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\*D a s Handbuch zur Raumfahrttechnik\* Dieses komplett vierfarbig gedruckte Standardwerk bietet Studierenden, Ingenieuren und Wissenschaftlern sowie

ambitionierten Raumfahrtinteressierten detaillierte Einblicke in die faszinierende Welt der Raumfahrt. Neben den Grundlagen werden in sieben Hauptkapiteln die Abläufe und Methoden für die Entwicklung, den Bau, den Betrieb und die Nutzung von Raumfahrtsystemen beschrieben: - Trägersysteme - Raumfahrt-Subsysteme - Aspekte bemannter Missionen - Missionsbetrieb - Raumfahrtnutzung - Konfiguration/Entwurf eines Raumflugkörpers - Management von Raumfahrtprojekten Die fünfte Auflage des Handbuches wurde um neue Planeten- und Satellitenmissionen ergänzt sowie mit neuen Inhalten zu Weltraumbiologie, Satellitennavigation, Trägersystemen und zur Technik unbemannter und bemannter Raumfahrzeuge auf den aktuellen Stand gebracht. Die einzelnen Kapitel und Unterkapitel, erstellt von führenden Experten von Hochschulen, Forschungseinrichtungen und der Raumfahrtindustrie, sind in sich abgeschlossen. Damit ermöglicht das Buch den Lesern, die sich zu ausgewählten Bereichen informieren wollen, einen schnellen Einstieg und fundierten Überblick. This book presents selected papers presented in the Symposium on Applied Aerodynamics and Design of Aerospace Vehicles (SAROD 2018), which was jointly organized by Aeronautical Development Agency (the nodal agency for the design and development of combat aircraft in India), Gas-Turbine Research Establishment (responsible for design and development of gas turbine engines for military applications), and CSIR-National Aerospace Laboratories (involved in major aerospace programs in the country such as SARAS program, LCA, Space Launch Vehicles, Missiles and UAVs). It brings together experiences of aerodynamicists in India as well as abroad in Aerospace Vehicle Design, Gas Turbine Engines, Missiles and related areas. It is a useful volume for researchers, professionals and students interested in diversified areas of aerospace engineering. Annotation Design and R & D engineers and students will value the comprehensive, meticulous coverage in this volume. Beginning with the basic principles and concepts of aeropropulsion combustion, chapters explore specific processes, limitations, and analytical methods as they bear on component design. This text provides an introduction to gas turbine engines and jet propulsion for aerospace or mechanical engineers. The text is divided into four parts: introduction to aircraft propulsion; basic concepts and one-dimensional/gas dynamics; parametric (design point) and performance (off-design) analysis of air breathing propulsion systems; and analysis and design of major gas turbine engine components (fans, compressors, turbines, inlets, nozzles, main burners, and afterburners). Design concepts are introduced early (aircraft performance in introductory chapter) and integrated throughout. Written with extensive student input on the design of the book, the book builds upon definitions and gradually develops the thermodynamics, gas dynamics, and gas turbine engine principles. "This book also fits well into the systems engineering focus of the Aerospace Series"-- Annotation Leading researchers provide a cohesive treatment of the complex issues in high-speed propulsion, as well as introductions to the current capabilities for addressing several fundamental aspects of high-speed vehicle propulsion development. Includes more than 380 references, 290 figures and tables, and 185 equations. Der Band führt in Grundlagen, Auslegung und rechnergestützte Simulation stationärer und mobiler Gasturbinenanlagen ein. Ausgehend von den realen, thermodynamischen Arbeitsprozessen werden die Hauptkomponenten wie Turboverdichter, Turbinen und Brennräume dargestellt. Darauf aufbauend wird das stationäre und instationäre Betriebsverhalten simuliert sowie die Anpassung an verschiedene Lastbereiche und

