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JPRS Report- 1993-07-21

Analysis and Design of Plated Structures-N E Shanmugam 2007-02-14 Plated structures are widely used in many engineering constructions ranging from aircraft to ships and from off-shore structures to bridges and buildings. Given their diverse use in severe dynamic loading environments, it is vital that their dynamic behaviour is analysed and understood. Analysis and design of plated structures Volume 2: Dynamics provides a concise review of the most recent research in the area and how it can be applied in the field. The book discusses the modelling of plates for effects such as transverse shear deformation and rotary inertia, assembly of plates in forming thin-walled members, and changing material properties in composite, laminated and functionally graded plates. Various recent techniques for linear and nonlinear vibration analysis are also presented and discussed. The book concludes with a hybrid strategy suitable for parameter identification of plated structures and hydroelastic analysis of floating plated structures. With its distinguished editors and team of international contributors, Analysis and design of plated structures Volume 2: Dynamics is an invaluable reference source for engineers, researchers and academics involved in the analysis and design of plated structures. It also provides a companion volume to Analysis and design of plated structures Volume 1: Stability. The second of two volumes on plated structures Provides a concise review of the most recent research in the research of plated structures Discusses modelling of plates for specific effects

Functionally Graded Materials-Hui-Shen Shen 2016-04-19 Put a New Class of Structural Composites to Use Real Solutions for Predicting Load Initially designed as thermal barrier materials for aerospace applications and fusion reactors, functionally graded materials (FGMs) are now widely employed as structural components in extremely high-temperature environments. However, little information is commonly available that would allow engineers to predict the response of FGM plates and shells subjected to thermal and mechanical loads. Functionally Graded Materials: Nonlinear Analysis of Plates and Shells is the first book devoted to the geometrically nonlinear response of inhomogeneous isotropic and functionally graded plates and shells. Concerned that the high loads common to many structures may result in nonlinear load-deflection relationships due to large deformations, author Hui-Shen Shen has been conducting investigations since 2001, paying particular attention to the nonlinear response of these plates and shells to nonlinear bending, postbuckling and nonlinear vibration. Nearly all the solutions presented are the results of investigations conducted by the author and his collaborators. The rigor of these investigative procedures allows the results presented within these pages to stand as a benchmark against which the validity and accuracy of other numerical solutions may be measured

Functionally Gradient Materials-J. B. Holt 1993

Trends in Welding Research-Stan A. David 2009-01-01

Functionally Graded Materials, Technology Leveraged Applications-Renée G. Ford 2002

Fundamentals of Functionally Graded Materials-Subra Suresh 1998 A revised, updated and integrated version of two review articles published in the Institute's journal, International Materials Reviews which dealt with the processing and the thermomechanical response of functionally graded materials. It includes new developments which have occurred since these articles were written.

JSME International Journal- 2002

Design and Modeling of Mechanical Systems - IV-Nizar Aifaoui 2020-02-26 This book offers a collection of original peer-reviewed contributions presented at the 8th International Congress on Design and Modeling of Mechanical Systems (CMSM'2019), held in Hammamet, Tunisia, from the 18th to the 20th of March 2019. It reports on research, innovative industrial applications and case studies concerning mechanical systems and related to modeling and analysis of materials and structures, multiphysics methods, nonlinear dynamics, fluid structure interaction and vibroacoustics, design and manufacturing engineering. Continuing on the tradition of the previous editions, these proceedings offers a broad overview of the state-of-the art in the field and a useful resource for academic and industry specialists active in the field of design and modeling of mechanical systems. CMSM'2019 was jointly organized by two leading Tunisian research laboratories: the Mechanical Engineering Laboratory of the National Engineering School of Monastir, University of Monastir and the Mechanical, Modeling and Manufacturing Laboratory of the National Engineering School of Sfax, University of Sfax.

Recent Developments in the Theory of Shells-Holm Altenbach 2019-09-25 This book commemorates the 80th birthday of Prof. W. Pietraszkiewicz, a prominent specialist in the field of general shell theory. Reflecting Prof. Pietraszkiewicz's focus, the respective papers address a range of current problems in the theory of shells. In addition, they present other structural mechanics problems involving dimension-reduced models. Lastly, several applications are discussed, including material models for such dimension-reduced structures.

