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Stratosphere; 3.7 Ideal Ramjet in High Supersonic Cruise in The Stratosphere; 3.8 Ideal Turbofan in Maximum Power Take-Off; 3.9 Ideal Turbofan in High Subsonic Cruise in The Stratosphere; 3.10 Ideal Internal Turbofan in Supersonic Cruise in The Stratosphere; 3.11 Real Engine Operations; 3.12 Nomenclature; 3.13 Exercises; References; Chapter 4 - Combustion Chambers for Air-Breathing Engines 4.1 Combustion Chamber Attributes 4.2 Modeling the Chemical Energy Release; 4.3 Constant Area Combustors; 4.4 Example: Constant Area Combustor; 4.5 Constant Pressure Combustors; 4.6 Fuels for Air-Breathing Engines; 4.7 Combustor Efficiency; 4.8 Combustor Configuration; 4.9 Example: Secondary Air for Cooling; 4.10 Criteria for Equilibrium in Chemical Reactions; 4.11 Calculation of Equilibrium Compositions; 4.12 Example: Homogeneous Reactions with a Direct Solution; 4.13 Example: Homogeneous Reactions with Trial-And-Error Solution 4.14 Example: Estimation of Importance of Neglected Product Species 4.15 Adiabatic Flame Temperature; 4.16 Example: Adiabatic Flame Temperature for Stoichiometric H₂-O₂ Mixture; 4.17 Nomenclature; References; Chapter 5 - Nozzles; 5.1 Nozzle Characteristics and Simplifying Assumptions; 5.2 Flow in a Nozzle with Simple Area Change; 5.3 Mass Flow in an Isentropic Nozzle; 5.4 Nozzle Operation; 5.5 Normal Shock inside the Nozzle; 5.6 Example: Shock in Nozzle; 5.7 Two-Dimensional Considerations in Nozzle Flows; 5.8 Example: Overexpanded Nozzles; 5.9 Example: Underexpanded Nozzles 5.10 Afterburning for Increased Thrust

Sommario/riassunto

Readers of this book will be able to: utilize the fundamental principles of fluid mechanics and thermodynamics to analyze aircraft engines, understand the common gas turbine aircraft propulsion systems and be able to determine the applicability of each, perform system studies of aircraft engine systems for specified flight conditions, perform preliminary aerothermal design of turbomachinery components, and conceive, analyze, and optimize competing preliminary designs for conventional and unconventional missions. Early coverage of cycle analysis provides a systems pers