Einsatzbedingungen behandelt. Strategien zur Auslegungsmethodik und -optimierung werden insbesondere an typischen Turbofan-Triebwerken demonstriert. p="" This highly informative book offers a comprehensive overview of the fundamentals of propulsion. The book focuses on foundational topics in propulsion, namely gas dynamics, turbomachinery, and combustion to more complex subjects such as practical design aspects of aircraft engines and thermodynamic aspects and analysis. It also includes pedagogical aspects such as end-of-chapter problems and worked examples to augment learning and self-testing. This book is a useful reference for students in the area of mechanical and aerospace engineering. Also, scientists and engineers working in the areas of aerospace propulsion and gas dynamics find this book a valuable addition. ^ A comprehensive review of the science and engineering behind future propulsion systems and energy sources in sustainable aviation Future Propulsion Systems and Energy Sources in Sustainable Aviation is a comprehensive reference that offers a review of the science and engineering principles that underpin the concepts of propulsion systems and energy sources in sustainable air transportation. The author, a noted expert in the field, examines the impact of air transportation on the environment and reviews alternative jet fuels, hybrid-electric and nuclear propulsion and power. He also explores modern propulsion for transonic and supersonic-hypersonic aircraft and the impact of propulsion on aircraft design. Climate change is the main driver for the new technology development in sustainable air transportation. The book contains critical review of gas turbine propulsion and aircraft aerodynamics; followed by an insightful presentation of the aviation impact on environment. Future fuels and energy sources are introduced in a separate chapter. Promising technologies in propulsion and energy sources are identified leading to pathways to sustainable aviation. To facilitate the utility of the subject, the book is accompanied by a website that contains illustrations, and equation files. This important book: Contains a comprehensive reference to the science and engineering behind propulsion and power in sustainable air transportation Examines the impact of air transportation on the environment Covers alternative jet fuels and hybrid-electric propulsion and power Discusses modern propulsion for transonic, supersonic and hypersonic aircraft Examines the impact of propulsion system integration on aircraft design Written for engineers, graduate and senior undergraduate students in mechanical and aerospace engineering, Future Propulsion Systems and Energy Sources in Sustainable Aviation explores the future of aviation with a guide to sustainable air transportation that includes alternative jet fuels, hybrid-electric propulsion, all-electric and nuclear propulsion. This book provides a comprehensive basics-to-advanced course in an aero-thermal science vital to the design of engines for either type of craft. The text classifies engines powering aircraft and single/multi-stage rockets, and derives performance parameters for both from basic aerodynamics and thermodynamics laws. Each type of engine is analyzed for optimum performance goals, and mission-appropriate engines selection is explained. Fundamentals of Aircraft and Rocket Propulsion provides information about and analyses of: thermodynamic cycles of shaft engines (piston, turboprop, turboshaft and propfan); jet engines (pulsejet, pulse detonation engine, ramjet, scramjet, turbojet and turbofan); chemical and non-chemical rocket engines; conceptual design of modular rocket engines (combustor, nozzle and turbopumps); and conceptual design of different modules of aero-engines in their design and off-design state. Aimed at graduate and final-year undergraduate students, this

textbook provides a thorough grounding in the history and classification of both aircraft and rocket engines, important design features of all the engines detailed, and particular consideration of special aircraft such as unmanned aerial and short/vertical takeoff and landing aircraft. End-of-chapter exercises make this a valuable student resource, and the provision of a downloadable solutions manual will be of further benefit for course instructors.

### AIRCRAFT PROPULSION THE DEFINITIVE INTRODUCTION TO ROCKET PROPULSION THEORY AND APPLICATIONS

The recent upsurge in global government and private spending and in space flight events has resulted in many novel applications of rocket propulsion technology. Rocket Propulsion Elements remains the definitive guide to the field, providing a comprehensive introduction to essential concepts and applications. Led by industry veteran George P. Sutton and by Professor Oscar Biblarz, this book provides interdisciplinary coverage including thermodynamics, aerodynamics, flight performance, propellant chemistry and more. This thoroughly revised ninth edition includes discussion and analysis of recent advances in the field, representing an authoritative reference for students and working engineers alike. In any engineering field, theory is only as useful as it is practical; this book emphasizes relevant real-world applications of fundamental concepts to link "thinking" and "doing".

This book will help readers:

- Understand the physics of flight and the chemistry of propulsion
- Analyze liquid, solid, gas, and hybrid propellants, and the engines they fuel
- Consider high-temperature combustion, stability, and the principles of electric and chemical propulsion
- Dissect the workings of systems in common use around the world today
- Delve into the latest advances in materials, systems, propellants, and more

Broad in scope, rich in detail, and clear in explanation, this seminal work provides an unparalleled foundation in aerospace engineering topics. Learning through the lens of modern applications untangles complex topics and helps students fully grasp the intricacies on a more intuitive level. Rocket Propulsion Elements, Ninth Edition merges information and utility building a solid foundation for innovation. This text provides an introduction to the fundamentals of gas turbine engines and jet propulsion for aerospace or mechanical engineers. The book contains sufficient material for two sequential courses in propulsion (advanced fluid dynamics), an introductory course in jet propulsion, and a gas turbine engine components course. The text is divided into four parts: introduction to aircraft propulsion; basic concepts and one-dimensional/gas dynamics; analysis and performance of air breathing propulsion systems; and analysis and design of gas turbine engine components.

