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Unspecified Center

**Japanese Journal of Applied Physics**

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**Upper-surface Blowing Nacelle Design Study for a Swept Wing Airplane at Cruise Conditions**

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**Design, Repair, and Refurbishment of Steam Turbines**

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International Aerospace Abstracts


General Design Analysis, Considerations and Applications

The definitive text on rocket propulsion—now revised to reflect advancements in the field For sixty years, Sutton's Rocket Propulsion Elements has been regarded as the single most authoritative sourcebook on rocket propulsion technology. As with the previous edition, coauthored with Oscar Biblarz, the Eighth Edition of Rocket Propulsion Elements offers a thorough introduction to basic principles of rocket propulsion for guided missiles, space flight, or satellite flight. It describes the physical mechanisms and designs for various types of rockets' and provides an understanding of how rocket propulsion is applied to flying vehicles. Updated and strengthened throughout, the Eighth Edition explores: The fundamentals of rocket propulsion, its essential technologies, and its key design rationale. The various types of rocket propulsion systems, physical phenomena, and essential relationships. The latest advances in the field such as changes in materials, systems design, propellants, applications, and manufacturing technologies, with a separate new chapter devoted to turbopumps. Liquid propellant rocket engines and solid propellant rocket motors, the two most prevalent of the rocket propulsion systems, with an in-depth consideration of advances in hybrid rockets and electrical space propulsion. Comprehensive and coherently organized, this seminal text guides readers evenhandedly through the complex factors that shape rocket propulsion, with both theory and practical design considerations. Professional engineers in the aerospace and defense industries as well as students in mechanical and aerospace engineering will find this updated classic indispensable for its scope of coverage and utility.

Modern Engineering for Design of Liquid-Propellant Rocket Engines

An analytical technique suitable for the solution of complex energy transfer problems involving coupled radiant and convective energy transfer is developed. Solutions for the coupled axial wall energy flux distribution in rocket nozzles using hydrogen as a propellant are presented. Flow rates and temperatures studied are near those forecast for gaseous-core nuclear-propulsion systems. Parameters varied are nozzle shape, inlet propellant temperature, mean reactor cavity temperature, and nozzle wall temperature level. The effects of variation of the propellant radiation absorption coefficient with pressure, temperature, and wavelength are presented, and real property variations are used where they appear to be significant. Comparison is made to a simplified, coupled solution using a modified second-order one-dimensional diffusion equation for the radiative transfer. At the temperature levels assumed, radiative transfer may account for a greater portion of the total energy transfer over important portions of the nozzle, and its effects cannot, therefore, be neglected. Extreme energy fluxes (near 3X10^8 Btu/(hr)(sq ft)) are observed for certain cases, and this implies that new nozzle cooling techniques must be developed.

Applied Mechanics Reviews

Lists citations with abstracts for aerospace related reports obtained from worldwide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database.

Analysis of Heat-transfer Effects in Rocket Nozzles Operating with Very High-temperature Hydrogen


Scientific and Technical Aerospace Reports

33rd AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit

A study was made to design two types of overwing nacelles for an existing wing-body at a design condition of Mach = 0.8 and C sub L = 0.2. Internal and external surface contours were developed for nacelles having either a D-shaped nozzle or a high-aspect-ratio nozzle for upper-surface blowing in the powered-lift mode of operation. The goal of the design was the development of external nacelle lines that would minimize high-speed aerodynamic interference effects. Each nacelle type was designed for both two- and four-engine airplanes using an iterative process of aerodynamic potential flow analysis. Incremental nacelle drag estimates were made for flow-through wind tunnel models of each configuration.

Observations Regarding Use of Advanced CFD Analysis, Sensitivity Analysis, and Design Codes in MDO

Aeronautical Engineering

Government Reports Annual Index


Technical Literature Abstracts


Observations regarding the use of advanced computational fluid dynamics (CFD) analysis, sensitivity analysis (SA), and design codes in gradient-based multidisciplinary design optimization (MDO) reflect our perception of the interactions required of CFD and our experience in recent aerodynamic design optimization studies using CFD. Sample results from these latter studies are summarized for conventional optimization (analysis-SA codes) and simultaneous analysis and design optimization (design code) using both Euler and Navier-Stokes flow approximations. The amount of computational resources required for aerodynamic design using CFD via analysis-SA codes is greater than that required for design codes. Thus, an MDO formulation that utilizes the more efficient design codes where possible is desired. However, in the aerovehicle MDO problem, the various disciplines that are involved have different design points in the flight envelope; therefore, CFD analysis-SA codes are required at the aerodynamic 'off design' points. The suggested MDO formulation is a hybrid multilevel optimization procedure that consists of both multipoint CFD analysis-SA codes and multipoint CFD design codes that perform suboptimizations.

Three-dimensional Navier-Stokes Analysis and Redesign of an Imbedded Bellmouth Nozzle in a Turbine Cascade Inlet Section
A Theoretical, Experimental and CFD Analysis of Regenerative Flow Compressors and Pumps for Microturbine and Automotive Fuel Applications

38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit: 02-4050 - 02-4099

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Polyphase Flow in Turbomachinery

Rocket Propulsion Elements

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