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Shape Optimization by the Homogenization Method Springer Science & Business Media **This book provides an introduction to the theory and numerical developments of the homogenization method. It's main features are: a comprehensive presentation of homogenization theory; an introduction to the theory of two-phase composite materials; a detailed treatment of structural optimization by using homogenization; a complete discussion of the resulting numerical algorithms with many documented test problems. It will be of interest to researchers, engineers, and advanced graduate students in applied mathematics, mechanical engineering, and structural optimization. SHAPE AND LAYOUT OPTIMIZATION USING HOMOGENIZATION METHOD. is constrained. The same technique is extended to cover cases where multiple load is applied within the given design domain. To determine elastic coefficients of structural material with microstructure, homogenization theory is used. A resizing rule is formulated on the basis of the optimality criteria method. Shape Optimization and Homogenization-based Approach in Material Optimization Shape Optimization of Plate Structures Using Homogenization with Applications in Mechanical Design Homogenization and Structural Topology Optimization Theory, Practice and Software** Springer Science & Business Media **Structural topology optimization is a fast growing field that is finding numerous applications in automotive, aerospace and mechanical design processes. Homogenization is a mathematical theory with applications in several engineering problems that are governed by partial**

differential equations with rapidly oscillating coefficients Homogenization and Structural Topology Optimization brings the two concepts together and successfully bridges the previously overlooked gap between the mathematical theory and the practical implementation of the homogenization method. The book is presented in a unique self-teaching style that includes numerous illustrative examples, figures and detailed explanations of concepts. The text is divided into three parts which maintains the book's reader-friendly appeal. On Truss Optimization by a Homogenization Method Topology Design of Structures Springer Science & Business Media **Proceedings of the NATO Advanced Research Workshop, Sesimbra, Portugal, June 20-26, 1992 Optimal Shape Design Lectures Given at the Joint C.I.M./C.I.M.E. Summer School Held in Troia (Portugal), June 1-6, 1998** Springer Science & Business Media **Optimal Shape Design is concerned with the optimization of some performance criterion dependent (besides the constraints of the problem) on the "shape" of some region. The main topics covered are: the optimal design of a geometrical object, for instance a wing, moving in a fluid; the optimal shape of a region (a harbor), given suitable constraints on the size of the entrance to the harbor, subject to incoming waves; the optimal design of some electrical device subject to constraints on the performance. The aim is to show that Optimal Shape Design, besides its interesting industrial applications, possesses nontrivial mathematical aspects. The main theoretical tools developed here are the homogenization method and domain variations in PDE. The style is mathematically rigorous, but specifically oriented towards applications, and it is intended for both pure and applied mathematicians. The reader is required to know classical PDE theory and basic functional analysis. Evolutionary Structural Optimization** Springer **Evolutionary Structural Optimization (ESO) is a design method based on the simple concept of gradually removing inefficient material from a structure as it is being designed. Through this method, the resulting structure will evolve towards its optimum shape. The latest techniques and results of ESO are presented here, illustrated by numerous clear and detailed examples. Sections cover the fundamental aspects of the method, the application to multiple load cases and multiple support environments, frequency optimization, stiffness and displacement constraints, buckling, jointed frame structures, shape optimization, and stress reduction. This is followed by a section describing Evolve97, a software package which will allow readers to try the ideas of ESO themselves and to solve their optimization problems. This software is provided on a computer diskette which accompanies the book. Shape Optimization, Homogenization and Optimal Control DFG-AIMS workshop held at the AIMS Center Senegal, March 13-16, 2017** Springer **The contributions in this volume give an insight into current research activities in Shape Optimization, Homogenization and Optimal Control performed in Africa, Germany and internationally. Seeds for collaboration can be found in the first four papers in the field of homogenization. Modelling and optimal control in partial differential**

