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Advances of CFD in Fluid Machinery Design John Wiley & Sons In the past Computational Fluid Dynamics (CFD) was confined to large organisations capable of developing and supporting their own codes. But recently there has been a rapid increase in the availability of reasonably priced commercial codes, and many more industrial organisations are now able to routinely use CFD. Advances of CFD in Fluid Machinery Design provide the perfect opportunity to find out what industry is doing and this book addresses how CFD is now being increasingly used in the design process, rather than as a post-design analysis tool. COMPLETE CONTENTS Trends in industrial use of CFD Challenges and methodologies in the design of axial flow fans for high-bypass-ratio, gas turbine engines using steady and unsteady CFD A three-dimensional inverse method based on pressure loading for the design of turbomachinery blades Application of CFD to the design and analysis of axial and centrifugal fans and compressors The design and performance of a transonic flow deswirling system – an application of current CFD design techniques tested against model and full-scale experiments Recent developments in unsteady flow modelling for turbomachinery aeroelasticity Computational investigation of flow in casing treatments for stall delay in axial flow fans Use of CFD for the three-dimensional hydrodynamic design of vertical diffuser pumps Recommendations to designers for CFD pump impeller and diffuser simulations Three dimensional CFD – a possibility to analyse piston pump flow dynamics CFD analysis of screw compressor performance Prediction of aerothermal phenomena in high-speed discstator systems Use of CFD in the design of a shaft seal for high-performance turbomachinery Users and potential users, of CFD for the design of fluid machinery, managers, designers, and researchers working in the field of 'industrial flows', will all find Advances of CFD in Fluid Machinery Design a valuable volume discussing state-of-the-art developments in CFD. **Compressors and Their Systems 7th International Conference John Wiley & Sons** This text presents the interactions from an international conference organized by the Fluid Machinery Group of the IMechE. The papers provide an up-to-date resume of compressors, refigeration, energy efficency, lubrication and sealing oils, and novel machines. **Screw Compressors Three Dimensional Computational Fluid Dynamics and Solid Fluid Interaction Springer Science & Business Media** This book presents the most up-to-date methods of three-dimensional modeling of the fluid dymanics and the solid-fluid interaction within these machines, which are still being developed. Adding modeling to the design process makes it possible not only to predict flow patterns more accurately, and also to determine distorting effects on rotors and casing of pressure and temperature distribution within the compressor. Examples outline the scope of the applied mathematical model. **Refrigeration Systems and Applications MDPI** The Special Issue "Refrigeration Systems and Applications" aims to encourage researchers to address the concerns associated with climate change and the sustainability of artificial cold production systems, and to further the transition to the more sustainable technologies and methodologies of tomorrow through theoretical, experimental, and review research on the different applications of refrigeration and associated topics. **Advanced Technologies, Systems, and Applications II Proceedings of the International Symposium on Innovative and Interdisciplinary Applications of Advanced Technologies (IAT) Springer** This book presents innovative and interdisciplinary applications of advanced technologies. It includes the scientific outcomes of the 9th DAYS OF BHAAAS (Bosnian-Herzegovinian American Academy of Arts and Sciences) held in Banja Vrućica, Teslić, Bosnia and Herzegovina on May 25–28, 2017. This unique book offers a comprehensive, multidisciplinary and interdisciplinary overview of the latest developments in a broad section of technologies and methodologies, viewed through the prism of applications in computing, networking, information technology, robotics, complex systems, communications, energy, mechanical engineering, economics and medicine, to name just a few. **Screw Compressors Mathematical Modelling and Performance Calculation Springer Science & Business Media**
Althoughtheprinciplesofoperationofhelicalscrewmachines,ascompressors or expanders, have been well known for more than 100 years, it is only during the past 30 years that these machines have become widely used. The main reasons for the long period before they were adopted were their relatively poor e?ciency and the high cost of manufacturing their rotors. Two main developments led to a solution to these di?culties. The ?rst of these was the introduction of the asymmetric rotor pro?le in 1973. This reduced the bl- hole area, which was the main source of internal leakage by approximately 90%, and thereby raised the thermodynamic e?ciency of these machines, to roughly the same level as that of traditional reciprocating compressors. The second was the introduction of precise thread milling machine tools at - proximately the same time. This made it possible to manufacture items of complex shape, such as the rotors, both accurately and cheaply. From then on, as a result of their ever improving e?ciencies, high rel- bility and compact form, screw compressors have taken an increasing share of the compressor market, especially