Turbine Analysis With Ansys

The book presents the select peer-reviewed proceedings of the International Conference on Emerging Trends in Design, Manufacturing, Materials and Thermal Sciences (ETDMMT 2020). The contents focus on latest research in product design, CAD/CAE/CFD, robotic systems, neural networks, thermal systems, alternative fuels, propulsion systems, environmental issues related to combustion, autonomous vehicles and alternative energy applications. In addition, the book also covers recent advances in automotive engineering and aerospace technologies. Given the range of contents covered, this book can be useful for students, researchers as well as practicing engineers.

These are the fully refereed proceedings of the International Conference on Materials Science and Information Technology (MSIT 2011), held during the 16-18 September 2011 in Singapore. The main goal of the event was to provide an international scientific forum for the exchange of new ideas in a number of fields by permitting in-depth interaction via discussions with peers from around the world. Core areas of materials science and information technology, plus multi-disciplinary and interdisciplinary aspects are covered. Volume is indexed by Thomson Reuters CPCI-S (WoS).

The 2016 International Conference on Mechanics and Architectural Design (MAD2016) were held in Suzhou, Jiangsu, China, 14 - 15 May 2016. The main objective of this conference is to provide a platform for researchers, academics and industrial professionals to present their research findings in the fields of Architecture, Mechanical and Civil Engineering.This proceedings consists of 90 articles selected after peer-review. It consists of 6 articles in Mechanics, and 84 articles covering research and development in Civil Engineering; addressing issues in building architecture and structure. Most of these projects were funded by the Chinese research agencies.

The book contains the research contributions belonging to the Special Issue "Numerical Simulation of Wind Turbines", published in 2020-2021. They consist of 15 original research papers and 1 editorial. Different topics are discussed, from innovative design solutions for large and small wind turbine to control, from advanced simulation techniques to noise prediction. The variety of methods used in the research contributions testifies the need for a holistic approach to the design and simulation of modern wind turbines and will be able to stimulate the interest of the wind energy community.

Reflecting the developments in gas turbine combustion technology that have occurred in the last decade, Gas Turbine Combustion: Alternative Fuels and

Emissions, Third Edition provides an up-to-date design manual and research reference on the design, manufacture, and operation of gas turbine combustors in applications ranging from aeronautical to power generation. Essentially self-contained, the book only requires a moderate amount of prior knowledge of physics and chemistry. In response to the fluctuating cost and environmental effects of petroleum fuel, this third edition includes a new chapter on alternative fuels. This chapter presents the physical and chemical properties of conventional (petroleum-based) liquid and gaseous fuels for gas turbines; reviews the properties of alternative (synthetic) fuels and conventional-alternative fuel blends; and describes the influence of these different fuels and their blends on combustor performance, design, and emissions. It also discusses the special requirements of aircraft fuels and the problems encountered with fuels for industrial gas turbines. In the updated chapter on emissions, the authors highlight the quest for higher fuel efficiency and reducing carbon dioxide emissions as well as the regulations involved. Continuing to offer detailed coverage of multifuel capabilities, flame flashback, high off-design combustion efficiency, and liner failure studies, this best-selling book is the premier guide to gas turbine combustion technology. This edition retains the style that made its predecessors so popular while updating the material to reflect the technology of the twenty-first

century.

This book presents the papers from the latest international conference, following on from the highly successful previous conferences in this series held regularly since 1978. Papers cover all current and novel aspects of turbocharging systems design for boosting solutions for engine downsizing. The focus of the papers is on the application of turbocharger and other pressure charging devices to spark ignition (SI) and compression ignition (CI) engines in the passenger car and commercial vehicles. Novel boosting solutions for diesel engines operating in the industrial and marine market sectors are also included. The current emission legislations and environmental trends for reducing CO2 and fuel consumption are the major market forces in the transport (land and marine) and industry sectors. In these market sectors the internal combustion engine is the key product where downsizing is the driver for development for both SI and CI engines in the passenger car and commercial vehicle applications. The more stringent future market forces and environmental considerations mean more stringent engine downsizing, thus, novel systems are required to provide boosting solutions including hybrid, electric-motor and exhaust waste energy recovery systems for high efficiency, response, reliability, durability and compactness etc. For large engines the big challenge is to enhance the high specific power and efficiency

whilst reducing emission levels (Nox and Sox) with variable quality fuels. This will require turbocharging systems for very high boost pressure, efficiency and a high degree of system flexibility. Presents papers from all the latest international conference Papers cover all aspects of the turbocharging systems design for boosting solutions for engine downsizing The focus of the papers is on the application of turbocharger and other pressure charging devices to spark ignition (SI) and compression ignition (CI) engines in the passenger car and commercial vehicles

