for a book that describes essential tools, applications, examples, and perspectives in the field of fuzzy learning. The editors of Fuzzy Learning and Applications fill this need, providing an essential book for researchers, scientists, and engineers alike. Organized into four parts, this book starts with the simplest learning method and gradually arrives at the most complex. First, it summarizes all the symbols and formulae used in the succeeding chapters and presents a historical overview of fuzzy learning. Next, it deals with current techniques, ranging from deterministic to hybrid methods. It then illustrates the enormous number of possibilities offered by fuzzy learning. Finally, it covers hardware dedicated to fuzzy learning, from digital to analog designs and implementations. With Fuzzy Learning and Applications, readers will discover the enormous possibilities fuzzy learning offers.

A Historical Perspective

A Primer on Machine Learning Applications in Civil Engineering

Modeling, Control, and Fuzzy Logic

Proceedings of ECEE 2020

Fuzzy Learning and Applications

Fuzzy logic methodology has proven effective in dealing with complex nonlinear systems containing uncertainties that are otherwise difficult to model. Technology based on this methodology is applicable to many real-world problems, especially in the area of consumer products. This book presents the first comprehensive, unified treatment of fuzzy modeling and fuzzy control, providing tools for the control of complex nonlinear systems. Coverage includes model complexity, model precision, and computing time. This is an excellent reference for electrical, computer, chemical, industrial, civil, manufacturing, mechanical and aeronautical engineers, and also useful for graduate courses in electrical engineering, computer engineering, and computer science.

Civil and environmental engineers work together to develop, build, and maintain the man-made and natural environments that make up the infrastructures and ecosystems in which we live and thrive. Civil and Environmental Engineering: Concepts, Methodologies, Tools, and Applications is a comprehensive multi-volume publication showcasing the best research on topics pertaining to road design, building maintenance and construction, transportation, earthquake engineering, waste and pollution management, and water resources management and engineering. Through its broad and extensive coverage on a variety of crucial concepts in the field of civil engineering, and its subfield of environmental engineering, this multi-volume work is an essential addition to the library collections of academic and government institutions and appropriately meets the research needs of engineers, environmental specialists, researchers, and graduate-level students.

A First Course in Fuzzy Logic, Third Edition continues to provide the ideal introduction to the theory and applications of fuzzy logic. This best-selling text provides a firm mathematical basis for the calculus of fuzzy concepts necessary for designing intelligent systems and a solid background for readers to pursue further studies and real-world applications. New in the Third Edition: A section on type-2 fuzzy sets - a topic that has received much attention in the past few years
Additional material on copulas and t-norms **More discussions on generalized modus ponens and the compositional rule of inference** **Complete revision to the chapter on possibility theory** **Significant expansion of the chapter on fuzzy integrals** **Many new exercises** **With its comprehensive updates, this new edition presents all the background necessary for students and professionals to begin using fuzzy logic in its many-and rapidly growing- applications in computer science, mathematics, statistics, and engineering.**

The number of fuzzy logic applications is very large. This book tells the reader how to use fuzzy logic to find solutions in areas such as control systems, factory automation, product quality control, product inspection, instrumentation, pattern recognition, image analysis, database query processing, decision support, data mining, time series (waveform) databases, geographic information systems, and image databases. Those who have applications in these areas will find the book invaluable. The author was the first student to write a PhD fuzzy logic thesis under Professor Lotfi A Zadeh (the inventor of fuzzy logic), in 1967 at the University of California, Berkeley. In 1993, he designed and introduced the NICEL language for writing fuzzy programs that enclose if-then rules. NICEL is powerful and easy to use. The reader will find in the book that many algorithms for real world applications can be conveniently represented in NICEL.