equations is the topic of the next six papers, again mixed from Africa and Germany. Finally, new results in the field of shape optimization are discussed in the final international three papers. This workshop, held at the AIMS Center Senegal, March 13-16, 2017, has been supported by the Deutsche Forschungsgemeinschaft (DFG) and by the African Institute for Mathematical Sciences (AIMS) in Senegal, which is one of six centres of a pan-African network of centres of excellence for postgraduate education, research and outreach in mathematical sciences. Structural Optimization in Magnetic Fields Using the Homogenization Design Method Optimization of Structural Topology, Shape, and Material Springer Science & Business Media **In the past, the possibilities of structural optimization were restricted to an optimal choice of profiles and shape. Further improvement can be obtained by selecting appropriate advanced materials and by optimizing the topology, i.e. finding the best position and arrangement of structural elements within a construction. The optimization of structural topology permits the use of optimization algorithms at a very early stage of the design process. The method presented in this book has been developed by Martin Bendsoe in cooperation with other researchers and can be considered as one of the most effective approaches to the optimization of layout and material design. Topology Optimization in Structural Mechanics** Springer **Topology optimization is a relatively new and rapidly expanding field of structural mechanics. It deals with some of the most difficult problems of mechanical sciences but it is also of considerable practical interest, because it can achieve much greater savings than mere cross-section or shape optimization. Variational Methods for Structural Optimization** Springer Science & Business Media **This book bridges a gap between a rigorous mathematical approach to variational problems and the practical use of algorithms of structural optimization in engineering applications. The foundations of structural optimization are presented in sufficiently simple form as to make them available for practical use. structuarl optimizatin of a lineary elastic structure using the homogenization method Shape and Layout Optimization of Structural Systems and Optimality Criteria Methods** Springer **Shape and layout optimization represent some of the most useful but also most difficult classes of problems in structural design, which have been investigated in detail only during the last few years. Shape optimization is concerned with the optimal shape of boundaries of continua or of interfaces between two materials in composites. Layout optimization deals with the simultaneous optimization of the topology, geometry and cross-sectional sizes of structural systems. In spite of its complextiy, layout optimization is a very rewarding task, because it results in much greater savings than the optimization of cross-sectional sizes only. Because of their important role in shape and layout optimization, the book also covers in detail new optimality criteria methods, which are capable of handling many thousand design variables and active design contraints. Shape and layout optimization is becoming an indispensable tool in the design of aeroplanes,**

space structures, cars, ships, building and civil engineering structures, power stations, chemical plants, artificial organs, sporting equipment, and all other solid systems where stresses and deformations play an important role. Computational Mechanics Proceedings of the Sixth World Congress on Computational Mechanics in Conjunction with the Second Asian-Pacific Congress on Computational Mechanics, September 5-10, 2004, Beijing, China □□□□□□□□□□□ Shell Structures, Theory and Applications Proceedings of the 8th International Conference on Shell Structures (SSTA 2005), 12-14 October 2005, Jurata, Gdansk, Poland CRC Press **Shells are basic structural elements of modern technology. Examples of shell structures include automobile bodies, domes, water and oil tanks, pipelines, ship hulls, aircraft fuselages, turbine blades, laudspeaker cones, but also balloons, parachutes, biological membranes, a human skin, a bottle of wine or a beer can. This volume contains full texts of over 100 papers presented by specialists from over 20 countries at the 8th Conference "Shell Structures: Theory and Applications", 12-14 October, 2005 in Jurata (Poland). The aim of the meeting was to bring together scientists, designers, engineers and other specialists in shell structures in order to discuss important results and new ideas in this field. The goal is to pursue more accurate theoretical models, to develop more powerful and versatile methods of analysis, and to disseminate expertise in design and maintenance of shell structures. Among the authors there are many distinguished specialists of shell structures, including the authors of general lectures: I.V. Andrianov (Ukraine), V.A. Eremeyev (Russia), A. Ibrahimbegovic (France), P. Klosowski (Poland), B.H. Kröplin (Germany), E. Ramm (Germany), J.M. Rotter (UK) and D. Steigmann (USA). The subject area of the papers covers various theoretical models and numerical analyses of strength, dynamics, stability, optimization etc. of different types of shell structures, their design and maintenance, as well as modelling of some surface-related mechanical phenomena. The Optimal Shape/topology Design of Structures for Dynamic Problems Using a Homogenization Method Featured Reviews in Mathematical Reviews 1997-1999 With Selected Reviews of Classic Books and Papers from 1940-1969** American Mathematical Soc. **This second volume of Featured Reviews makes available special detailed reviews of some of the most important mathematical articles and books published from 1997 through 1999. Also included are excellent reviews of several classic books and articles published prior to 1970. Among those reviews, for example, are the following: Homological Algebra by Henri Cartan and Samuel Eilenberg, reviewed by G. Hochschild; Faisceaux algebriques coherents by Jean-Pierre Serre, reviewed by C. Chevalley; and On the Theory of General Partial Differential Operators by Lars Hormander, reviewed by J. L. Lions. In particular, those seeking information on current developments outside their own area of expertise will find the volume very useful. By identifying some of the best publications, papers, and books that have had or are expected to have a significant impact in applied and pure mathematics, this volume will serve as a comprehensive guide to important new research**

