
Rocket Propulsion K Ramamurthi Pdf 12

The design and development of rockets and spacecraft with inertial and momentum recovery systems for the recovery of their kinetic energy is described. The methods of design and development of such systems are discussed, and various design criteria and tests are laid down for each type of system. The design of the systems is summarized in a concise manner. Rocket propulsion is one of the most elusive methods in the development of Space technology. The progress made by the rocketry during the last century is described. The development of future generation of rockets is discussed. All the basics and some advanced topics of rocket propulsion are dealt with in this book. An introductory knowledge on the laws of motion in space, the rocket equation, working principle, performance characteristics and design and development of rockets are needed. Some of the recent developments in various stages of rocket development are described and a brief discussion on pulsed-detonation rockets is also given. The principles governing the operation of electrical rockets and the limitations arising from power and associated mass are deduced. Detuning and gain stabilization methods of overcoming combustion instability are discussed; The principles governing the operation of electrical rockets and the limitations arising from power and associated mass are deduced; A brief on advanced rockets such as nuclear rockets, tri-propellant rockets, pulse detonation rockets is also provided. A concise treatment of the fundamentals of thermodynamics is presented in this book. In particular, emphasis is placed on discussions of the second law, a unique feature of thermodynamics, which states the limitations of converting thermal energy into mechanical energy. The entropy function that permits the loss in the potential of a real thermodynamic process to be assessed, the maximum possible work in a process, and irreversibility and equilibrium are deduced from the law through physical and intuitive considerations. They are applicable in mitigating waste heat and are useful for solving energy, power, propulsion and climate-related issues.



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The fundamental aspects of rockets and the current trends in rocket propulsion are dealt with in this course. Starting with description of motion in space, the requirements of rockets for placing spacecrafts in different orbits and escaping the gravitational fields of the planets are examined. The operating principles and design aspects of solid propellant, liquid propellant, electrical, nuclear and other types of rockets are dealt with. Rocket Propulsion. Instructor: Prof. K. Ramamurthi, Department of Mechanical Engineering, IIT Madras. This course covers topics in rocket propulsion: motion in space, rocket principle, nozzles, chemical propellants, solid propellant rockets, liquid propellant rockets, monopropellant rockets, hybrid rockets, combustion instability, electrical rockets, and advances in rocket propulsion. (from nptel.ac.in) A brief overview of astronomical observations and design principles of rockets and satellites are provided in the book. The operation of rockets using liquid and cryogenic propellants and other forms of propulsion such as gravity and magnetic propulsion is explained in detail. With examples, the concepts of performance prediction, design of rocket engines, and problems related to fuel toxicity are described. The theoretical basis of thermodynamics is thoroughly explained in this concise book with emphasis on the features and applications of the three major forms of thermodynamic energy and the use of these energy forms in the propulsion systems of rockets. The physical aspects and mechanisms of other forms of propulsion such as the braking and thrusting forces of gases and magnetic forces are explained in a precise and precise manner. The vast body of existing literature on the subject is covered in a well-organized manner. Practical examples illustrate the concepts. The book provides the reader with a comprehensive and unified view of the theory of rockets and thermodynamics. It is easily understood and a good reference work. 5ec8ef588b

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