This book presents innovative ideas, cutting-edge findings, and novel techniques, methods, and applications in a broad range of cybersecurity and cyberthreat intelligence areas. As our society becomes smarter, there is a corresponding need to secure our cyberfuture. The book describes approaches and findings that are of interest to business professionals and governments seeking to secure our data and underpin infrastructures, as well as to individual users.

Turbine is the most critical component in hydropower plants as it affects the cost as well as overall performance of the plant. Hence, for the cost effective design of any hydropower project, it is very important to predict the hydraulic behavior and efficiency of hydro turbines before they are used. Experimental approach of predicting the performance of hydro turbine is costly and time consuming compared to CFD approach. This research work describes the fluid

flow conditions and flow parameters within a radial turbine with regards to each part of the turbine. Fluid flow conditions and flow characteristics within the turbine are obtained by Computational Fluid Dynamics (CFD) simulation with the help of ANSYS software. The flow behavior is observed inside the turbine at different guide vane angles and maximum hydraulic efficiency is obtained for all cases and comparison is done between theoretical and experimental (CFD) efficiency. For all the different guide vane angles characteristic curves are verified. For every case inlet velocity is changed as 10m/s, 7m/s, 4m/s in sequence. CFD simulation is done with K- (SST) model and SIMPLEC algorithm."

As the human population expands and natural resources become depleted, it becomes necessary to explore other sources for energy consumption and usage. Renewable and Alternative Energy: Concepts, Methodologies, Tools, and Applications provides a comprehensive overview of emerging perspectives and innovations for alternative energy sources. Highlighting relevant concepts on energy efficiency, current technologies, and ongoing industry trends, this is an ideal reference source for academics, practitioners, professionals, and upper-level students interested in the latest research on renewable energy.

Advances in Renewable Energies Offshore is a collection of the papers presented at the 3rd International Conference on Renewable Energies Offshore (RENEW 2018) held in Lisbon, Portugal, on 8-10 October 2018. The 104 contributions were written by a diverse international group of authors and have been reviewed by an International Scientific Committee. The book is organized in the following main subject areas: - Modelling tidal currents - Modelling waves - Tidal energy devices (design, applications and experiments) - Tidal energy arrays - Wave energy devices (point absorber, multibody, applications, control, experiments, CFD, coastal

OWC, OWC and turbines) - Wave energy arrays - Wind energy devices - Wind energy arrays - Maintenance and reliability - Combined platforms - Moorings, and - Flexible materials Advances in Renewable Energies Offshore collects recent developments in these fields, and will be of interest to academics and professionals involved in the above mentioned areas.
Green technologies and energy-efficient practices have become two of the most prevalent issues in global society. However, many countries still lack the technology or resources needed to implement sustainable practices within their societies. Promoting Sustainable Practices through Energy Engineering and Asset Management discusses the challenges that the developing world faces when implementing and utilizing environmentally friendly techniques. This publication is a crucial reference source for managers, scientists, technology developers, and engineers interested in the adoption of sustainable practices in developing countries.
This book comprises select proceedings of the 43rd National Systems Conference on Innovative and Emerging Trends in Engineering Systems (NSC 2019) held at the Indian Institute of Technology, Roorkee, India. The contents cover latest research in the highly multidisciplinary field of systems engineering, and discusses its various aspects like systems design, dynamics, analysis, modeling and simulation. Some of the topics covered include computing systems, consciousness systems, electrical systems, energy systems, manufacturing systems, mechanical systems, literary systems, social systems, and quantum and nano systems. Given the scope of the contents, this book will be useful for researchers and professionals from diverse engineering and management background.
Proceedings of the NATO Advanced Study Institute on Vibration and Wear Damage in High

Speed Rotating Machinery, Tróia, Sebútal, April 10-22, 1989

Multi-body dynamics describes the physics of motion of an assembly of constrained or restrained bodies. As such it encompasses the behaviour of nearly every living or inanimate object in the universe. Multi-body dynamics - Monitoring and Simulation Techniques III includes papers from leading academic researchers, professional code developers, and practising engineers, covering recent fundamental advances in the field, as well as applications to a host of problems in industry.They broadly cover the areas: Multi-body methodology Structural dynamics Engine dynamics Vehicle dynamics - ride and handling Machines and mechanisms Multi-body Dynamics is a unique volume, describing the latest developments in the field, supplemented by the latest enhancements in computer simulations, and experimental measurement techniques. Leading industrialists explain the importance attached to these developments in industrial problem solving.