Analysis of Shells, Plates, and Beams-Holm Altenbach 2020-06-03 This book commemorates the 75th birthday of Prof. George Jaiani - Georgia's leading expert on shell theory. He is also well known outside Georgia for his individual approach to shell theory research and as an organizer of meetings, conferences and schools in the field. The collection of papers presented includes articles by scientists from various countries discussing the state of the art and new trends in the theory of shells, plates, and beams. Chapter 20 is available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

The NURBS Book-Les Piegl 2012-12-06 Until recently B-spline curves and surfaces (NURBS) were principally of interest to the computer aided design community, where they have become the standard for curve and surface description. Today we are seeing expanded use of NURBS in modeling objects for the visual arts, including the film and entertainment industries, art, and sculpture. NURBS are now also being used for modeling scenes for virtual reality applications. These applications are expected to increase. Consequently, it is quite appropriate for The NURBS Book to be part of the Monographs in Visual Communication Series. B-spline curves and surfaces have been an enduring element throughout my professional life. The first edition of Mathematical Elements for Computer Graphics, published in 1972, was the first computer aided design/interactive computer graphics textbook to contain material on B-splines. That material was obtained through the good graces of Bill Gordon and Louie Knapp while they were at Syracuse University. A paper of mine, presented during the Summer of 1977 at a Society of Naval Architects and Marine Engineers meeting on computer aided ship surface design, was arguably the first to examine the use of B-spline curves for ship design. For many, B-splines, rational B-splines, and NURBS have been a bit mysterious.

Analysis of Shells, Plates, and Beams-Holm Altenbach 2020-06-03 This book commemorates the 75th birthday of Prof. George Jaiani - Georgia's leading expert on shell theory. He is also well known outside Georgia for his individual approach to shell theory research and as an organizer of meetings, conferences and schools in the field. The collection of papers presented includes articles by scientists from various countries discussing the state of the art and new trends in the theory of shells, plates, and beams. Chapter 20 is available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

Troubleshooting Finite-Element Modeling with Abaqus-Raphael Jean Boulbes 2019-09-06 This book gives Abaqus users who make use of finite-element models in academic or practitioner-based research the in-depth program knowledge that allows them to debug a structural analysis model. The book provides many methods and

guidelines for different analysis types and modes, that will help readers to solve problems that can arise with Abaqus if a structural model fails to converge to a solution. The use of Abaqus affords a general checklist approach to debugging analysis models, which can also be applied to structural analysis. The author uses step-by-step methods and detailed explanations of special features in order to identify the solutions to a variety of problems with finite-element models. The book promotes: • a diagnostic mode of thinking concerning error messages; • better material definition and the writing of user material subroutines; • work with the Abaqus mesher and best practice in doing so; • the writing of user element subroutines and contact features with convergence issues; and • consideration of hardware and software issues and a Windows HPC cluster solution. The methods and information provided facilitate job diagnostics and help to obtain converged solutions for finite-element models regarding structural component assemblies in static or dynamic analysis. The troubleshooting advice ensures that these solutions are both high-quality and cost-effective according to practical experience. The book offers an in-depth guide for students learning about Abaqus, as each problem and solution are complemented by examples and straightforward explanations. It is also useful for academics and structural engineers wishing to debug Abaqus models on the basis of error and warning messages that arise during finite-element modelling processing.

Finite Elements in Fracture Mechanics-Meinhard Kuna 2013-07-19 Fracture mechanics has established itself as an important discipline of growing interest to those working to assess the safety, reliability and service life of engineering structures and materials. In order to calculate the loading situation at cracks and defects, nowadays numerical techniques like finite element method (FEM) have become indispensable tools for a broad range of applications. The present monograph provides an introduction to the essential concepts of fracture mechanics, its main goal being to procure the special techniques for FEM analysis of crack problems, which have to date only been mastered by experts. All kinds of static, dynamic and fatigue fracture problems are treated in two- and three-dimensional elastic and plastic structural components. The usage of the various solution techniques is demonstrated by means of sample problems selected from practical engineering case studies. The primary target group includes graduate students, researchers in academia and engineers in practice.

