

Numerical And Experimental Design Study Of A

Two series of numerical integrations are carried out with a vertically parameterized model which was designed for the purpose of studying the effects of high-level heating on the large-scale circulation of the lower atmosphere. The initial data required by the model are the surface temperature distribution, the vertically integrated streamfield, and the temperature distribution at the top of the atmosphere, which is taken to be 0.1 mb, about 65 km. The initial data for the surface temperature distribution and the vertically integrated streamfield are taken respectively from the observed surface and 500 mb northern hemisphere charts at the time of a large geomagnetic disturbance. This time is assumed to coincide with an influx of solar corpuscular radiation down to auroral levels. The corpuscular radiation perturbs the upper-level temperature distribution by superimposing upon a constant temperature of 247K (the undisturbed state) a temperature increment proportional to the observed auroral frequency distribution. The total heat input is modest, resulting in an average increment of about 7C in 24 hours at the 0.1 mb level. The results indicate that in this model significant changes in the large-scale tropospheric circulation can be produced by the type of upper-level heating introduced. The changes are consistent with what was expected from empirical studies, but improvements in the model are necessary before it can be concluded that such changes would constitute a response of the real atmosphere to a solar energy perturbation. (Author).

This book offers timely insights into research on numerical and experimental fluid mechanics and aerodynamics, mainly for (but not limited to) aerospace applications. It reports on findings by members of the STAB (German Aerospace Aerodynamics Association) and DGLR (German Society for Aeronautics and Astronautics) and covers both nationally and EC-funded projects. Continuing on the tradition of the previous volumes, the book highlights innovative solutions, promoting translation from fundamental research to industrial applications. It addresses academics and professionals in the field of aeronautics, astronautics, ground transportation, and energy alike. Seals are considered one of the important flow elements of a turbomachinery device. Traditional labyrinth seals have proven their performance functionality by reducing leakage rates. Significant improvements on labyrinth seal functionality were obtained through altering the design geometry of labyrinth seals to prevent contamination across a seal and maintaining small leakage flowrates. This results in a windback seal that has only one tooth which continuously winds around the shaft like a screw thread. These seals are used in gas compressors to isolate the gas face seal from bearing oil. A purge gas is passed through the seal into the bearing housing. The helical design allows the seal to clear itself of any oil contamination. Windback seal performance is controlled through changing the seal geometry. A 2D graphical design tool for calculating the total and cavity leakage flowrates for windback seals is introduced. The effectiveness of the Fluent CFD (Computational Fluid Dynamics) commercial code to accurately predict the leakage rate for windback seals was evaluated. The objective is to determine if CFD simulations can be used along with a few experimental tests to study windback seals of this design with air as the working fluid. Comparison of measurement and predictions for a windback seal using the [kappa-epsilon]turbulence model with enhanced wall treatment functions show predictions and measurements comparing very well with a maximum difference of 5% for leakage rate. Similarly, the leakage rate of the tested smooth seal compares favorably with two dimensional CFD predictions, with a difference of 2%-11% and 8%-15% using laminar and [kappa-epsilon] turbulent flow models, respectively. The variation of leakage with shaft speed and pressure ratio across the seals is accurately predicted by the CFD simulations. Increasing the rotor speed to15000 rpm increases the measured leakage flowrate for the windback seal by 2% at high differential pressure and 4.5% at low differential pressure, and decreases it by 10 % for the smooth seal. The effects of seal clearance, tooth pitch, cavity depth and the tooth number of starts on leakage flowrate, velocity and pressure distributions were studied numerically for three differential pressures and four rotor speeds.