in the ?elds of compressed air production, and refrigeration and air conditioning, and today, a substantial proportion of compressors manufactured for industry are of this type. Despite, the now wide usage of screw compressors and the publication of many scienti?c papers on their development, only a handful of textbooks have been published to date, which give a rigorous exposition of the principles of their operation and none of these are in English. **Performance Evaluation and CFD Simulation of Multiphase Twin-Screw Pumps** Twin-screw pumps are economical alternatives to the conventional multiphase system and are increasingly used in the oil and gas industry due to their versatility in transferring the multiphase mixture with varying Gas Void Fraction (GVF). Present work focuses on the experimental and numerical analysis of twin-screw pumps for different operating conditions. Experimental evaluation aims to understand steady state and transient behavior of twin-screw pumps. Detailed steady state evaluation helped form better understanding of twin-screw pumps under different operating conditions. A comparative study of twin-screw pumps and compressors contradicted the common belief that compressor efficiency is better than the efficiency of twin-screw pumps. Transient analysis at high GVF helped incorporate necessary changes in the design of sealflush recirculation loop to improve the efficiency of the pump. The effect of viscosity of the sealflush fluid at high GVF on pump performance was studied. Volumetric efficiency was found to be decreased with increase in viscosity. Flow visualization was aimed to characterize phase distribution along cavities and clearances at low to high GVF. Dynamic pressure variation was studied along the axis of the screw which helped correlate the GVF, velocity and pressure distribution. Complicated fluid flow behavior due to enclosed fluid pockets and interconnecting clearances makes it difficult to numerically simulate the pump. Hence design optimization and performance prediction incorporates only analytical approach and experimental evaluation. Current work represents an attempt to numerically simulate a multiphase twin-screw pump as a whole. Single phase 3D CFD simulation was performed for different pressure rise. The pressure and velocity profile agreed well with previous studies. Results are validated using an analytical approach as well as experimental data. A two-phase CFD simulation was performed for 50% GVF. An Eulerian approach was employed to evaluate multiphase flow behavior. Pressure, velocity, temperature and GVF distributions were successfully predicted using CFD simulation. Bubble size was found to be most dominant parameter, significantly affecting phase separation and leakage flow rate. Better phase separation was realized with increased bubble size, which resulted in decrease in leakage flow rate. CFD results agreed well with experimental data for the bubble size higher than 0.08 mm. The electronic version of this dissertation is accessible from http://hdl.handle.net/1969.1/150982 **8th International Conference on Compressors and their Systems Elsevier** This book contains the papers from the 2013 International Conference on Compressors and Their Systems, held from 9-10 September at City University London. The long-running conference series is the ultimate global forum for reviewing the latest developments and novel approaches in compressor research. High-quality technical papers are sourced from around the globe, covering technology development, operation, maintenance and reliability, safety and environmental impact, energy efficiency and carbon footprint, system integration and behaviour, upgrades and refurbishment, design and manufacture, education and professional development. All the papers are previously unpublished and constitute leading edge research. Presents leading edge developments in compressor technology Gives the latest prediction and modelling techniques Details the new technology and machinery **Advanced Multimedia and Ubiquitous Engineering Future Information Technology Springer** This volume brings together contributions representing the state-of-the-art in new multimedia and future technology information research, currently a major topic in computer science and electronic engineering. Researchers aim to interoperate multimedia frameworks, transforming the way people work and interact with multimedia data. This book covers future information technology topics including digital and multimedia convergence, ubiquitous and pervasive computing, intelligent computing and applications, embedded systems, mobile and wireless communications, bio-inspired computing, grid and cloud computing, semantic web, human-centric computing and social networks, adaptive and context-aware computing, security and trust computing and related areas. Representing the combined proceedings of the 9th International Conference on Multimedia and Ubiquitous Engineering (MUE-15) and the 10th International Conference on Future Information Technology (Future Tech 2015), this book aims to provide a complete coverage of the areas outlined and to bring together researchers from academic and industry and other practitioners to share their research ideas, challenges and solutions. **Computational Fluid Dynamics Basic Instruments and Applications in Science BoD – Books on Demand** This book is the result of a careful selection of contributors in the field of CFD. It is divided into three sections according to the purpose and approaches used in the development of the contributions. The