Finite Element Analysis of Mode I Crack Propagation in Layered Functionally Graded Beams-William Wei-Qiang Liang 1999

Functionally Graded Materials-Y. Miyamoto 2013-11-27 Seven years have elapsed since Dr. Renee Ford, editor-in-chief of Materials Technology, first suggested to me to publish a book on Functionally Graded Materials (FGMs). She said that the FGM concept, then largely unknown outside of Japan and a relatively few laboratories elsewhere, would be of great interest to everyone working in the materials field because of its potentially universal applicability. There was no book about FGMs in English at that time, although the number of research papers, review articles, and FGM conference proceedings had been increasing yearly. We discussed what the book should cover, and decided it should present a comprehensive description from basic theory to the most recent applications of FGMs. This would make it useful both as an introduction to FGMs for those simply curious about what this new materials field was all about, and also as a textbook for researchers, engineers, and graduate students in various material fields. The FGM Forum in Japan generously offered to support this publication program. is very difficult for an individual author to write a book that Because it covers such a wide range of various aspects of many different materials, I invited more than 30 eminent materials scientists throughout the world, who were associated with FGM research, to contribute selected topics. I also asked several leading researchers in this field to edit selected chapters: Dr. Barry H. Rabin, then at the U. S.

Introduction to Finite Element Analysis Using MATLAB® and Abaqus-Amar Khennane 2013-06-10 There are some books that target the theory of the finite element, while others focus on the programming side of things. Introduction to Finite Element Analysis Using MATLAB® and Abaqus accomplishes both. This book teaches the first principles of the finite element method. It presents the theory of the finite element method while maintaining a balance between its mathematical formulation, programming implementation, and application using commercial software. The computer implementation is carried out using MATLAB, while the practical applications are carried out in both MATLAB and Abaqus. MATLAB is a high-level language specially designed for dealing with matrices, making it particularly suited for programming the finite element method, while Abaqus is a suite of commercial finite element software. Includes more than 100 tables, photographs, and figures Provides MATLAB codes to generate contour plots for sample results Introduction to Finite Element Analysis Using MATLAB and Abaqus introduces and explains theory in each chapter, and provides corresponding examples. It offers introductory notes and provides matrix structural analysis for trusses, beams, and frames. The book examines the theories of stress and strain and the relationships between them. The author then covers weighted residual methods and finite element approximation and numerical integration. He presents the finite element formulation for plane stress/strain problems, introduces axisymmetric problems, and highlights the theory of plates. The text supplies step-by-step procedures for solving problems with Abaqus interactive and keyword editions. The described procedures are implemented as MATLAB codes and Abaqus files can be found on the CRC Press website.

Micromechanics of Composite Materials-Jacob Aboudi 2012-11-01 Summary: A Generalized Multiscale Analysis Approach brings together comprehensive background information on the multiscale nature of the composite, constituent material behaviour, damage models and key techniques for multiscale modelling, as well as presenting the findings and methods, developed over a lifetime's research, of three leading experts in the field. The unified approach presented in the book for conducting multiscale analysis and design of conventional and smart composite materials is also applicable for structures with complete linear and nonlinear material behavior, with numerous applications provided to illustrate use. Modeling composite behaviour is a key challenge in research and industry; when done efficiently and reliably it can save money, decrease time to market with new innovations and prevent component failure.

ASME Technical Papers-

Paper- 1989

Energy Research Abstracts- 1985 Semiannual, with semiannual and annual indexes. References to all scientific and technical literature coming from DOE, its laboratories, energy centers, and contractors. Includes all works deriving from DOE, other related government-sponsored information, and foreign nonnuclear information. Arranged under 39 categories, e.g., Biomedical sciences, basic studies; Biomedical sciences, applied studies; Health and safety; and Fusion energy. Entry gives bibliographical information and abstract. Corporate, author, subject, report number indexes.

Non-linear Bending Analysis of Functionally Graded Beams with Spring Constraints and Thermal Effects-Swetha Suresh 2019 Functionally graded materials, a subcategory of Advanced Composite Materials, is characterized by variation in microstructure and properties across the thickness of the beam. The unique advantage of Functionally Graded Materials (FGM) is the smooth and continuous change in properties of constituent materials from one layer to its adjacent layer in comparison to sharp changes in material properties as seen in composites. This unique attribute of functionally graded materials thereby, reduces the stress concentrations, shear and thermal stresses that occur at the interference of layers. Functionally graded materials can, thus, find applications in areas subjected to high mechanical loads and thermal stresses. The scope of this thesis is twofold: first, to study the nonlinear static analysis of FGM beams subjected to uniformly distributed mechanical transverse pressure load with both conventional and unconventional boundary conditions. The conventional boundary conditions considered here, are simply-supported and clamped-clamped with immovable edges, and unconventional boundary conditions considered are translational and rotational springs. The reason for considering unconventional boundary conditions is that in practice, it might be very difficult to achieve rigidly simply-supported or rigidly clamped boundaries. The effect of first order shear deformation theory is also considered. Second, is to study the nonlinear bending analysis of FGM beams subjected to both thermal loads and uniformly distributed mechanical transverse pressure load, for clamped-clamped beams with immovable edges.