across all fields covered by MR. Nonlinear Homogenization and its Applications to Composites, Polycrystals and Smart Materials Proceedings of the NATO Advanced Research Workshop, held in Warsaw, Poland, 23-26 June 2003 Springer Science & Business Media **Although several books and conference proceedings have already appeared dealing with either the mathematical aspects or applications of homogenization theory, there seems to be no comprehensive volume dealing with both aspects. The present volume is meant to fill this gap, at least partially, and deals with recent developments in nonlinear homogenization emphasizing applications of current interest. It contains thirteen key lectures presented at the NATO Advanced Workshop on Nonlinear Homogenization and Its Applications to Composites, Polycrystals and Smart Materials. The list of thirty one contributed papers is also appended. The key lectures cover both fundamental, mathematical aspects of homogenization, including nonconvex and stochastic problems, as well as several applications in micromechanics, thin films, smart materials, and structural and topology optimization. One lecture deals with a topic important for nanomaterials: the passage from discrete to continuum problems by using nonlinear homogenization methods. Some papers reveal the role of parameterized or Young measures in description of microstructures and in optimal design. Other papers deal with recently developed methods – both analytical and computational – for estimating the effective behavior and field fluctuations in composites and polycrystals with nonlinear constitutive behavior. All in all, the volume offers a cross-section of current activity in nonlinear homogenization including a broad range of physical and engineering applications. The careful reader will be able to identify challenging open problems in this still evolving field. For instance, there is the need to improve bounding techniques for nonconvex problems, as well as for solving geometrically nonlinear optimum shape-design problems, using relaxation and homogenization methods. Topology Optimization in Structural and Continuum Mechanics** Springer Science & Business Media **The book covers new developments in structural topology optimization. Basic features and limitations of Michell's truss theory, its extension to a broader class of support conditions, generalizations of truss topology optimization, and Michell continua are reviewed. For elastic bodies, the layout problems in linear elasticity are discussed and the method of relaxation by homogenization is outlined. The classical problem of free material design is shown to be reducible to a locking material problem, even in the multiload case. For structures subjected to dynamic loads, it is explained how they can be designed so that the structural eigenfrequencies of vibration are as far away as possible from a prescribed external excitation frequency (or a band of excitation frequencies) in order to avoid resonance phenomena with high vibration and noise levels. For diffusive and convective transport processes and multiphysics problems, applications of the density method are discussed. In order to take uncertainty in material parameters, geometry, and operating conditions**

into account, techniques of reliability-based design optimization are introduced and reviewed for their applicability to topology optimization. Topology Design Methods for Structural Optimization Butterworth-Heinemann **Topology Design Methods for Structural Optimization provides engineers with a basic set of design tools for the development of 2D and 3D structures subjected to single and multi-load cases and experiencing linear elastic conditions. Written by an expert team who has collaborated over the past decade to develop the methods presented, the book discusses essential theories with clear guidelines on how to use them. Case studies and worked industry examples are included throughout to illustrate practical applications of topology design tools to achieve innovative structural solutions. The text is intended for professionals who are interested in using the tools provided, but does not require in-depth theoretical knowledge. It is ideal for researchers who want to expand the methods presented to new applications, and includes a companion website with related tools to assist in further study. Provides design tools and methods for innovative structural design, focusing on the essential theory Includes case studies and real-life examples to illustrate practical application, challenges, and solutions Features accompanying software on a companion website to allow users to get up and running fast with the methods introduced Includes input from an expert team who has collaborated over the past decade to develop the methods presented Topology Optimization Theory, Methods, and Applications** Springer Science & Business Media **The topology optimization method solves the basic engineering problem of distributing a limited amount of material in a design space. The first edition of this book has become the standard text on optimal design which is concerned with the optimization of structural topology, shape and material. This edition, has been substantially revised and updated to reflect progress made in modelling and computational procedures. It also encompasses a comprehensive and unified description of the state-of-the-art