III European Conference on Computational Mechanics: Solids, Structures and Coupled Problem in Engineering Computational Mechanics in Solid, Structures and Coupled Problems in Engineering is today a mature science with applications to major industrial projects. This book contains the edited version of the Abstracts of Plenary and Keynote Lectures and Papers, and a companion CD-ROM with the full-length papers, presented at the III European Conference on Computational Mechanics: Solids, Structures and Coupled Problems in Engineering (ECCM-2006), held in the National Laboratory of Civil Engineering,

Lisbon, Portugal 5th - 8th June 2006. The book reflects the state-of-art of Computation Mechanics in Solids, Structures and Coupled Problems in Engineering and it includes contributions by the world most active researchers in this field.

An ocean current turbine was designed to harness the maximum available power outputted by a 2.23 m/s unidirectional ocean current. This design takes advantage of turbine blades which cover all of the available inlet area. The current challenges in the marine current turbine industry are addressed through material analysis and various computational fluid dynamic and structure simulations. By investigation through analysis in ANSYS Fluent it is possible to calculate probable forces on the new turbine design. Through pressure contour plotting and moment force evaluations we are able to show where the turbine can be optimized for efficiency geometrically. Static structure analysis through ANSYS allows areas of high stress and strain to be targeted. This process allows for structure and material optimization through eliminating key areas of high risk to material wear and cavitation. This work concentrates on optimizing the design of the marine current turbine for unidirectional flow purposes in the Gulf Stream of North Carolina with emphasis on torque and power output along with linear elastic structure analysis through deformation, stress, and strain plotting. The

results show that the turbine with a shroud angle of 95 degrees yielded the best power output compared to shroud angles 75, 85, 95, and 105 degrees. The turbine length of 100 mm with a twist angle of 90 degrees proved to have the most optimum performance amongst all the cases studies. After addressing areas of high stress and strain through making the turbine blades thicker, the turbine was redesigned twice and simulated at a range of rotational frequency from 50 RPM to 250 RPM. The newly redesigned turbines with blades scaled 20 and 40 percent larger than previous trials had a power output around 12 and 18 Watts which is more than twice the highest power output previously studied for the give RPM. The third redesign of the turbine is offered as a highly suggested option for further research and phototyping for production of clean energy from North Carolina's Gulf Stream.

Wind turbines operate in a constantly changing wind environment. This requires modeling and simulation of extreme events in which the wind turbine operates and a study of associated turbine loads as part of the design practice and/or site assessment. Thunderstorms are transient atmospheric events that occur frequently in some regions of the world and can influence the design of a wind turbine. Downbursts are extreme surface winds that are produced during a thunderstorm. They are both complex to model and their damaging effect on wind

turbines has been noted in recent years. In the last few decades, downbursts have been the subject of studies in various fields--- most notably, in aviation. Despite their complexity, generally only empirical models based on observational data have been developed for practical uses. Based on such field data as well as laboratory tests, it is common to model a downburst as a jet impingement on a flat plate. The actual buoyancy-driven flow has been commonly modeled as an equivalent momentum flux-driven flow resulting from the impinging jet. The use of computational fluid dynamics (CFD) to model a downburst based on the idea of an impinging jet offers an alternative approach to experimental and analytical approaches. Simulation of "downburst"' wind fields using a computational model and analysis of associated loads on a wind turbine operating during such events is the subject of this study. Although downburst-like events have been simulated using commercial CFD software, the resulting wind fields from such simulations have not been used as inflow fields for wind turbine loads analysis. In this study, the commercial CFD software, ANSYS FLUENT 12.0, is used to simulate downburst events and the output wind fields are used as input to loads analysis for a utility-scale 5-MW wind turbine. The inflow wind fields are represented by both non-turbulent and turbulent components---the former are simulated using FLUENT while the latter are simulated as stochastic processes using Fourier

techniques together with standard turbulence power spectral density functions and coherence functions. The CFD-based non-turbulent wind fields are compared with those from empirical/analytical approaches; turbine loads are also compared for the two approaches. The study suggests that a CFD-based approach can capture similar wind field characteristics as are modeled in the alternative approach; associated turbine loads are as well not noticeably different with the two approaches.