Introduction to Experimental Design

With Applications to Engineering and Science

Numerical and Experimental Studies on Combustion Engines and Vehicles

Numerical and Experimental Study of the Performance of a Drop-Shaped Pin Fin Heat Exchanger

Mathematical, Numerical, and Experimental Analysis

This book presents the proceedings of the 14th International Conference on Computer Aided Engineering, collecting the best papers from the event, which was held in Wroclaw, Poland in June 2018. It includes contributions from researchers in computer engineering addressing the applied science and development of the industry and offering up-to-date information on the development of the key technologies in technology transfer. It is divided into the following thematic sections: ▯ parametric and concurrent design, ▯ advanced numerical simulations of physical systems, ▯ integration of CAD/CAE systems for machine design, ▯ presentation of professional CAD and CAE systems, ▯ presentation of the modern methods of machine testing, ▯ presentation of practical CAD/CAM/CAE applications: ▯ designing and manufacturing of machines and technical systems, ▯ durability prediction, repairs and retrofitting of power equipment, ▯ strength and thermodynamic analyses of power equipment, ▯ design and calculation of various types of load-carrying structures, ▯ numerical methods of dimensioning materials handling and long-distance transport equipment (cranes, gantries, automotive, rail, air, space and other special vehicles and earth-moving machinery), ▯ CAE integration problems. The conference and its proceedings offer a major interdisciplinary forum for researchers and engineers in innovative studies and advances in this dynamic field.

Developments in Geographic Information Technology have raised the expectations of users. A static map is no longer enough; there is now demand for a dynamic representation. Time is of great importance when operating on real world geographical phenomena, especially when these are dynamic. Researchers in the field of Temporal Geographical Information Systems (TGIS) have been developing methods of incorporating time into geographical information systems. Spatio-temporal analysis embodies spatial modelling, spatio-temporal modelling and spatial reasoning and data mining. Advances in Spatio-Temporal Analysis contributes to the field of spatio-temporal analysis, presenting innovative ideas and examples that reflect current progress and achievements.

▯Engineering Fluid Dynamics 2018▯. The topic of engineering fluid dynamics includes both experimental as well as computational studies. Of special interest were submissions from the fields of mechanical, chemical, marine, safety, and energy engineering. We welcomed both original research articles as well as review articles. After one year, 28 papers were submitted and 14 were accepted for publication. The average processing time was 37.91 days. The authors had the following geographical distribution: China (9); Korea (3); Spain (1); and India (1). Papers covered a wide range of topics, including analysis of fans, turbines, fires in tunnels, vortex generators, deep sea mining, as well as pumps.

Numerical Experiments with a Vertically Parameterized Model Designed to Study the Effects of High-level Heating on the Large-scale Circulation of the Lower Atmosphere

Philosophical Papers

Design and Analysis of Experiments. Introduction to Experimental Design

Advances in Spatio-Temporal Analysis

Research and Applications in Structural Engineering, Mechanics and Computation

Numerical and Experimental Study of New Designs of All-vanadium Redox Flow Batteries for Performance Improvement

Experimental and Applied Mechanics, Volume 4: Proceedings of the 2012 Annual Conference on Experimental and Applied Mechanics, the fourth volume of seven from the Conference, brings together 54 contributions to this important area of research and engineering. The collection presents early findings and case studies on fundamental and applied aspects of Experimental and Applied Mechanics, including papers on: Fracture & Fatigue Microscale & Microstructural Effects in Fatigue & Fracture Material Applications Composite Characterization Using Digital Image Correlation Techniques Multi-Scale Simulation and Testing of Composites Residual Stress Inverse Problems/Hybrid Methods Nano-Composites Microstructure Material Characterization Modeling and Uncertainty Quantification Impact Behavior of Composites

Design Study of a Regenerative Pump Using Numerical and Experimental TechniquesNumerical and Experimental Design of Ultrasonic Particle Filters for Water TreatmentDesign and Analysis of Experiments, Volume 1Introduction to Experimental DesignJohn Wiley & Sons

This research presents the results of a combined numerical and experimental study of heat transfer and pressure drop behavior in a compact heat exchanger (CHE) designed with drop-shaped pin fins. A numerical study using ANSYS was first conducted to select the optimum pin shape and configuration for the CHE. This was followed by an experimental study to validate the numerical model. The results indicate that the drop shaped pin fins yield a considerable improvement in heat transfer compared to circular pin fins for the same pressure drop characteristics. This improvement is mainly due to the increased wetted surface area of the drop pins, and the delay in the flow separation as it passes the more streamlined drop shaped pin fins. The data and conclusions of this study can be used in heat exchanger design for large heat flux cooling applications as in gas turbine blades, and high-power electronics.