of the so-called material distribution method, based on the use of mathematical programming and finite elements. Applications treated include not only structures but also materials and MEMS. Topology Optimization Design of Heterogeneous Materials and Structures** John Wiley & Sons **This book pursues optimal design from the perspective of mechanical properties and resistance to failure caused by cracks and fatigue. The book abandons the scale separation hypothesis and takes up phase-field modeling, which is at the cutting edge of research and is of high industrial and practical relevance. Part 1 starts by testing the limits of the homogenization-based approach when the size of the representative volume element is non-negligible compared to the structure. The book then introduces a non-local homogenization scheme to take into account the strain gradient effects. Using a phase field method, Part 2 offers three significant contributions concerning optimal placement of the inclusion phases. Respectively, these contributions take into account fractures in quasi-brittle materials, interface cracks and periodic composites. The**

topology optimization proposed has significantly increased the fracture resistance of the composites studied. Boundary Elements and Other Mesh Reduction Methods XXXVIII WIT Press **Containing the latest in a long line of conferences covering the most recent advances in Boundary Elements and Mesh Reduction Methods (BEM/MRM), this book contains an important chapter in the history of this important method used in science and engineering. The BEM/MRM conference has long been recognised as THE international forum on the technique. The proceedings of the conference therefore constitute a record of the development of the method, running from the initial successful development of boundary integral techniques into the BEM, a method that eliminates the need for an internal mesh, to the recent and most sophisticated Mesh Reduction and even Meshless Methods. Since the boundary elements, mesh reduction, and meshless methods are used in many engineering and scientific fields, the book will be of great interest to all engineers and scientists working within the areas of numerical analysis, boundary elements and meshless methods. Topics covered include: Advanced formulations; Advanced meshless and mesh reduction methods; Structural mechanics applications; Solid mechanics; Heat and mass transfer, Electrical engineering and electromagnetics; Computational methods; Fluid flow modelling; Damage mechanics and fracture; Dynamics and Vibrations Engineering applications. Computational Methods in Engineering & Science Proceedings of Enhancement and Promotion of Computational Methods in Engineering and Science X" Aug. 21-23, 2006, Sanya, China** Springer Science & Business Media **Here are the printed proceedings of EPMESC X, held on August 21-23, 2006 in Sanya, Hainan Island of China. It includes 14 full papers of plenary and semi-plenary lectures and approximately 166 one-page summaries. The accompanying CD-ROM includes all 180 full papers presented at the conference. IUTAM Symposium on Topological Design Optimization of Structures, Machines and Materials Status and Perspectives** Springer Science & Business Media **This volume offers edited papers presented at the IUTAM-Symposium Topological design optimization of structures, machines and materials - status and perspectives, October 2005. The papers cover the application of topological design optimization to fluid-solid interaction problems, acoustics problems, and to problems in biomechanics, as well as to other multiphysics problems. Also in focus are new basic modelling paradigms, covering new geometry modelling such as level-set methods and topological derivatives. Topology Optimization of Structures and Composite Continua** Springer Science & Business Media **Topology optimization of structures and composite materials is a new and rapidly expanding field of mechanics which now plays an ever-increasing role in most branches of technology, such as aerospace, mechanical, structural, civil and ma terials engineering, with important implications for energy production as well as building and environmental sciences. It is a truly "high-tech" field which requires advanced computer facilities and computational methods, whilst involving unusual theoretical considerations in pure mathematics.**

Topology optimization deals with some of the most difficult problems of mechanical sciences, but it is also of consid erable practical interest because it can achieve much greater savings than conven tional (sizing or shape) optimization. Extensive research into topology optimization is being carried out in most of the developed countries of the world. The workshop addressed the state of the art of the field, bringing together re searchers from a diversity of backgrounds (mathematicians, information scientists, aerospace, automotive, mechanical, structural and civil engineers) to span the full breadth and depth of the field and to outline future developments in research and avenues of cooperation between NATO and Partner countries. The program cov ered • theoretical (mathematical) developments, • computer algorithms, software development and computational difficulties, and • practical applications in various fields of technology. A novel feature of the workshop was that, in addition to shorter discussions after each lecture, a 30 minutes panel discussion took place in each sesssion, which made this ARW highly interactive and more informal. Applications of the Topological Derivative Method Springer **The book presents new