A composite 3 meter ocean current turbine blade has been designed and analyzed using Blade Element Theory (BET) and commercial Finite Element Modeling (FEM) code, ANSYS. It has been observed that using the numerical BET tool created, power production up to 141 kW is possible from a 3 bladed rotor in an ocean current of 2.5 m/s with the proposed blade design. The blade is of sandwich construction with carbon fiber skin and high density foam core. It also contains two webs made of S2-glass for added shear rigidity. Four design cases were analyzed, involving differences in hydrodynamic shape, material properties, and internal structure. Results from the linear static structural analysis revealed that the best design provides adequate stiffness and strength to produce the proposed power without any structural failure. An Eigenvalue Buckling analysis confirmed that the blade would not fail from buckling prior to

overstressed laminate failure if the loading was to exceed the Safety Factor.
The development of new and effective analytical and numerical models is essential to understanding the performance of a variety of structures. As computational methods continue to advance, so too do their applications in structural performance modeling and analysis. Modeling and Simulation Techniques in Structural Engineering presents emerging research on computational techniques and applications within the field of structural engineering. This timely publication features practical applications as well as new research insights and is ideally designed for use by engineers, IT professionals, researchers, and graduate-level students.
This volume comprises the proceedings of the 42nd National and 5th International Conference on Fluid Mechanics and Fluid Power held at IIT Kanpur in December, 2014.The conference proceedings encapsulate the best deliberations held during the conference. The diversity of participation in the conference, from academia, industry and research laboratories reflects in the articles appearing in the volume. This contributed volume has articles from authors who have participated in the conference on thematic areas such as Fundamental Issues and Perspectives in Fluid Mechanics; Measurement Techniques and Instrumentation; Computational Fluid Dynamics; Instability,

Transition and Turbulence; Turbomachinery; Multiphase Flows; Fluid?Structure Interaction and Flow?Induced Noise; Microfluidics; Bio?inspired Fluid Mechanics; Internal Combustion Engines and Gas Turbines; and Specialized Topics. The contents of this volume will prove useful to researchers from industry and academia alike.

Rapid development of urban areas dramatically increases an energy demand. In order to respond to this fact and to ensure a proper diversification of its sources, renewable energy seems to be a reasonable solution. Savonius wind turbine meets all of the above expectations, while having unique features, contributing to its superiority over the commonly used turbines with a horizontal axis of rotation. The aim of this study was to develop a physical representation of the flow in the Savonius wind turbine, allowing to precisely compare alternative projects in terms of parameters of their work. The analysis was performed using the ANSYS package for numerical fluid mechanics (known as Computational Fluid Dynamics). In the first part of the work a comparative study, using the geometry of the rotors tested experimentally, was performed. It confirmed the accuracy of the method. Then a completely new geometry was proposed, which has not been studied previously by any scientific centre. Detailed analysis of the results obtained exposes potential sources of differences, at the same time shows the

direction in which a development of this type rotors will follow.

Selected, peer reviewed papers from the International Conference on Energy Efficient Technologies for Sustainability (ICEETS 2013), April 10-12, 2013, Tamilnadu, India

As environmental concerns have focused attention on the generation of electricity from clean and renewable sources wind energy has become the world's fastest growing energy source. The Wind Energy Handbook draws on the authors' collective industrial and academic experience to highlight the interdisciplinary nature of wind energy research and provide a comprehensive treatment of wind energy for electricity generation. Features include: An authoritative overview of wind turbine technology and wind farm design and development In-depth examination of the aerodynamics and performance of land-based horizontal axis wind turbines A survey of alternative machine architectures and an introduction to the design of the key components Description of the wind resource in terms of wind speed frequency distribution and the structure of turbulence Coverage of site wind speed prediction techniques Discussions of wind farm siting constraints and the assessment of environmental impact The integration of wind farms into the electrical power system, including power quality and system stability Functions of wind turbine controllers and design and analysis techniques With

coverage ranging from practical concerns about component design to the economic importance of sustainable power sources, the Wind Energy Handbook will be an asset to engineers, turbine designers, wind energy consultants and graduate engineering students.

