

1. Record Nr.	UNINA9911006990003321
Autore	Liepmann H. W (Hans Wolfgang), <1914-2009.>
Titolo	Elements of Gas Dynamics
Pubbl/distr/stampa	Newburyport, : Dover Publications, 2013
ISBN	9781523109630 1523109637 9780486316857 0486316858
Edizione	[1st ed.]
Descrizione fisica	1 online resource (792 p.)
Collana	Dover Books on Aeronautical Engineering
Altri autori (Persone)	RoshkoA
Disciplina	533/.2
Soggetti	Gas dynamics Aerodynamics Engineering & Applied Sciences Applied Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	Cover; Title Page; Copyright Page; Editors' Preface; Authors' Preface; Contents; Chapter 1. Concepts from Thermodynamics; 1.1 - Introduction; 1.2 - Thermodynamic Systems; 1.3 - Variables of State; 1.4 - The First Principal Law; 1.5 - Irreversible and Reversible Processes; 1.6 - Perfect Gases; 1.7 - The First Law Applied to Reversible Processes. Specific Heats; 1.8 - The First Law Applied to Irreversible Processes; 1.9 - The Concept of Entropy. The Second Law; 1.10 - The Canonical Equation of State. Free Energy and Free Enthalpy; 1.11 - Reciprocity Relations 1.12 - Entropy and Transport Processes 1.13* - Equilibrium Conditions; 1.14* - Mixtures of Perfect Gases; 1.15* - The Law of Mass Action; 1.16* - Dissociation; 1.17* - Condensation; 1.18 - Real Gases in Gasdynamics; Chapter 2. One-Dimensional Gasdynamics; 2.1 - Introduction; 2.2 - The Continuity Equation; 2.3 - The Energy Equation; 2.4 - Reservoir Conditions; 2.5 - Euler's Equation; 2.6 - The Momentum Equation; 2.7 - Isentropic Conditions; 2.8 - Speed of Sound; Mach Number; 2.9 - The Area-Velocity Relation; 2.10 - Results from the Energy Equation; 2.11 - Bernoulli Equation; Dynamic Pressure

2.12 - Flow at Constant Area 2.13 - The Normal Shock Relations for a Perfect Gas; Chapter 3. One-Dimensional Wave Motion; 3.1 - Introduction; 3.2 - The Propagating Shock Wave; 3.3 - One-Dimensional Isentropic Equations; 3.4 - The Acoustic Equations; 3.5 - Propagation of Acoustic Waves; 3.6 - The Speed of Sound; 3.7 - Pressure and Particle Velocity in a Sound Wave; 3.8 - "Linearized" Shock Tube; 3.9 - Isentropic Waves of Finite Amplitude; 3.10 - Propagation of Finite Waves; 3.11 - Centered Expansion Wave; 3.12 - The Shock Tube; Chapter 4. Waves in Supersonic Flow; 4.1 - Introduction 4.2 - Oblique Shock Waves 4.3 - Relation Between θ and δ ; 4.4 - Supersonic Flow Over a Wedge; 4.5 - Mach Lines; 4.6 - Piston Analogy; 4.7 - Weak Oblique Shocks; 4.8 - Supersonic Compression by Turning; 4.9 - Supersonic Expansion by Turning; 4.10 - The Prandtl-Meyer Function; 4.11 - Simple and Nonsimple Regions; 4.12 - Reflection and Intersection of Oblique Shocks; 4.13 - Intersection of Shocks of the Same Family; 4.14 - Detached Shocks; 4.15 - Mach Reflection; 4.16 - Shock-Expansion Theory; 4.17 - Thin Airfoil Theory; 4.18* - Flat Lifting Wings; 4.19* - Drag Reduction 4.20* - The Hodograph Plane 4.21 - Cone in Supersonic Flow; Chapter 5. Flow in Ducts and Wind Tunnels; 5.1 - Introduction; 5.2 - Flow in Channel of Varying Area; 5.3 - Area Relations; 5.4 - Nozzle Flow; 5.5 - Normal Shock Recovery; 5.6 - Effects of Second Throat; 5.7 - Actual Performance of Wind Tunnel Diffusers; 5.8 - Wind Tunnel Pressure Ratio; 5.9 - Supersonic Wind Tunnels; 5.10 - Wind Tunnel Characteristics; 5.11 - Compressor Matching; 5.12 - Other Wind Tunnels and Testing Methods; Chapter 6. Methods of Measurement; 6.1 - Introduction; 6.2 - Static Pressure; 6.3 - Total Pressure 6.4 - Mach Number from Pressure Measurements

Sommario/riassunto

The increasing importance of concepts from compressible fluid flow theory for aeronautical applications makes the republication of this first-rate text particularly timely. Intended mainly for aeronautics students, the text will also be helpful to practicing engineers and scientists who work on problems involving the aerodynamics of compressible fluids. Covering the general principles of gas dynamics to provide a working understanding of the essentials of gas flow, the contents of this book form the foundation for a study of the specialized literature and should give the necessary background