results and applications of the topological derivative method in control theory, topology optimization and inverse problems. It also introduces the theory in singularly perturbed geometrical domains using selected examples. Recognized as a robust numerical technique in engineering applications, such as topology optimization, inverse problems, imaging processing, multi-scale material design and mechanical modeling including damage and fracture evolution phenomena, the topological derivative method is based on the asymptotic approximations of solutions to elliptic boundary value problems combined with mathematical programming tools. The book presents the first order topology design algorithm and its applications in topology optimization, and introduces the second order Newton-type reconstruction algorithm based on higher order topological derivatives for solving inverse reconstruction problems. It is intended for researchers and students in applied mathematics and computational mechanics interested in the mathematical aspects of the topological derivative method as well as its applications in computational mechanics. Trends in PDE Constrained Optimization** Springer **Optimization problems subject to constraints governed by partial differential equations (PDEs) are among the most challenging problems in the context of industrial, economical and medical applications. Almost the entire range of problems in this field of research was studied and further explored as part of the Deutsche Forschungsgemeinschaft (DFG) priority program 1253 on “Optimization with Partial Differential Equations” from 2006 to 2013. The investigations were motivated by the fascinating potential applications and challenging mathematical problems that arise in the field of PDE constrained optimization. New analytic and algorithmic paradigms have been developed, implemented and validated in the context of real-world applications. In this special volume, contributions from more than fifteen German universities combine the results of this interdisciplinary program**

with a focus on applied mathematics. The book is divided into five sections on “Constrained Optimization, Identification and Control”, “Shape and Topology Optimization”, “Adaptivity and Model Reduction”, “Discretization: Concepts and Analysis” and “Applications”. Peer-reviewed research articles present the most recent results in the field of PDE constrained optimization and control problems. Informative survey articles give an overview of topics that set sustainable trends for future research. This makes this special volume interesting not only for mathematicians, but also for engineers and for natural and medical scientists working on processes that can be modeled by PDEs. Scientific and Technical Aerospace Reports Applied Mechanics Reviews Evolutionary Topology Optimization of Continuum Structures Methods and Applications John Wiley & Sons **Evolutionary Topology Optimization of Continuum Structures treads new ground with a comprehensive study on the techniques and applications of evolutionary structural optimization (ESO) and its later version bi-directional ESO (BESO) methods. Since the ESO method was first introduced by Xie and Steven in 1992 and the publication of their well-known book Evolutionary Structural Optimization in 1997, there have been significant improvements in the techniques as well as important practical applications. The authors present these developments, illustrated by numerous interesting and detailed examples. They clearly demonstrate that the evolutionary structural optimization method is an effective approach capable of solving a wide range of topology optimization problems, including structures with geometrical and material nonlinearities, energy absorbing devices, periodical structures, bridges and buildings. Presents latest developments and applications in this increasingly popular & maturing optimization approach for engineers and architects; Authored by leading researchers in the field who have been working in the area of ESO and BESO developments since their conception; Includes a number of test problems for students as well as a chapter of case studies that includes several recent practical projects in which the authors have been involved; Accompanied by a website housing ESO/BESO computer programs at http://www.wiley.com/go/huang and test examples, as well as a chapter within the book giving a description and step-by-step instruction on how to use the software package BESO2D. Evolutionary Topology Optimization of Continuum Structures will appeal to researchers and graduate students working in structural design and optimization, and will also be of interest to civil and structural engineers, architects and mechanical engineers involved in creating innovative and efficient structures. Building Information Modeling Framework for Structural Design** CRC Press **BIM for Structural Engineering and Architecture Building Information Modeling: Framework for Structural Design outlines one of the most promising new developments in architecture, engineering, and construction (AEC). Building information modeling (BIM) is an information management and analysis technology that is changing the role of computation in the architectural and engineering industries. The**