The success of any product sold to consumers is based, largely, on the longevity of the product. This concept can be extended by various methods of improvement including optimizing the initial creation structures which can lead to a more desired product and extend the product's time on the market. Design and Optimization of Mechanical Engineering Products is an essential research source that explores the structure and processes used in creating goods and the methods by which these goods are improved in order to continue competitiveness in the consumer market. Featuring coverage on a broad range of topics including modeling and simulation, new product development, and multi-criteria decision making, this publication is targeted toward students, practitioners, researchers, engineers, and academicians.

This book presents the proceedings of the 5th International Conference on Electrical, Control & Computer Engineering 2019, held in Kuantan, Pahang, Malaysia, on 29th July 2019. Consisting of two parts, it covers the conferences' main foci: Part 1 discusses instrumentation, robotics and control, while Part 2

addresses electrical power systems. The book appeals to professionals, scientists and researchers with experience in industry.The conference provided a platform for professionals, scientists and researchers with experience in industry. Wind Turbines addresses all those professionally involved in research, development, manufacture and operation of wind turbines. It provides a cross-disciplinary overview of modern wind turbine technology and an orientation in the associated technical, economic and environmental fields. It is based on the author's experience gained over decades designing wind energy converters with a major industrial manufacturer and, more recently, in technical consulting and in the planning of large wind park installations, with special attention to economics. The second edition accounts for the emerging concerns over increasing numbers of installed wind turbines. In particular, an important new chapter has been added which deals with offshore wind utilisation. All advanced chapters have been extensively revised and in some cases considerably extended

Several modifications have been implemented to numerical simulation codes based on blade element momentum theory (BEMT), for application to the design of ocean current turbine (OCT) blades. The modifications were applied in terms of section modulus and include adjustments due to core inclusion, buoyancy, and added mass. Hydrodynamic loads and mode shapes were calculated using the

modified BEMT based analysis tools. A 3D model of the blade was developed using SolidWorks. The model was integrated with ANSYS and several loading scenarios, calculated from the modified simulation tools, were applied. A complete stress and failure analysis was then performed. Additionally, the rainflow counting method was used on ocean current velocity data to determine the loading histogram for fatigue analysis. A constant life diagram and cumulative fatigue damage model were used to predict the OCT blade life. Due to a critical area of fatigue failure being found in the blade adhesive joint, a statistical analysis was performed on experimental adhesive joint data.

This book presents select peer reviewed proceedings of the International Conference on Applied Mechanical Engineering Research (ICAMER 2019). The books examines various areas of mechanical engineering namely design, thermal, materials, manufacturing and industrial engineering covering topics like FEA, optimization, vibrations, condition monitoring, tribology, CFD, IC engines, turbo-machines, automobiles, manufacturing processes, machining, CAM, additive manufacturing, modelling and simulation of manufacturing processing, optimization of manufacturing processing, supply chain management, and operations management. In addition, recent studies on composite materials, materials characterization, fracture and fatigue, advanced materials, energy

storage, green building, phase change materials and structural change monitoring are also covered. Given the contents, this book will be useful for students, researchers and professionals working in mechanical engineering and allied fields.

This book comprises selected peer-reviewed proceedings of the International Conference on Advances in Industrial Automation and Smart Manufacturing (ICAIASM) 2019. The contents focus on innovative manufacturing processes, standards and technologies used to implement Industry 4.0, and industrial IoT based environment for smart manufacturing. The book particularly emphasizes on emerging industrial concepts like industrial IoT and cyber physical systems, advanced simulation and digital twin, wireless instrumentation, rapid prototyping and tooling, augmented reality, analytics and manufacturing operations management. Given the range of topics covered, this book will be useful for students, researchers as well as industry professionals.

Power and Energy Engineering are important and pressing topics globally, covering issues such as shifting paradigms of energy generation and consumption, intelligent grids, green energy and environmental protection. The 11th Asia-Pacific Power and Energy Engineering Conference (APPEEC 2019) was held in Xiamen, China from April 19 to 21, 2019. APPEEC has been an annual conference since 2009 and has been successfully held in Wuhan (2009 & 2011), Chengdu (2010 & 2017), Shanghai (2012 &

2014), Beijing (2013 & 2015), Suzhou (2016) and Guilin (2018), China. The objective of APPEEC 2019 was to provide scientific and professional interactions for the advancement of the fields of power and energy engineering. APPEEC 2019 facilitated the exchange of insights and innovations between industry and academia. A group of excellent speakers have delivered keynote speeches on emerging technologies in the field of power and energy engineering. Attendees were given the opportunity to give oral and poster presentations and to interface with invited experts.