first section describes the "high-performance computing" (HPC) tools and their impact on CFD modeling. The second section is dedicated to "CFD models for local and large-scale industrial phenomena." Two types of approaches are basically contained here: one concerns the adaptation from global to local scale, - e.g., the applications of CFD to study the climate changes and the adaptations to local scale. The second approach, very challenging, is the multiscale analysis. The third section is devoted to "CFD in numerical modeling approach for experimental cases." Its chapters emphasize on the numerical approach of the mathematical models associated to few experimental (industrial) cases. Here, the impact and the importance of the mathematical modeling in CFD are focused on. It is expected that the collection of these chapters will enrich the state of the art in the CFD domain and its applications in a lot of fields. This collection proves that CFD is a highly interdisciplinary research area, which lies at the interface of physics, engineering, applied mathematics, and computer science. **Advances in Noise Analysis, Mitigation and Control BoD – Books on Demand** The adverse impacts from excess noise on human health and daily activities have accelerated at an alarming rate over the last few decades. This has prompted significant research into noise attenuation and mitigation of these unwanted effects. This book is a collection of works from eminent researchers from around the world, who address the aforementioned issues. It provides the most up-to-date information on current work being conducted in the field of noise pollution and is of value to a wide range of students, engineers, scientists and industry consultants who wish to further understand current methodologies and emerging concepts. **Highly Deforming Computational Meshes for CFD Analysis of Twin-Screw Positive Displacement Machines** Commercial flow solvers can be used to obtain flow solutions in applications with deforming domains, but, in general, are not suitable for screw machine flow calculations. This is due to the large magnitude of deformation of the domain and the geometrical complexity of helical rotors. In this chapter, the governing equations for deforming domains and three methods of obtaining mesh movement, commonly used by FVM solvers, have been analysed. A comparative study of customised methods of grid generation for screw machines, using algebraic and differential approaches, is shown to help in the selection of techniques that can improve grid quality, robustness and speed of grid generation. The analysis of an oil-injected twin-screw compressor is included as a test case to demonstrate the application of SCORG, a deforming grid generator, as a means of predicting performance. **New Technologies, Development and Application Springer** The papers included in this book were presented at the International Conference "New Technologies, Development and Application," which was held at the Academy of Sciences and Arts of Bosnia and Herzegovina in Sarajevo, Bosnia and Herzegovina on 28th–30th June 2018. The book covers a wide range of technologies and technical disciplines including complex systems such as: Robotics, Mechatronics Systems, Automation, Manufacturing, Cyber-Physical Systems, Autonomous Systems, Sensors, Networks, Control Systems, Energy Systems, Automotive Systems, Biological Systems, Vehicular Networking and Connected Vehicles, Effectiveness and Logistics Systems, Smart Grids, Nonlinear Systems, Power Systems, Social Systems, and Economic Systems. **Proceedings of the ASME Advanced Energy Systems Division 7th International Conference on Compressors and their Systems 2011 Elsevier** This book contains the papers presented at the 7th International Conference on Compressors and their Systems at City University London in conjunction with the IMECHE. This conference is the ultimate global forum for reviewing the latest developments and novel approaches in compressor research. It features contributions from equipment manufacturers, suppliers, users and research organisations. These papers present developments in air, gas and refrigeration compressors; vacuum pumps; expanders; and related systems and components. Papers cover the design, development and operation of a wide range of compressors and expanders. Equipment manufacturers, suppliers, users and research organisations are all represented. Aspects covered include: present and future developments in scroll compressors; design and optimisation of screw compressors; latest thinking in oscillating and vane compressors; improving the function of valves; latest research in dynamic compressors; detailed analysis of reciprocating compressors; improved accuracy and usefulness of modelling techniques; developing better control of

