Aircraft Propulsion and Gas Turbine Engines

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The escalating use of aircraft in the 21st century demands a thorough understanding of engine propulsion concepts, including the performance of aero engines. Among other critical activities,gas turbines play an extensive role in electric power generation, and marine propulsion for naval vessels and cargo ships.

In the most exhaustive volume to date, this text examines the foundation of aircraft propulsion: aerodynamics interwoven with thermodynamics, heat transfer, and mechanical design. With a finely focused approach, the author devotes each chapter to a particular engine type, such as ramjet and pulsejet, turbojet, and turbofan. Supported by actual case studies, he illustrates engine performance under various operating conditions.

Part I discusses the history, classifications, and performance of air breathing engines. Beginning with Leonardo and continuing on to the emergence of the jet age and beyond, this section chronicles inventions up through the 20th century. It then moves into a detailed discussion of different engine types, including pulsejet, ramjet, single- and multi-spool turbojet, and turbofan in both subsonic and supersonic applications.

The author discusses Vertical Take Off and Landing aircraft, and provides a comprehensive examination of hypersonic scramjet and turbo ramjet engines. He also analyzes the different types of industrial gas turbines having single-and multi-spool with intercoolers, regenerators, and reheaters.

Part II investigates the design of rotating compressors and turbines, and non-rotating components, intakes, combustion chambers, and nozzles for all modern jet propulsion and gas turbine engine systems, along with their performance. Every chapter concludes with illustrative examples followed by a problems section; for greater clarity, some provide a listing of important mathematical relations.

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