Research & Technology 2002

Windback Seal Design for Gas Compressors

Statistical Design and Analysis of Experiments

Design and Analysis of Experiments, Volume 1

Index to the Monthly Issues

Nanofluids

Nanofluids: Mathematical, Numerical and Experimental Analysis provides a combined treatment of the numerical and experimental aspects of this crucial topic. Mathematical methods such as the weighted residual method and perturbation techniques, as well as numerical methods such as Finite Element and Lattice-Boltzmann are addressed, along with experimental methods in nanofluid analysis. The effects of magnetic field, electric field and solar radiation on the optical properties and synthesis of nanofluid flow are examined and discussed as well. This book also functions as a comprehensive review of recent progress in nanofluids analysis and its application in different engineering sciences. This book is ideal for all readers in industry or academia, along with anyone interested in nanofluids for theoretical or experimental design reasons. Explains the governing equations in which magnetic or electric fields are applied Gives instructions on how to confirm numerical modeling results by comparing with experimental outcomes Provides detailed information on the governing equations where nanofluids are used as a working fluid

In recent years, microfluidic devices with a large surface-to-volume ratio have witnessed rapid development, allowing them to be successfully utilized in many engineering applications. A smart control process has been proposed for many years, while many new innovations and enabling technologies have been developed for smart flow control, especially concerning “smart flow control” at the microscale. This Special Issue aims to highlight the current research trends related to this topic, presenting a collection of 33 papers from leading scholars in this field. Among these include studies and demonstrations of flow characteristics in pumps or valves as well as dynamic performance in roiling mill systems or jet systems to the optimal design of special components in smart control systems.

Provides timely applications, modifications, and extensions of experimental designs for a variety of disciplines Design and Analysis of Experiments, Volume 3: Special Designs and Applications continues building upon the philosophical foundations of experimental design by providing important, modern applications of experimental design to the many fields that utilize them. The book also presents optimal and efficient designs for practice and covers key topics in current statistical research. Featuring contributions from leading researchers and academics, the book demonstrates how the presented concepts are used across various fields from genetics and medicinal and pharmaceutical research to manufacturing, engineering, and national security. Each chapter includes an introduction followed by the historical background as well as in-depth procedures that aid in the construction and analysis of the discussed designs. Topical coverage includes: Genetic cross experiments, microarray experiments, and variety trials Clinical trials, group-sequential designs, and adaptive designs

Fractional factorial and search, choice, and optimal designs for generalized linear models Computer experiments with applications to homeland security Robust parameter designs and split-plot type response surface designs Analysis of directional data experiments Throughout the book, illustrative and numerical examples utilize SAS®, JMP®, and R software programs to demonstrate the discussed techniques. Related data sets and software applications are available on the book’s related FTP site. Design and Analysis of Experiments, Volume 3 is an ideal textbook for graduate courses in experimental design and also serves as a practical, hands-on reference for statisticians and researchers across a wide array of subject areas, including biological sciences, engineering, medicine, and business.

Structural Masonry

Scientific and Technical Aerospace Reports

Application to Flowmeter Design

Experimental and Applied Mechanics, Volume 4

Design Study of a Regenerative Pump Using Numerical and Experimental Techniques

Statistical Principles in Experimental Design

Research and Applications in Structural Engineering, Mechanics and Computation contains the Proceedings of the Fifth International Conference on Structural Engineering, Mechanics and Computation (SEMCM 2013, Cape Town, South Africa, 2-4 September 2013). Over 420 papers are featured. Many topics are covered, but the contributions may be seen to fall. The Book Has Been Addressed To The Students And Researchers In The Disciplines Of Psychology, Education, Sociology, Social-Work, Medicine, Management, And Allied Disciplines. It Has Been Written For Those Who Do Not Possess Sophisticated Mathematical Background. Various Designs And Their Analyses Have Been Presented In Simple Understandable Language. The Intended Emphasis Is To Make The Reader Understand The Basic Principles Of Experimental Design, Layout For Data Collection, Analysis Of Data, Interpretation Of Results Of Experimental Outcome. It Offers An Integrated Approach Placing Due Emphasis On Theory, Application, And Computational Procedures. Schematic Representations Of Analysis For Each Design Is A Novel Feature Of This Book. It Makes The Analysis Simple And Easy To Comprehend. Each Design Includes General Layout For Data Collection, Schematic Representation Of The Analysis, Followed By Numerical Example With Detailed Solution And Interpretation. Numerous Illustrations, Many From Published Research, Are Provided With The Intent To Equip The Reader To Develop Insight Into The Intricacies Of Research Strategy. Special Treatment Has Been Given To Within Subject And Mixed Designs. Multivariate Analysis Of Variance, Analysis Of Covariance, And Also Analysis Of Variance By Ranks Have Been Included.