centrifugal compressors; and reducing unwanted noise and vibration. Presents all the papers of the International Conference on Compressors and their Systems 2011 Up to date papers on compressor technology improvements The latest prediction modelling techniques are presented **Ludwig's Applied Process Design for Chemical and Petrochemical Plants Gulf Professional Publishing** The fourth edition of Ludwig's Applied Process Design for Chemical and Petrochemical Plants, Volume Three is a core reference for chemical, plant, and process engineers and provides an unrivalled reference on methods, process fundamentals, and supporting design data. New to this edition are expanded chapters on heat transfer plus additional chapters focused on the design of shell and tube heat exchangers, double pipe heat exchangers and air coolers. Heat tracer requirements for pipelines and heat loss from insulated pipelines are covered in this new edition, along with batch heating and cooling of process fluids, process integration, and industrial reactors. The book also looks at the troubleshooting of process equipment and corrosion and metallurgy. Assists engineers in rapidly analyzing problems and finding effective design methods and mechanical specifications Definitive guide to the selection and design of various equipment types, including heat exchanger sizing and compressor sizing, with established design codes Batch heating and cooling of process fluids supported by Excel programs **Issues in Structural and Materials Engineering: 2012 Edition ScholarlyEditions** Issues in Structural and Materials Engineering: 2012 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Mechanical Engineering. The editors have built Issues in Structural and Materials Engineering: 2012 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Mechanical Engineering in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Structural and Materials Engineering: 2012 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/. **Fluid Machinery Congress 6-7 October 2014 Woodhead Publishing** Manufacturers and engineers face growing challenges as technology develops. Ever more stringent limits on emissions are driving changes in industry operating practices, while new emerging applications such as shale gas and coal bed methane impose demands for operation under high pressures and temperatures. This congress showcases the latest fluid machinery technology available and provides a forum for sharing valuable experiences around design, operation and maintenance. examine the latest developments in fluid machinery technology explore opportunities to network and share experiences around different functions focus on future technological challenges and the changes they will bring to the industry **Computational Methods Springer Science & Business Media** The First International Conference on Computational Methods (ICCM04), organized by the department of Mechanical Engineering, National University of Singapore, was held in Singapore, December 15-17, 2004, with great success. This conference proceedings contains some 290 papers from more than 30 countries/regions. The papers cover a broad range of topics such as meshfree particle methods, Generalized FE and Extended FE methods, inverse analysis and optimization methods. Computational methods for geomechanics, machine learning, vibration, shock, impact, health monitoring, material modeling, fracture and damage mechanics, multi-physics and multi-scales simulation, sports and environments are also included. All the papers are pre-reviewed before they are accepted for publication in this proceedings. The proceedings will provide an informative, timely and invaluable resource for engineers and scientists working in the important areas of computational methods. **Organic Rankine Cycle for Energy Recovery System MDPI** The rising trend in the global energy demand poses new challenges to humankind. The energy and mechanical engineering sectors are called to develop new and more environmentally friendly solutions to harvest residual energy from primary production processes. The Organic Rankine Cycle (ORC) is an emerging energy system for power production and waste heat recovery. In the near future, this technology can play an increasing role within the energy generation sectors and can help achieve the carbon footprint reduction targets of many industrial processes and human activities. This Special Issue focuses on selected research and application cases of ORC-based waste heat recovery solutions. Topics included in this publication cover the following aspects: performance modeling and optimization of ORC systems based on pure and zeotropic mixture working fluids; applications of waste heat recovery via ORC to gas turbines and reciprocating engines; optimal sizing and operation of ORC under combined heat and power and district heating application; the potential of ORC on board ships and related issues; life cycle analysis for biomass application; ORC integration with supercritical CO2 cycle; and the proper design of the main ORC components, including fluid dynamics issues. The current state of the art is considered and some cutting-edge ORC technology research activities are examined in this book. **Positive Displacement Machines Modern Design Innovations and Tools Academic Press** Positive Displacement Machines: Modern Design Innovations and Tools explains the design and workings of a wide range of positive displacement pumps, compressors and gas expanders. Written at a mathematical and technical level, the book explores the most influential research in this field over the past decade, along with industry best practices. Sections highlight the importance of using the latest computation techniques and discuss how to follow the proper design procedures to achieve a desired outcome. Explains how these machines work on a fundamental level, helping the reader build a holistic understanding which aids complex problem- solving Describes how to mathematically model the performance of pumps, compressors and gas expanders Provides advice on how to design and optimize positive displacement machines to match a given application **Potenzial von nicht-konstanter Rotorsteigung für Schraubenkompressoren Logos Verlag Berlin GmbH** Schraubenkompressoren sind in der Industrie weit verbreitet und