Aircraft Propulsion and Gas Turbine Engines, Second Edition builds upon the success of the book's first edition, with the addition of three major topic areas: Piston Engines with integrated propeller coverage; Pump Technologies; and Rocket Propulsion. The rocket propulsion section extends the text's coverage so that both Aerospace and Aeronautical topics can be studied and compared. Numerous updates have been made to reflect the latest advances in turbine engines, fuels, and combustion. The text is now divided into three parts, the first two devoted to air breathing engines, and the third covering non-air breathing or rocket engines. This introductory 2005 text on air-breathing jet propulsion focuses on the basic operating principles of jet engines and gas turbines. Previous coursework in fluid mechanics and thermodynamics is elucidated and applied to help the student understand and predict the characteristics of engine components and various types of engines and power gas turbines. Numerous examples help the reader appreciate the

methods and differing, representative physical parameters. A capstone chapter integrates the text material into a portion of the book devoted to system matching and analysis so that engine performance can be predicted for both on- and off-design conditions. The book is designed for advanced undergraduate and first-year graduate students in aerospace and mechanical engineering. A basic understanding of fluid dynamics and thermodynamics is presumed. Although aircraft propulsion is the focus, the material can also be used to study ground- and marine-based gas turbines and turbomachinery and some advanced topics in compressors and turbines. The book details sources of thermal energy, methods of capture, and applications. It describes the basics of thermal energy, including measuring thermal energy, laws of thermodynamics that govern its use and transformation, modes of thermal energy, conventional processes, devices and materials, and the methods by which it is transferred. It covers 8 sources of thermal energy: combustion, fusion (solar) fission (nuclear), geothermal, microwave, plasma, waste heat, and thermal energy storage. In each case, the methods of production and capture and its uses are described in detail. It also discusses novel processes and devices used to improve transfer and transformation processes. Das Buch bietet die in der Fachliteratur umfassendste Behandlung aller wichtigen Fragen zu Flugzeugtriebwerken und Gasturbinenantrieben. Eine leicht verständliche Einführung in die Aerodynamik und Thermodynamik hilft Lesern, die Grundlagen der Technik und verschiedene Triebwerkstypen besser zu verstehen. Neu hinzugekommen sind Abschnitte zu realen Triebwerkskreisprozessen und Triebwerkssystemen. In der 3., vollständig überarbeiteten Auflage werden auch neuere Triebwerkstypen wie das Wärmetauschertriebwerk vorgestellt. The renewed interest in high-speed propulsion has led to increased activity in the development of the supersonic combustion ramjet engine for hypersonic flight applications. In the hypersonic regime the scramjet engine's specific thrust exceeds that of other propulsion systems. This book, written by a leading researcher, describes the processes and characteristics of the scramjet engine in a unified manner, reviewing both theoretical and experimental research. The focus is on the phenomena that dictate the thermo-aerodynamic processes encountered in the scramjet engine, including component analyses and flowpath considerations; fundamental theoretical topics related to internal flow with chemical reactions and non-equilibrium effects, high-temperature gas dynamics, and hypersonic effects are included. Cycle and component analyses are further described, followed by flowpath examination. Finally, the book reviews experimental and theoretical capabilities and describes ground testing facilities and computational fluid dynamics facilities developed for the study of time-accurate, high-temperature aerodynamics. Good, No Highlights, No Markup, all pages are intact, Slight Shelfwear, may have the corners slightly dented, may have slight color changes/slightly damaged spine. Winner of the Summerfield Book Award. The next great leap for jet propulsion will be to power-sustained, efficient flight through the atmosphere. Scramjet Propulsion Explore the cutting edge of HAP technologies with this comprehensive resource from an international leader in her field Scramjet Propulsion: A Practical Introduction delivers a comprehensive treatment of hypersonic air breathing propulsion and its applications. The book covers the most up-to-date hypersonic technologies, like endothermic fuels, fuel injection and flameholding systems, high temperature materials, and TPS, and offers technological overviews of hypersonic flight platforms like the X-43A, X-51A, and HiFIRE. It is organized around

easy-to-understand explanations of technical challenges and provides extensive references for the information contained within. The highly accomplished author provides readers with a fulsome description of the theoretical underpinnings of hypersonic technologies, as well as critical design and technology issues affecting hypersonic air breathing propulsion technologies. The book's combination of introductory theory and advanced instruction about individual hypersonic engine components is ideal for students and practitioners in fields as diverse as hypersonic vehicle and propulsion development for missile defense technologies, launch aerospaceplanes, and civilian transports. Over 250 illustrations and tables round out the material. Readers will also learn from: A thorough introduction to hypersonic flight, hypersonic vehicle concepts, and a review of fundamental principles in hypersonic air breathing propulsion Explorations of the aerothermodynamics of scramjet engines and the design of scramjet components, as well as hypersonic air breathing propulsion combustors and fuels Analyses of dual-mode combustion phenomena, materials structures, and thermal management in hypersonic vehicles, and combined cycle propulsion An examination of CFD analysis, ground and flight testing, and simulation Perfect for researchers and graduate students in aerospace engineering, Scramjet Propulsion: A Practical Introduction is also an indispensable addition to the libraries of engineers working on hypersonic vehicle development seeking a state-of-the-art resource in one of the most potentially disruptive areas of aerospace research today. Annotation A design textbook attempting to bridge the gap between traditional academic textbooks, which emphasize individual concepts and principles; and design handbooks, which provide collections of known solutions. The airbreathing gas turbine engine is the example used to teach principles and methods. The first edition appeared in 1987. The disk contains supplemental material. Annotation c. Book News, Inc., Portland, OR (booknews.com).

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