This volume is an outcome of the international conference on advances in structures: steel, concrete, composite and aluminium in Sydney in 2003. It focuses on researches in composite design, fire engineering, light gauge construction, advanced structural analysis and concrete filled tubes.

Monthly Catalog of United States Government Publications

Contributions to the 22nd STAB/DGLR Symposium

Advances in Evolutionary and Deterministic Methods for Design, Optimization and Control in Engineering and Sciences

Design and Analysis of Experiments, Volume 3

Engineering Design Applications IV

Journal of Rehabilitation Research and Development

This text provides a basis for a standardized approach to structural masonry, using an integration of experimental and computational techniques. Accurate displacement-controlled materials experiments have produced an extensive database of strength, stiffness and softening properties for tension, compression and shear, and this data has been transferred into numerical models for simulating the deformational behaviour of masonry structures. The models have been implemented into finite and distinct element codes and have subsequently been verified against shear wall experiments and analytical solutions for masonry parts.

A revision of this classic statistics text for first-year graduate students in psychology, education and related social sciences. The two new authors are former students of Winer's. They have updated, rewritten and reorganized the text to fit the course as it is now taught.

Emphasizes the strategy of experimentation, data analysis, and theirinterpretation of experimental results. Features numerous examples using actual engineering andscientific studies. Presents statistics as an integral component of experimentationfrom the planning stage to the presentation of theconclusions. Deep and concentrated experimental design coverage, withequivalent but separate emphasis on the analysis of data from thevarious designs. Topics can be implemented by practitioners and do not require ahigh level of training in statistics. New edition includes new and updated material and computeroutput.

Studies in D-optimal Experimental Design

Engineering Fluid Dynamics 2018

Smart Flow Control Processes in Micro Scale

Proceedings of the 14th International Scientific Conference: Computer Aided Engineering

A First Course in Design and Analysis of Experiments

Special Designs and Applications

Oehlert's text is suitable for either a service course for non-statistics graduate students or for statistics majors. Unlike most texts for the one-term grad/upper level course on experimental design, Oehlert's new book offers a superb balance of both analysis and design, presenting three practical themes to students: • when to use various designs • how to analyze the results • how to recognize various design options Also, unlike other older texts, the book is fully oriented toward the use of statistical software in analyzing experiments.

February issue includes Appendix entitled Directory of United States Government periodicals and subscription publications; September issue includes List of depository libraries; June and December issues include semiannual index

This book describes methods for designing and analyzing experiments conducted using computer code in lieu of a physical experiment. It discusses how to select the values of the factors at which to run the code (the design of the computer experiment). It also provides techniques for analyzing the resulting data so as to achieve these research goals.

New Results in Numerical and Experimental Fluid Mechanics XIII

Advances in Structures

Numerical and Experimental Study of Shaft Resistance of Piles in Granular Soils

An Experimental/ Numerical Basis for Practical Design Rules (CUR Report 171)