dadurch für einen großen Teil des weltweiten elektrischen Energieumsatzes verantwortlich. Die in der Regel in Schraubenkompressoren verwendeten Rotoren mit konstanter Rotorsteigung stellen dabei stets einen Kompromiss zwischen den beiden primär vorherrschenden dissipativen Mechanismen, Spaltmassenströmen und Auslassdrosselung, dar. Rotoren mit nicht-konstanter Rotorsteigung bieten eine vielversprechende Möglichkeit zur energetischen Verbesserung von Schraubenkompressoren. In diesem Band wird das Potenzial nicht-konstanter Rotorsteigung auf Grundlage dimensionsloser Kennzahlen für eine große Variationsbreite an Randbedingungen untersucht. Die Genauigkeit der dafür durchgeführten Kammermodellsimulationen hängt in großem Maße von der Modellierung der maschineninternen Spaltmassenströme ab. Mithilfe von CFD-Simulationen wird daher der Durchfluss durch die Stirn- und Gehäusespalte untersucht und die Ergebnisse anhand eines Versuchsstandes experimentell validiert. Die Ergebnisse fließen anschließend in Form von Strömungsbeiwerten in die Simulation der Schraubenkompressoren ein. Die nicht-konstante Rotorsteigung wird anhand zweier geometrischer Konzepte untersucht und die optimalen Rotorgeometrien sowie die zugehörigen Gütegrade mit der optimalen Lösung konstanter Rotorsteigung gegenübergestellt. Das theoretisch bestimmte Potenzial wird schließlich anhand eines öleingespritzten Prototyps mit nicht-konstanter Rotorsteigung experimentell validiert. **CRC Handbook of Thermal Engineering, Second Edition CRC Press** The CRC Handbook of Thermal Engineering, Second Edition, is a fully updated version of this respected reference work, with chapters written by leading experts. Its first part covers basic concepts, equations and principles of thermodynamics, heat transfer, and fluid dynamics. Following that is detailed coverage of major application areas, such as bioengineering, energy-efficient building systems, traditional and renewable energy sources, food processing, and aerospace heat transfer topics. The latest numerical and computational tools, microscale and nanoscale engineering, and new complex-structured materials are also presented. Designed for easy reference, this new edition is a must-have volume for engineers and researchers around the globe. **Radial Flow Turbocompressors Cambridge University Press** An introduction to the theory and engineering practice that underpins the component design and analysis of radial flow turbocompressors. Drawing upon an extensive theoretical background and years of practical experience, the authors provide descriptions of applications, concepts, component design, analysis tools, performance maps, flow stability, and structural integrity, with illustrative examples. Features wide coverage of all types of radial compressor over many applications unified by the consistent use of dimensional analysis. Discusses the methods needed to analyse the performance, flow, and mechanical integrity that underpin the design of efficient centrifugal compressors with good flow range and stability. Includes explanation of the design of all radial compressor components, including inlet guide vanes, impellers, diffusers, volutes, return channels, de-swirl vanes and side-streams. Suitable as a reference for advanced students of turbomachinery, and a perfect tool for practising mechanical and aerospace engineers already within the field and those just entering it. **Government Reports Announcements & Index Compression Machinery for Oil and Gas Gulf Professional Publishing** Compression Machinery for Oil and Gas is the go-to source for all oil and gas compressors across the industry spectrum. Covering multiple topics from start to finish, this reference gives a complete guide to technology developments and their applications and implementation, including research trends. Including information on relevant standards and developments in subsea and downhole compression, this book aids engineers with a handy, single resource that will help them stay up-to-date on the compressors needed for today's oil and gas applications. Provides an overview of the latest technology, along with a detailed discussion of engineering Delivers on the efficiency, range and limit estimations for machines Pulls together multiple contributors to balance content from both academics and corporate research **ASME Technical Papers Proceedings of the 5th International Conference on Industrial Engineering (ICIE 2019) Volume I Springer Nature** This book highlights recent findings in industrial, manufacturing and mechanical engineering, and provides an overview of the state of the art in these fields, mainly in Russia and Eastern Europe. A broad range of topics and issues in modern engineering are discussed, including the dynamics of machines and working processes, friction, wear and lubrication in machines, surface transport and technological machines, manufacturing engineering of industrial facilities, materials engineering, metallurgy, control systems and their industrial applications, industrial mechatronics, automation and robotics. The book gathers selected papers presented at the 5th International Conference on Industrial Engineering (ICIE), held in Sochi, Russia in March 2019. The authors are experts in various fields of engineering, and all papers have been carefully reviewed. Given its scope, the book will be of interest to a wide readership, including mechanical and production engineers, lecturers in engineering disciplines, and engineering graduates. **Applied Mechanics Reviews Paper Chemical Engineering Progress Scientific