Application of Soft Computing and Intelligent Methods in Geophysics

Practical Applications of Fuzzy Technologies

Advances in Civil Engineering and Infrastructural Development

Fuzzy Logic and Mathematics

The Application of Fuzzy Logic and Virtual Reality in the Study of Ancient Methods and Materials Used for the Construction of the Great Wall of China in Jinshanling

Engineers have attempted to solve water resources engineering problems with the help of empirical, regression-based and numerical models. Empirical models are not universal, nor are regression-based models. The numerical models are, on the other hand, physics-based but require substantial data measurement and parameter estimation. Hence, there is a need to employ models that are robust, user-friendly, and practical and that do not have the shortcomings of the existing methods. Artificial intelligence methods meet this need. Soft Computing in Water Resources Engineering introduces the basics of artificial neural networks (ANN), fuzzy logic (FL) and genetic algorithms (GA). It gives details on the feed forward back propagation algorithm and also introduces neuro-fuzzy modelling to readers. Artificial intelligence method applications covered in the book include predicting and forecasting floods, predicting suspended sediment, predicting event-based flow hydrographs and sedimentographs, locating seepage path in an earth-fill dam body, and the predicting dispersion coefficient in natural channels. The author also provides an analysis comparing the artificial intelligence models and contemporary non-artificial intelligence methods (empirical, numerical, regression, etc.). The ANN, FL, and GA are fairly new methods in water resources engineering. The first publications appeared in the early 1990s and quite a few studies followed in the early 2000s. Although these methods are currently widely known in journal publications, they are still very new for many scientific readers and they are totally new for students, especially undergraduates. Numerical methods were first taught at the graduate level but are now taught at the undergraduate level. There are already a few graduate courses developed on AI methods in engineering departments of some universities. It is expected that these courses, too, will soon be taught at the undergraduate levels.

The findings from literature searches, site visits, and interviews of experts on the Great Wall were used as the inputs for the fuzzy sets and logic assessments. The fuzzy models used in the evaluations were the fuzzy sets angular model and the fuzzy sets rotational model. The outputs of the fuzzy evaluations (i.e., the main construction method, the sequence implemented at the time of construction, and the current performance of the structure) were used as the inputs to create the VR model of the structure using the software SolidWorks, Google SketchUp (with Google Earth), Unity Pro, and 3ds Max. This virtual reality model guided the end user through the construction methods of the structure (dynamic interaction) and gave a walkthrough simulation of the structure. The acquisition and analysis of the knowledge base from the literature review, site visits, and interviews of the experts are shown in Volume I of this dissertation. The fuzzy assessments are presented in Volume II, and the creation and feedback of the VR models are shown in Volume III of this dissertation.

This book provides a practical guide to applying soft-computing methods to interpret geophysical data. It discusses the design of neural networks with Matlab for geophysical data, as well as fuzzy logic and neuro-fuzzy concepts and their applications. In addition, it describes genetic algorithms for the automatic and/or intelligent processing and interpretation of geophysical data.

This book is an attempt to accumulate the researches on diverse inter disciplinary field of engineering and management using Fuzzy Inference System (FIS). The book is organized in seven sections with twenty two chapters, covering a wide range of applications. Section I, caters theoretical aspects of FIS in chapter one. Section II, dealing with FIS applications to management related problems and consisting three chapters. Section III, accumulates six chapters to commemorate FIS application to mechanical and industrial engineering problems. Section IV, elaborates FIS application to image processing and cognition problems encompassing four chapters. Section V, describes FIS application to various power system engineering problem in three chapters. Section VI highlights the FIS application to system modeling and control problems and constitutes three chapters. Section VII accommodates two chapters and presents FIS application to civil engineering problem.