Cumulative index

"Energy storage is envisioned as a key part of a renewable energy solution incorporated in a grid that overcomes two critical limits of renewable energy: intermittency and uncertainty. Among various technologies, a vanadium redox flow battery (VRFB) offers a promise because of its unique features such as long cycle life, separation of energy and power, and low cost. However, there are many remaining challenges, including the limited application due to low energy density and complicated geometries. The complex geometry makes it difficult to optimize the performance and can cause a serious concern about leakage of the liquid. The goal of this dissertation is to resolve these challenges through modeling and experimentation. Three main efforts: flow field optimization by optimizing channels, new design for stability improvement and cost reduction, and a new concept of distributed VRFB. First, the effects of channel and length on battery performance were investigated based on 3D electrochemical models validated by experimental measurements. Second, to address the problem of leakage, a new design for the battery was introduced to increase reliability, reduce costs, and ease assembly. This battery has a small number of parts, which can more effectively prevent electrolyte leakage. Based on PVC (polyvinyl chloride) material, it solves the problem caused by electrolyte penetration by replacing existing graphite plate. Third, the development of a new distributed VRFB design to address the problem of insufficient power, one of the main challenges of the flow system. This new technology is more efficient for space utilization, equal weight distribution, and fueling like a gasoline vehicle, reducing charge time"--Abstract, page iv.

This volume presents up-to-date material on the state of the art in evolutionary and deterministic methods for design, optimization and control with applications to industrial and societal problems from Europe, Asia, and America. EUROGEN 2015 was the 11th of a series of International Conferences devoted to bringing together specialists in evolutionary and deterministic methods in design optimization, with emphasis on solving industrial and societal problems. The conference was organised around a number of parallel symposia, regular sessions, and keynote lectures focused on surrogate-based optimization in aerodynamic design, adjoint methods for steady & unsteady optimization in marine design, game strategies combined with evolutionary computation, optimization under uncertainty, topology optimization, optimal planning, shape optimization, and production scheduling.

This user-friendly new edition reflects a modern and accessible approach to experimental design and analysis Design and Analysis of Experiments, Volume 1, Second Edition provides a general introduction to the philosophy, theory, and practice of designing scientific comparative experiments and also details the intricacies that are often encountered in the design and analysis of experiments. In addition to the addition of extensive numerical examples and expanded treatment of key concepts, this book further addresses the needs of practitioners and successfully provides a solid understanding of the relationship between the quality of experimental design and the validity of conclusions. This Second Edition continues to provide the theoretical background and statistical framework within which to apply the fundamental concepts. The difference between experimental studies and observational studies is addressed, along with a discussion of the various components of experimental design: the error-control design, the treatment design, and the observation design. A series of error-control designs are presented, including randomized, randomized-block, and split-plot designs. The Latin square principle, the split-unit principle, and the notion of factorial treatment structure. This book also emphasizes the practical aspects of designing and analyzing experiments and features: Increased coverage of the practical aspects of designing and analyzing experiments, complete with theoretical background that explores the various types of interaction between both treatment and blocking factors, and numerical and graphical techniques are provided to analyze and interpret these interactions Discussion of the important distinctions between two types of blocking factors and their role in the process of drawing statistical inferences from an experiment, including highlighting its relationship to split-plot and split-block designs Numerical examples using SAS® to illustrate the analysis of data from various designs and to construct factorial designs that relate the results to the theoretical derivations Design and Analysis of Experiments, Volume 1, Second Edition is an ideal textbook for first-year graduate students and researchers in a wide array of subject areas, including biological sciences, engineering, medicine, pharmacology, psychology, and business.

Numerical and Experimental Design of Ultrasonic Particle Filters for Water Treatment

The Design and Analysis of Computer Experiments

Structures, Materials and Processes

Numerical and Experimental Study of Gas-particle Flows in Orifices and Venturis

An Experimental Study of Numerical Methods for Design Optimization

A Numerical and Experimental Study

The matters discussed and presented in the chapters of this book cover a wide spectrum of topics and research methods commonly used in the field of engine combustion technology and vehicle functional systems. This book contains the results of both computational analyses and experimental studies on jet and reciprocating combustion engines as well heavy-duty onroad vehicles. Special attention is devoted to research and measures toward preventing the emission of harmful exhaust components, reducing fuel consumption or using unconventional methods of engine fueling or using renewable and alternative fuels in different applications. Some technical improvements in design and control of vehicle systems are also presented.

Monthly Catalog of United States Government Publications, Cumulative Index

Proceedings of the 2012 Annual Conference on Experimental and Applied Mechanics

Proceedings of the International Conference on Advances in Structures (ASSCCA '03), Sydney, Australia, 22-25 June 2003

Journal of Rehabilitation Research & Development