

1. Record Nr.	UNINA9910962247003321
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Titolo	Theory of aerospace propulsion / / Pasquale M. Sforza
Pubbl/distr/stampa	Elsevier Science & Technology, 2011
ISBN	9786613293640 9781283293648 1283293641 9780123848895 012384889X
Edizione	[1st ed.]
Descrizione fisica	1 online resource (703 p.)
Collana	Aerospace Engineering
Disciplina	629.1/1 629.11
Soggetti	Jet propulsion
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Front Cover; Theory of Aerospace Propulsion; Copyright; Contents; Preface; Chapter 1 - Idealized Flow Machines; 1.1 Conservation Equations; 1.2 Flow Machines with No Heat Addition: The Propeller; 1.3 Flow Machines with $P = 0$ and $Q = \text{Constant}$: The Turbojet, Ramjet, and Scramjet; 1.4 Flow Machines with $P = 0$, $Q = \text{Constant}$, and $A_0 = 0$: The Rocket; 1.5 The Special Case of Combined Heat and Power: The Turbofan; 1.6 Force Field for Air-Breathing Engines; 1.7 Conditions for Maximum Thrust; 1.8 Example: Jet and Rocket Engine Performance; 1.9 Nomenclature; Reference Chapter 2 - Quasi-One-Dimensional Flow Equations2.1 Introduction; 2.2 Equation of State; 2.3 Speed of Sound; 2.4 Mach Number; 2.5 Conservation of Mass; 2.6 Conservation of Energy; 2.7 Example: Heating Values for Different Fuel-Oxidizer Combinations; 2.8 Conservation of Species; 2.9 Conservation of Momentum; 2.10 Impulse Function; 2.11 Stagnation Pressure; 2.12 Equations of Motion in Standard Form; 2.13 Example: Flow in a Duct with Friction; 2.14 Nomenclature; References; Chapter 3 - Idealized Cycle Analysis of Jet Propulsion Engines; 3.1 Introduction; 3.2 General Jet Engine Cycle 3.3 Ideal Jet Engine Cycle Analysis3.4 Ideal Turbojet in Maximum Power

Take-Off; 3.5 Ideal Turbojet in High Subsonic Cruise in The Stratosphere; 3.6 Ideal Turbojet in Supersonic Cruise in The 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 perspective.