Fuzzy Modeling and Fuzzy Control

Concepts, Methodologies, Tools, and Applications

Perspectives in Civil Engineering

Fuzzy Sets, Decision Making, and Expert Systems

Uncertainty Modeling and Analysis in Civil Engineering

Since the late 1980s, a large number of very user-friendly tools for fuzzy control, fuzzy expert systems, and fuzzy data analysis have emerged. This has changed the character of this area and started the area of 'fuzzy technology'. The next large step in the development occurred in 1992 when almost independently in Europe, Japan and the USA, the three areas of fuzzy technology, artificial neural nets and genetic algorithms joined forces under the title of 'computational intelligence' or 'soft computing'. The synergies which were possible between these three areas have been exploited very successfully. Practical Applications of Fuzzy Sets focuses on model and real applications of fuzzy sets, and is structured into four major parts: engineering and natural sciences; medicine; management; and behavioral, cognitive and social sciences. This book will be useful for practitioners of fuzzy technology, scientists and students who are looking for applications of their models and methods, for topics of their theses, and even for venture capitalists who look for attractive possibilities for investments.

The book presents the select proceedings of the 2nd International Conference on Sustainable Construction Technologies and Advancements in Civil Engineering (ScTACE 2021). This book discusses the latest developments and contributions towards sustainable construction technologies and advances in civil engineering. Various topics covered in this book are construction technologies, geotechnical engineering, transportation and traffic engineering, structural engineering, environmental engineering, remote sensing and GIS, geo-environmental engineering, water resources engineering and earthquake engineering. This book will be useful for students, researchers and professionals working in the area of civil engineering.

Large complex systems, such as power plants and chemical manufacturing plants, depend on automatic control systems for safe operation. This book, a fully-updated revision of a successful work, introduces the principles of neural nets and fuzzy logic as they apply to designing large-scale control systems.

Machine learning has undergone rapid growth in diversification and practicality, and the repertoire of techniques has evolved and expanded. The aim of this book is to provide a broad overview of the available machine-learning techniques that can be utilized for solving civil engineering problems. The fundamentals of both theoretical and practical aspects are discussed in the domains of water resources/hydrological modeling, geotechnical engineering, construction engineering and management, and coastal/marine engineering. Complex civil engineering problems such as drought forecasting, river flow forecasting, modeling evaporation, estimation of dew point temperature, modeling compressive strength of concrete, ground water level forecasting, and significant wave height forecasting are also included. Features Exclusive information on machine learning and data analytics applications with respect to civil engineering Includes many machine learning techniques in numerous civil engineering disciplines Provides ideas on how and where to apply machine learning techniques for problem solving Covers water resources and hydrological modeling, geotechnical engineering, construction engineering and management, coastal and marine engineering, and geographical information systems Includes MATLAB® exercises

Microelectronic Design of Fuzzy Logic-Based Systems

Proceedings of Workshop on Civil Engineering Applications of Fuzzy Sets

Fuzzy-logic-based Programming

Recent Advances in Civil Engineering

Control Application Using Fuzzy Logic: Design of a Fuzzy Temperature Controller

The hydrological sciences typically present grey or fuzzy information, making them quite messy and a choice challenge for fuzzy logic application. Providing readers with the first book to cover fuzzy logic modeling as it relates to water science, the author takes an approach that incorporates verbal expert views and other parameters that allow him to eschew the use of mathematics. The book's first seven chapters expose the fuzzy logic principles, processes and design for a fruitful inference system with many hydrological examples. The last two chapters present the use of those principles in larger scale hydrological scales within the hydrological cycle. With the expansion of new technologies, materials, and the design of complex systems, the expectations of society upon engineers are becoming larger than ever. Engineers make critical decisions with potentially high adverse consequences. The current political, societal, and financial climate requires engineers to formally consider the factors of uncertainty (e.g., floods, earthquakes, winds, environmental risks) in their decisions at all levels. Uncertainty Modeling and Analysis in Civil Engineering provides a thorough report on the immediate state of uncertainty modeling and analytical methods for civil engineering systems, presenting a toolbox for solving problems in real-world situations. Topics include Neural Networks Genetic algorithms Numerical modeling Fuzzy sets and operations Reliability and risk analysis Systems control Uncertainty in probability estimates This compendium is a considerable reference for civil engineers as well as for engineers in other disciplines, computer scientists, general scientists, and students.