innovative process constructs a database assembling all of the objects needed to build a specific structure. Instead of using a computer to produce a series of drawings that together describe the building, BIM creates a single illustration representing the building as a whole. This book highlights the BIM technology and explains how it is redefining the structural analysis and design of building structures. BIM as a Framework Enabler This book introduces a new framework—the structure and architecture synergy framework (SAS framework)—that helps develop and enhance the understanding of the fundamental principles of architectural analysis using BIM tools. Based upon three main components: the structural melody, structural poetry, and structural analysis, along with the BIM tools as the frame enabler, this new framework allows users to explore structural design as an art while also factoring in the principles of engineering. The framework stresses the influence structure can play in form generation and in defining spatial order and composition. By highlighting the interplay between architecture and structure, the book emphasizes the conceptual behaviors of structural systems and their aesthetic implications and enables readers to thoroughly understand the art and science of whole structural system concepts. Presents the use of BIM technology as part of a design process or framework that can lead to a more comprehensive, intelligent, and integrated building design Places special emphasis on the application of BIM technology for exploring the intimate relationship between structural engineering and architectural design Includes a discussion of current and emerging trends in structural engineering practice and the role of the structural engineer in building design using new BIM technologies Building Information Modeling: Framework for Structural Design provides a thorough understanding of architectural structures and introduces a new framework that revolutionizes the way building structures are designed and constructed. IUTAM Symposium on Variations of Domain and Free-Boundary Problems in Solid Mechanics Proceedings of the IUTAM Symposium held in Paris, France, 22–25 April 1997 Springer Science & Business Media **Proceedings of the IUTAM Symposium held in Paris, France, 22-25 April 1997 Variational Analysis and Aerospace Engineering Mathematical Challenges for the Aerospace of the Future** Springer **This book presents papers surrounding the extensive discussions that took place from the 'Variational Analysis and Aerospace Engineering' workshop held at the Ettore Majorana Foundation and Centre for Scientific Culture in 2015. Contributions to this volume focus on advanced mathematical methods in aerospace engineering and industrial engineering such as computational fluid dynamics methods, optimization methods in aerodynamics, optimum controls, dynamic systems, the theory of structures, space missions, flight mechanics, control theory, algebraic geometry for CAD applications, and variational methods and applications. Advanced graduate students, researchers, and professionals in mathematics and engineering will find this volume useful as it illustrates current collaborative research projects**

in applied mathematics and aerospace engineering. IUTAM Symposium on Optimization of Mechanical Systems Proceedings of the IUTAM Symposium held in Stuttgart, Germany, 26–31 March 1995 Springer Science & Business Media **The International Union of Theoretical and Applied Mechanics (IUTAM) initiated and sponsored an International Symposium on Optimization of Mechanical Systems held in 1995 in Stuttgart, Germany. The Symposium was intended to bring together scientists working in different fields of optimization to exchange ideas and to discuss new trends with special emphasis on multi body systems. A Scientific Committee was appointed by the Bureau of IUTAM with the following members: S. Arimoto (Japan) EL. Chernousko (Russia) M. Geradin (Belgium) E.J. Haug (U.S.A.) C.A.M. Soares (Portugal) N. Olhoff (Denmark) W.O. Schiehlen (Germany, Chairman) K. Schittkowski (Germany) R.S. Sharp (U.K.) W. Stadler (U.S.A.) H.-B. Zhao (China) This committee selected the participants to be invited and the papers to be presented at the Symposium. As a result of this procedure, 90 active scientific participants from 20 countries followed the invitation, and 49 papers were presented in lecture and poster sessions. High Performance Structures and Materials V** WIT Press **Including the latest developments in design, optimisation, manufacturing and experimentation, this text presents a wide range of topics relating to advanced types of structures, particularly those based on new concepts and new types of materials. Integrated Design and Manufacturing in Mechanical Engineering ’98 Proceedings of the 2nd IDMME Conference held in Compiègne, France, 27–29 May 1988** Springer Science & Business Media **This volume contains the selected manuscripts of the papers presented at the Second IDMME Conference on "Integrated Design and Manufacturing in Mechanical Engineering", held in Compiegne, France, at the University of Technology of Compiegne, May 27-29, 1998. The purpose of the Conference was to present and discuss topics dealing with the optimization of product design and manufacturing processes with particular attention to (1) the analysis and optimum design of mechanical parts and mechanisms (2) the modeling of forming processes (3) the development of computer aided manufacturing tools (4) the methodological aspects of integrated design and manufacturing in adapted technical and human environments. The initiative of the conference and the organization thereof is mainly due to the efforts of the french PRIMECA group (Pool of Computer ResoUfces for Mechanics). The international Institution for Production Engineering Research (C.I.R.P.) was helpful to attract international participants. The conference brought together three hundred and twenty worldwide participants.**