Volume fraction of component materials is varied using power law across the thickness. Material modeling has been done using two different models, namely: rule of mixtures and Mori-Tanaka model. Nonlinear governing equations were obtained using the von Karmen geometric nonlinearity and first-order shear deformation theory. Results are obtained for variations with different gradation patterns. A few of the obtained results are compared with the Finite Element Results that are obtained using ABAQUS software.

Functionally Graded Thin-walled Structural Systems Under Extreme Loading-Elias Ali 2020 With increasing fire accidents in buildings, explosions on critical infrastructures accompanied by increasing development in technology, manufacturing and construction process, the biggest challenge the construction industry, material science, and civil engineering community face these days is the selection of appropriate materials and the study of their responses for extreme loading environment. One of a new class of advanced composite materials recently developed is functionally graded materials (FGMs). FGMs are advanced composite materials characterized by a non-homogeneous material system with a gradual gradation of material property within a given dimension in which two or more materials are mixed with a graded interface. Even though FGMs have been used in the last three decades for aerospace, medicine, defense, energy and optoelectronics, their application in structural components and infrastructures is still in its research stage and in recent years, it has attracted researchers and manufacturers for its potential application under extreme environments such as fire accident and blast. This research has the aim of providing a better understanding, expanding the current knowledge, and investigates this novel composite material for its potential application in thin-walled structural members and systems under extreme loading environment through numerical computations. To achieve these aims, the research was divided into four phases: 1) Investigate both analytical and numerical solutions of FGM structural components (beam and plate) under mechanical loading, 2) Investigate the application of FGMs as a thermal barrier in Cold-Formed Steel (CFS) structural elements, 3) Investigate numerically the response of thin-walled FGM pipes and plates under blast loading and 4) Investigate the performance of large scale FGM wall systems under extreme loading (fire and blast). Furthermore, optimization of FGM for extreme loading was investigated through a parametric study of FGM material functions (power-law, sigmoid and exponential) and material thickness. Finite element analysis (FEA) using ABAQUS was used to perform the heat transfer and structural responses of the thin-walled structural members/wall system under standard fire conditions, while a Coupled Eulerian-Lagrangian (CEL) was used to investigate the response of FGM plate, pipes and wall system under blast loading. It was observed from results of the research that, FGM sheathing showed better performance in reducing the spread of fire-temperature to CFS member by up to 14% compared to traditional gypsum board in fire exposed flange and increases the collapse moment and failure load by 12% and 18% for CFS beams and columns respectively. Blast response of FGM pipes and plates also resulted in smaller deformation than uniformly graded material. Responses of the FGM sheathed wall system under both fire and blast loading also exhibit better performance as compared with similar configuration with gypsum sheathing. Overall, this research has contributed and demonstrated the potential application of FGMs in thin-walled structural components/systems for the future development of resilient and sustainable structures/infrastructures under extreme loading.

Functionally Graded Materials VIII-O. van der Biest 2005 Multifunctional materials are composite systems that exhibit useful responses to electrical, optical, magnetic and/or mechanical stimuli. They allow the compact and economic integration of two or more functions; which can be mechanical, biological, acoustic, thermal, electrical, magnetic, optical or sensory in nature. Functionally graded materials (FGM) are also multi-functional materials, which exhibit spatial variations in composition and/or microstructure; created with the specific purpose of controlling variations in thermal, structural or functional properties. In spite of large differences in the type and size scale of the materials considered, many common features exist, thus furnishing a rationale for grouping these materials together in one book. The topics covered include: structural applications, materials for information technology, energy conversion materials and devices, biomedical materials and their applications, multifunctional materials for sensors and actuators, eco-materials, thin films and coatings, modeling and simulations, testing and characterization, processing of materials. Overall, the book provides an excellent overview of the latest scientific and technological results in the field of FGMs, Multi-FGMs and related fields.

Isogeometric Analysis and Applications 2014-Bert Jüttler 2015-12-21 Isogeometric Analysis is a groundbreaking computational approach that promises the possibility of integrating the finite element method into conventional spline-based CAD design tools. It thus bridges the gap between numerical analysis and geometry, and moreover it allows to tackle new cutting edge applications at the frontiers of research in science and engineering. This proceedings volume contains a selection of outstanding research papers presented at the second International Workshop on Isogeometric Analysis and Applications, held at Annweiler, Germany, in April 2014.