Providing equal emphasis on theoretical foundations and practical issues, this book features fuzzy logic concepts and techniques in intelligent systems, control, and information technology. Uses Fuzzy Logic Toolbox MATLAB to demonstrate exemplar applications and to develop hands-on exercises.

This book is a guide for students, researchers, and practitioners to the latest developments in fuzzy hybrid computing in construction engineering and management. It discusses basic theory related to fuzzy logic and fuzzy hybrid computing, their application in a range of practical construction problems, and emerging and future research trends.

Fuzzy Hybrid Computing in Construction Engineering and Management

Use of Fuzzy Logic in Eia: A New Direction in Civil Engineering Field

Artificial Neural Networks, Fuzzy Logic and Genetic Algorithms

A First Course in Fuzzy Logic, Third Edition

Energy, Environmental and Construction Engineering

This book gathers the latest advances, innovations, and applications in the field of energy, environmental and construction engineering, as presented by international researchers and engineers at the International Scientific Conference Energy, Environmental and Construction Engineering, held in St. Petersburg, Russia on November 19-20, 2020. It covers highly diverse topics, including BIM; bridges, roads and tunnels; building materials; energy efficient and green buildings; structural mechanics; fluid mechanics; measuring technologies; environmental management; power consumption management; renewable energy; smart cities; and waste management. The contributions, which were selected by means of a rigorous international peer-review process, highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaborations.

The latest update on this popular textbook The importance of concepts and methods based on fuzzy logic and fuzzy set theory has been rapidly growing since the early 1990s and all the indications are that this trend will continue in the foreseeable future. Fuzzy Logic with Engineering Applications, Fourth Edition is a new edition of the popular textbook with 15% of new and updated material. Updates have been made to most of the chapters and each chapter now includes new end-of-chapter problems. Key features: New edition of the popular textbook with 15% of new and updated material. Includes new examples and end-of-chapter problems. Has been made more concise with the removal of out of date material. Covers applications of fuzzy logic to engineering and science. Accompanied by a website hosting a solutions manual and software. The book is essential reading for graduates and senior undergraduate students in civil, chemical, mechanical and electrical engineering as well as researchers and practitioners working with fuzzy logic in industry.

Fuzzy logic has virtually exploded over the landscape of emerging technologies, becoming an integral part of myriad applications and a standard tool for engineers. Until recently, most of the attention and applications have centered on fuzzy systems implemented in software. But these systems are limited. Problems that require real-time operation, low area, or low power consumption demand hardware designed to the fuzzy paradigm - and engineers with the background and skills to design it. Microelectronic Design of Fuzzy Logic-Based Systems offers low-cost answers to issues that software cannot resolve. From the theoretical, architectural, and technological foundation to design tools and applications, it serves as your guide to effective hardware realizations of fuzzy logic. Review fuzzy logic theory and the basic issues of fuzzy sets, operators, and inference mechanisms Explore the trade-offs between efficient theoretical behavior and practical hardware realizations Discover the properties of the possible microelectronic realizations of fuzzy systems - conventional processors, fuzzy coprocessors, and fuzzy chips Investigate the design of fuzzy chips that implement the whole fuzzy inference method into silicon Analyze analog, digital, and mixed-signal techniques Reduce your design effort for fuzzy systems with CAD tools - learn the requirements they should meet and survey current environments. Put it all together - see examples and case studies illustrating how all of this is used to solve particular problems related to control and neuro-fuzzy applications