This book surveys reliability, availability, maintainability and safety (RAMS) analyses of various engineering systems. It highlights their role throughout the lifecycle of engineering systems and explains how RAMS activities contribute to their efficient and economic design and operation. The book discusses a variety of examples and applications of RAMS analysis, including: • software products; • electrical and electronic engineering systems; • mechanical engineering systems; • nuclear power plants; • chemical and process plants and • railway systems. The wide-ranging nature of the applications discussed highlights the multidisciplinary nature of complex engineering systems. The book provides a quick reference to the latest advances and terminology in various engineering fields, assisting students and researchers in the areas of reliability, availability, maintainability, and safety engineering.

Several factors in the design and analysis of hydropower structures, the identification of hydrodynamic damping and estimating its influences on the blade vibrations are crucial

for constructors who try to assess the dynamics of runners in hydropower turbines at the earliest stage of the design phase. The current state-of-the-art approach to determine dynamic characteristics of the turbine blades consists of a steady state computational fluid dynamics (CFD) simulation which provides the fluid pressure on the turbine blade. This is then applied as a boundary or load condition for the finite element simulation of the configuration. Such an approach is called one-way coupled simulation since no deflection is fed back into CFD. To capture the influence of the deformed blade on the hydraulic performance, the deformation has to be brought back into the CFD solution such that an improved solution can be found and the loop can be closed. This comprises what is called two-way coupled fluid structure interaction (FSI) simulation or multi-field simulation, which is investigated in this thesis. This study presents a three-dimensional numerical fluid-structure interaction (FSI) modeling of a vibrating hydrofoil using the commercial software ANSYS-CFX and investigates the hydrodynamic damping as the fluid contribution to the total damping. We use an FSI simulation with two separate solvers, one for the fluid (CFD) and one for the structure (FEM) that run in sequential order with synchronization points to exchange information at the interface of the fluid and structure domains. In the present work the two commercially available solvers ANSYS CFX 13.0 and ANSYS Classic 13.0 are applied as CFD and FEM solver respectively. Different meshes were generated in this analysis for the fluid and solid fields. As the first step and to show the basic steps in fluid-

structure interaction analysis with ANSYS-CFX and to validate the above mentioned two-way FSI approach, oscillation of a vertical plate in a cavity filled with a fluid is considered. We also consider the transient analysis of the plate with cantilever support in dry-condition to investigate the effect of considering numerical damping in the analysis. The effects of time step and viscous damping were also studied in details. After validating the proposed approach, special attention is paid to damping due to FSI in realistic flowing water conditions through the systematic application of a two-way fluid-structure interaction modeling.

This volume represents the proceedings of the 2013 International Conference on Innovation, Communication and Engineering (ICICE 2013). This conference was organized by the China University of Petroleum (Huadong/East China) and the Taiwanese Institute of Knowledge Innovation, and was held in Qingdao, Shandong, P.R. China, October 26 - November 1, 20

The high-pressure oxidizer turbopump (HPOTP) consists of two centrifugal pumps, on a common shaft, that are directly driven by a hot-gas turbine. Pump shaft axial thrust is balanced in that the double-entry main inducer/impeller is inherently balanced and the thrusts of the preburner pump and turbine are nearly equal but opposite. Residual shaft thrust is controlled by a self-compensating, non-rubbing, balance piston. Shaft hang-up must be avoided if the balance piston is to perform properly. One potential cause of shaft hang-up is contact between the Phase 2 bearing support and axial spring

cartridge of the HPOTP main pump housing. The status of the bearing support/axial spring cartridge interface is investigated under current loading conditions. An ANSYS version 4.3, three-dimensional, finite element model was generated on Lockheed's VAX 11/785 computer. A nonlinear thermal analysis was then executed on the Marshall Space Flight Center Engineering Analysis Data System (EADS). These thermal results were then applied along with the interference fit and bolt preloads to the model as load conditions for a static analysis to determine the gap status of the bearing support/axial spring cartridge interface. For possible further analysis of the local regions of HPOTP main pump housing assembly, detailed ANSYS submodels were generated using I-DEAS Geomod and Supertab (Appendix A). Sisk, Gregory A. Unspecified Center...