Proceedings of the ASME Aerospace Division-American Society of Mechanical Engineers. Aerospace Division 2005

Applied Mechanics of Solids-Allan F. Bower 2009-10-05 Modern computer simulations make stress analysis easy. As they continue to replace classical mathematical methods of analysis, these software programs require users to have a solid understanding of the fundamental principles on which they are based. Develop Intuitive Ability to Identify and Avoid Physically Meaningless Predictions Applied Mechanics o

Functionally Graded Materials-Rasheedat Modupe Mahamood 2017-02-14 This book presents the concept of functionally graded materials as well as their use and different fabrication processes. The authors describe the use of additive manufacturing technology for the production of very complex parts directly from the three dimension computer aided design of the part by adding material layer after layer. A case study is also presented in the book on the experimental analysis of functionally graded material using laser metal deposition process.

Shell-like Structures-Holm Altenbach 2016-08-09 The book presents mathematical and mechanical aspects of the theory of plates and shells, applications in civil, aero-space and mechanical engineering, as well in other areas. The focus relates to the following problems:• comprehensive review of the most popular theories of plates and shells,• relations between three-dimensional theories and two-dimensional ones,• presentation of recently developed new refined plates and shells theories (for example, the micropolar theory or gradient-type theories),• modeling of coupled effects in shells and plates related to electromagnetic and temperature fields, phase transitions, diffusion, etc.,• applications in modeling of non-classical objects like, for example, nanostructures,• presentation of actual numerical tools based on the finite element approach.

Material Modeling in Finite Element Analysis-Z. Yang 2019-10-10 Finite element analysis has been widely applied in mechanical, civil, and biomedical designs. This book aims to provide the readers comprehensive views of various material models with practical examples, which would help readers understand various materials, and build appropriate material models in the finite element analysis. This book is composed of four main parts: 1) metals, 2) polymers, 3) soils, and 4) modern materials. Each part starts with the structure and function of different materials and then follows the corresponding material models such as BISO, MISO, Chaboche model in metals, Arruda-Boyce model, Mooney-Rivlin model, Ogden model in polymers, Mohr-Coulomb model, Cam Clay model and Jointed Rock model in geomechanics, composites and shape memory alloys in modern materials. The final section presents some specific problems, such as metal forming process, combustion chamber, Mullins effect of rubber tire, breast shape after breast surgery, viscoelasticity of liver soft tissues, tunnel excavation, slope stability, orthodontic wire, and piezoelectric microaccelerometer. All modeling files are provided in the appendixes of the book. This book would be helpful for graduate students and researchers in the mechanical, civil,

and biomedical fields who conduct finite element analysis. The book provides all readers with comprehensive understanding of modeling various materials.

Field-Assisted Sintering-Eugene A. Olevsky 2018-08-09 This book represents the first ever scientific monograph including an in-depth analysis of all major field-assisted sintering techniques. Until now, the electromagnetic field-assisted technologies of materials processing were lacking a systematic and generalized description in one fundamental publication; this work promotes the development of generalized concepts and of comparative analyses in this emerging area of materials fabrication. This book describes modern technologies for the powder processing-based fabrication of advanced materials. New approaches for the development of well-tailored and stable structures are thoroughly discussed. Since the potential of traditional thermo-mechanical methods of material treatment is limited due to inadequate control during processing, the book addresses ways to more accurately control the resultant material's structure and properties by an assisting application of electro-magnetic fields. The book describes resistance sintering, high-voltage consolidation, sintering by low-voltage electric pulses (including spark plasma sintering), flash sintering, microwave sintering, induction heating sintering, magnetic pulse compaction and other field-assisted sintering techniques. Includes an in-depth analysis of all major field-assisted sintering techniques; Explains new techniques and approaches for material treatment; Provides detailed descriptions of spark plasma sintering, microwave sintering, high-voltage consolidation, magnetic pulse compaction, and various other approaches when field-assisted treatment is applied.

Textile Asia- 1999

Metal Matrix Composites-Minoru Taya 2016-01-11 Metal Matrix Composites: Thermomechanical Behavior discusses metal matrix composites, elaborating on that consists of two phases—fiber as reinforcement and metal as matrix. This book focuses on polymer matrix composites, including topics in metal matrix composites ranging from processing to fracture mechanics. The three basic types of composite materials—dispersion-strengthened, particle-reinforced, and fiber (whisker)-reinforced, are also described in detail. Dispersion-strengthened is characterized by a microstructure consisting of an elemental matrix within which fine particles are uniformly dispersed, while particle-reinforced is indicated by dispersed particles of greater than 1.0 μm diameter with a volume fraction of 5 to 40%. Fiber (whisker)-reinforced provides a distinguishing microstructural feature of fiber-reinforced materials, such as that the reinforcing fiber has one long dimension, while the reinforcing particles of the other two types do not. This publication serves as a reference data book to students and researchers aiming to acquire knowledge of the thermomechanical behavior of metal matrix composites.