The term "fuzzy logic," as it is understood in this book, stands for all aspects of representing and manipulating knowledge based on the rejection of the most fundamental principle of classical logic--the principle of bivalence. According to this principle, each declarative sentence is required to be either true or false. In fuzzy logic, these classical truth values are not abandoned. However, additional, intermediate truth values between true and false are allowed, which are interpreted as degrees of truth. This opens a new way of thinking---thinking in terms of degrees rather than absolutes. For example, it leads to the definition of a new kind of sets, referred to as fuzzy sets, in which membership is a matter of degree. The book examines the genesis and development of fuzzy logic. It surveys the prehistory of fuzzy logic and inspects circumstances that eventually lead to the emergence of fuzzy logic. The book explores in detail the development of propositional, predicate, and other calculi that admit degrees of truth, which are known as fuzzy logic in the narrow sense. Fuzzy logic in the broad sense, whose primary aim is to utilize degrees of truth for emulating common-sense human reasoning in natural language, is scrutinized as well. The book also examines principles for developing mathematics based on fuzzy logic and provides overviews of areas in which this has been done most effectively. It also presents a detailed survey of established and prospective applications of fuzzy logic in various areas of human affairs, and provides an assessment of the significance of fuzzy logic as a new paradigm.

Select Proceedings of ICRACEID 2019

Fuzzy Logic Controller for Mechatronics and Automation

Commemorating the 150th Anniversary of the American Society of Civil Engineers

Civil and Environmental Engineering: Concepts, Methodologies, Tools, and Applications

Structural Health Monitoring Using Genetic Fuzzy Systems

This book has been designed to improve the methodology of EIA that involved uncertainty and impreciseness during prediction of it's parameter.The parametric information or data available from the periphery of a project are not always crisp or precise, rather linguistic & hedges.Most of the data are nonnumeric, viz. "good","very good","low","high","less","big," "poor,"etc. which are fuzzy data.Naturally every decision maker hesitates more or less on every evaluation activity.At present there is no tool available to an engineers or experts by which these uncertainties can be eliminated or reduced.The aim of this book is to build up a new concept of fuzzy EIA tool to tackle this uncertainty with "degree of membership value" for all possible grades of truthness. Consequently exploring the subject Fuzzy-EIA in this book is a kind of innovative contribution in a new direction and dimension. I strongly feel that this book will highly be beneficial to both students and teachers and will also get benefit to use as a major resource for learning theory, solving problems, and initiating research projects for the UPGP programmes and research scholar in various fields.

In the two decades since its inception by L. Zadeh, the theory of fuzzy sets has matured into a wide-ranging collection of concepts, models, and techniques for dealing with complex phenomena which do not lend themselves to analysis by classical methods based on probability theory and bivalent logic. Nevertheless, a question which is frequently raised by the skeptics is, Are there, in fact, any significant problem areas in which the use of the theory of fuzzy sets leads to results which could not be obtained by classical methods? The approximately 5000 publications in this area, which are scattered over many areas such as artificial intelligence, computer science, control engineering, decision making, logic, operations research, pattern recognition, robotics and others, provide an affirmative answer to this question. In spite of the large number of publications, good and comprehensive textbooks which could facilitate the access of newcomers to this area and support teaching were missing until recently. To help to close this gap and to provide a textbook for courses in fuzzy set theory which can also be used as an introduction to this field, the first volume ofthis book was published in 1985 [Zimmermann 1985 b]. This volume tried to cover fuzzy set theory and its applications as extensively as possible. Applications could, therefore, only be described to a limited extent and not very detailed.

Safety evaluation by definition involves many complex factors and thus covers a wide range of topics. In order to focus the content of the workshop the subject matter was specific to the state of the art and the recent developments in nonlinear and time-variant methods employing identification procedures. Participants in the workshop represented a wide range of expertise. They were selected in order to cover the state of the art of knowledge in fault-detection and dam age assessment, system identification, signal processing, mathematical and physical modelling and applications of techniques such as fuzzy logic and neural networks. The emphasis was placed on the exploitation and understanding of nonlinearity arising from structural or material faults. Figure 1 indicates the range of topics covered in the workshop. Since no unique or general approach yet exists for treating nonlinearity in the field of safety evaluation, many of the topics presented were problem specific. In order to assist the reader in selecting the material of primary interest a matrix of the topics covered by each participant is shown in Table 1. This table relates the authors to the subject matter, providing a guide through the diverse range of topics presented at the workshop.