and Technical Aerospace Reports Testing and Analysis of a Transonic Axial Compressor** A test program to evaluate a new transonic axial compressor stage was conducted. The stage was designed (by Nelson Sanger of NASA Lewis) relying heavily on CFD techniques while minimizing conventional empirical design methods. The stage was installed in the NPS Transonic Compressor Test Rig and instrumented with fixed temperature and pressure probes. A new PC-based data acquisition system was commissioned and programmed for stage performance measurements. These were obtained at 50, 60, 65, 70, and 80% of the design speed before failure of the spinner retaining bolt led to the loss of the stage. The flow through the rotor was analyzed and the rotor performance predicted using a 3-dimensional viscous code (RVC3D). The predicted rotor performance agreed qualitatively and was numerically consistent with the measured stage performance. **Grid Generation Methods Springer Science & Business Media** This text is an introduction to methods of grid generation technology in scientific computing. Special attention is given to methods developed by the author for the treatment of singularly-perturbed equations, e.g. in modeling high Reynolds number flows. Functionals of conformality, orthogonality, energy and alignment are discussed. **Handbook of Grid Generation CRC Press** Handbook of Grid Generation addresses the use of grids (meshes) in the numerical solutions of partial differential equations by finite elements, finite volume, finite differences, and boundary elements. Four parts divide the chapters: structured grids, unstructured girds, surface definition, and adaption/quality. An introduction to each section provides a roadmap through the material. This handbook covers: Fundamental concepts and approaches Grid generation process Essential mathematical elements from tensor analysis and differential geometry, particularly relevant to curves and surfaces Cells of any shape - Cartesian, structured curvilinear coordinates, unstructured tetrahedra, unstructured hexahedra, or various combinations Separate grids overlaid on one another, communicating data through interpolation Moving boundaries and internal interfaces in the field Resolving gradients and controlling solution error Grid generation codes, both commercial and freeware, as well as representative and illustrative grid configurations Handbook of Grid Generation contains 37 chapters as well as contributions from more than 100 experts from around the world, comprehensively evaluating this expanding field and providing a fundamental orientation for practitioners. **The Role of Exergy in Energy and the Environment Springer** This book is devoted to the analysis and applications of energy, exergy, and environmental issues in all sectors of the economy, including industrial processes, transportation, buildings, and services. Energy sources and technologies considered are hydrocarbons, wind and solar energy, fuel cells, as well as thermal and electrical storage. This book provides theoretical insights, along with state-of-the-art case studies and examples and will appeal to the academic community, but also to energy and environmental professionals and decision makers. **Heat Pump and Refrigeration Systems Design, Analysis, and Applications, 1995 Presented at the 1995 ASME International Mechanical Engineering Congress and Exposition, November 12-17, 1995, San Francisco, California Turbomachinery Performance Analysis Butterworth-Heinemann** This modern overview to performance analysis places aero- and fluid-dynamic treatments, such as cascade and meridional flow analyses, within the broader context of turbomachine performance analysis. For the first time ducted propellers are treated formally within the general family of turbomachines. It also presents a new approach to the use of dimensional analysis which links the overall requirements, such as flow and head, through velocity triangles to blade element loading and related fluid dynamics within a unifying framework linking all aspects of performance analysis for a wide range of turbomachine types. Computer methods are introduced in the main text and a key chapter on axial turbine performance analysis is complemented by the inclusion of 3 major computer programs on an accompanying disc. These enable the user to generate and modify design data through a graphic interface to assess visually the impact on predicted performance and are designed as a Computer Aided Learning Suite for student project work at the professional designer level. Based on the author's many years of teaching at degree level and research experience, this book is a must for all students and professional engineers involved with turbomachinery. **Advances in Engineering Design and Simulation Select Proceedings of NIRC 2018 Springer Nature** This book consists of selected peer-reviewed papers presented at the NAFEMS India Regional Conference (NIRC 2018). It covers current topics related to advances in computer aided design and manufacturing. The book focuses on the latest developments in engineering modelling and simulation, and its application to various complex engineering systems. Finite element method/finite element analysis, computational fluid dynamics, and additive manufacturing are some of the key topics covered in this book. The book aims to provide a better understanding of

contemporary product design and analyses, and hence will be useful for researchers, academicians, and professionals. **Proceedings of the Institution of Mechanical Engineers Index**