Advances in Structural Engineering-Vasant Matsagar 2014-12-12 The book presents research papers presented by academicians, researchers, and practicing structural engineers from India and abroad in the recently held Structural Engineering Convention (SEC) 2014 at Indian Institute of Technology Delhi during 22 - 24 December 2014. The book is divided into three volumes and encompasses multidisciplinary areas within structural engineering, such as earthquake engineering and structural dynamics, structural mechanics, finite element methods, structural vibration control, advanced cementitious and composite materials, bridge engineering, and soil-structure interaction. Advances in Structural Engineering is a useful reference material for structural engineering fraternity including undergraduate and postgraduate students, academicians, researchers and practicing engineers.

Proceedings of the International Conference on Advances in Computational Mechanics 2017-Hung Nguyen-Xuan 2018-02-20 This book provides an overview of state-of-the-art methods in computational engineering for modeling and simulation. This proceedings volume includes a selection of refereed papers presented at the International Conference on Advances in Computational Mechanics (ACOME) 2017, which took place on Phu Quoc Island, Vietnam on August 2-4, 2017. The contributions highlight recent advances in and innovative applications of computational mechanics. Subjects covered include: biological systems; damage, fracture and failure; flow problems; multiscale multiphysics problems; composites and hybrid structures; optimization and inverse problems; lightweight structures; computational mechatronics; computational dynamics; numerical methods; and high-performance computing. The book is intended for academics, including graduate students and experienced researchers interested in state-of-the-art computational methods for solving challenging problems in engineering.

Evolving and Revolutionary Technologies for the New Millennium-Leslie Jay Cohen 1999

Recent Advances in Structural Engineering, Volume 1-A. Rama Mohan Rao 2018-08-01 This book is a collection of select papers presented at the Tenth Structural Engineering Convention 2016 (SEC-2016). It comprises plenary, invited, and contributory papers covering numerous applications from a wide spectrum of areas related to structural engineering. It presents contributions by academics, researchers, and practicing structural engineers addressing analysis and design of concrete and steel structures, computational structural mechanics, new building materials for sustainable construction, mitigation of structures against natural hazards, structural health monitoring, wind and earthquake engineering, vibration control and smart structures, condition assessment and performance evaluation, repair, rehabilitation and retrofit of structures. Also covering advances in construction techniques/ practices, behavior of structures under blast/impact loading, fatigue and fracture, composite materials and structures, and structures for non-conventional energy (wind and solar), it will serve as a valuable resource for researchers, students and practicing engineers alike.

Innovative Product Design and Intelligent Manufacturing Systems-BBVL. Deepak 2020-03-13 This book gathers selected research articles from the International Conference on Innovative Product Design and Intelligent Manufacturing System (ICIPDIMS 2019), held at the National Institute of Technology, Rourkela, India. The book discusses latest methods and advanced tools from different areas of design and manufacturing technology. The main topics covered include design methodologies, industry 4.0, smart manufacturing, and advances in robotics among others. The contents of this book are useful for academics as well as professionals working in industrial design, mechatronics, robotics, and automation.

Mechanics of Composite Structural Elements-Holm Altenbach 2018-04-10 This second edition of the textbook presents a systematic introduction to the structural mechanics of composite components. The book focusses on modeling and calculation of sandwiches and laminated composites i.e. anisotropic material. The new edition includes an additional chapter covering the latest advances in both research and applications, which are highly relevant for readers. The textbook is written for use not only in engineering curricula of aerospace, civil and mechanical engineering, but also for materials science and applied mechanics. Furthermore, it addresses practicing engineers and researchers. No prior knowledge of composite materials and structures is required for the understanding of its content. The book is close to classical courses of "Strength of Materials" and "Theory of Beams, Plates and Shells" but it extends the classic content on two topics: the linear elastic material behavior of isotropic and non-isotropic structural elements, and inhomogeneous material properties in the thickness direction. The Finite Element Analysis of laminate and sandwich structures is briefly presented. Many solved examples illustrate the application of the techniques learned.