This book comprises selected proceedings of the International Conference on Recent Advancements in Civil Engineering and Infrastructural Developments (ICRACEID 2019). The contents are broadly divided into five areas (i) smart transportation with urban planning, (ii) clean energy and environment, (iii) water distribution and waste management, (iv) smart materials and structures, and (v) disaster management. The book aims to provide solutions to global challenges using innovative and emerging technologies covering various fields of civil engineering. The major topics covered include urban planning, transportation, water distribution, waste management, disaster management, environmental pollution and control, environmental impact assessment, application of GIS and remote sensing, and structural analysis and design. Given the range of topics discussed, the book will be beneficial for students, researchers as well industry professionals.

Application of Multi-Criteria Decision Analysis in Environmental and Civil Engineering

17-19 October 1985

The application of fuzzy logic to traffic assignment in developing countries

Intelligence, Control, and Information

Managing Business in the Civil Construction Sector Through Information Communication Technologies

The first edition of Fuzzy Logic with Engineering Applications (1995) was the first classroom text for undergraduates in the field. Now updated for the second time, this new edition features the latest advances in the field including material on expansion of the MLFE method using genetic algorithms, cognitive mapping, fuzzy agent-based models and total uncertainty. Redundant or obsolete topics have been removed, resulting in a more concise yet inclusive text that will ensure the book retains its broad appeal at the forefront of the literature. Fuzzy Logic with Engineering Applications, 3rd Edition is oriented mainly towards methods and techniques. Every chapter has been revised, featuring new illustrations and examples throughout. Supporting MATLAB code is downloadable at www.wileyeurope.com/go/fuzzylogic. This will benefit student learning in all basic operations, the generation of membership functions, and the specialized applications in the latter chapters of the book, providing an invaluable tool for students as well as for self-study by practicing engineers.

In the early 1970s, fuzzy systems and fuzzy control theories added a new dimension to control systems engineering. From its beginnings as mostly heuristic and somewhat ad hoc, more recent and rigorous approaches to fuzzy control theory have helped make it an integral part of modern control theory and produced many exciting results. Yesterday's art

Structural health monitoring (SHM) has emerged as a prominent research area in recent years owing to increasing concerns about structural safety, and the need to monitor and extend the lives of existing structures. Structural Health Monitoring Using Genetic Fuzzy Systems elaborates the process of intelligent SHM development and implementation using the evolutionary system. The use of a genetic algorithm automates the development of the fuzzy system, and makes the method easy to use for problems involving a large number of measurements, damage locations and sizes; such problems being typical of SHM. The ideas behind fuzzy logic, genetic algorithms and genetic fuzzy systems are also explained. The functionality of the genetic fuzzy system architecture is elucidated within a case-study framework, covering: • SHM of beams; • SHM of composite tubes; and • SHM of helicopter rotor blades. Structural Health Monitoring Using Genetic Fuzzy Systems will be useful for aerospace, civil and mechanical engineers working with structures and structured components. It will also be useful for computer scientists and applied mathematicians interested in the application of genetic fuzzy systems to engineering problems.

Many industries have struggled to realize the importance of modern technology, but none more so than the construction industry. By employing various computer-aided management systems, construction businesses have increased their profitability and the systematic way their companies function. Managing Business in the Civil Construction Sector Through Information Communication Technologies supplies a compendium of innovative research that highlights the use of computer-aided design and tools and the vital role that such forms of information technology have to play in the actual production activities of any civil construction company. Subsequent chapters focus on equally vital areas such as that of construction management, contracts management, materials management, human resource management, and enterprise resource planning. Chapters on cloud computing technology, internet of things, and artificial intelligence enable readers to acquire an overview and grasp the basics of these latest trending technologies. This book is ideally designed for construction firms, students, entrepreneurs, industry professionals, IT consultants, and academicians.

Fuzzy Logic and Hydrological Modeling

Fuzzy Logic

Intelligent Control

Fuzzy Logic with Engineering Applications

Safety Evaluation Based on Identification Approaches Related to Time-Variant and Nonlinear Structures