1.	Record Nr.	UNINA9910789456503321
	Autore	Bradshaw P (Peter), <1935->
	Titolo	An introduction to turbulence and its measurement / / P. Bradshaw
	Pubbl/distr/stampa	Oxford, England : , : Pergamon Press, , 1985 ©1971
	ISBN	1-4831-4084-9
	Descrizione fisica	1 online resource (239 p.)
	Collana	Pergamon International Library of Science, Technology, Engineering and Social Studies Thermodynamics and Fluid Mechanics Series
	Disciplina	532/.0527
	Soggetti	Turbulence - Measurement
	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; An Introduction to Turbulence and its Measurement; Copyright Page; Editorial Introduction; Table of Contents; Preface; Acknowledgements; Glossary; CHAPTER 1. The Physics of Turbulence; 1.1. ""Control-volume"" Analysis for the Equations of Motion; 1.2. Newton's Second Law of Motion; 1.3. The Newtonian Viscous Fluid(1); 1.4. Possible Solutions of the Equations of Motion; 1.5. The Reynolds Stresses; 1.6. Vortex Stretching(3); 1.7. Compressible Flow; 1.8. Flow-visualization Experiments; CHAPTER 2. Measurable Quantities and their Physical Significance 2.1. Statistics of Random Processes2.2. Turbulent Energy; 2.3. Spatial Correlations; 2.4. Time Correlations (Autocorrelations or Autocovariances); 2.5. Frequency Spectra; 2.6. Wave Number Spectra; 2.7. Space-Time Correlations; 2.8. Cross-correlations and Cross-spectra; 2.9. Higher-order Correlations and Spectra; 2.10. Probability Distributions and Intermittency; CHAPTER 3. Examples of Turbulent Flows(5); 3.1. Turbulence behind a Grid of Bars(2) ; 3.2. ""Infinite"" Shear Flow(6); 3.3. Couette Flow(7); 3.4. Two-dimensional Boundary Layers(5·10·11); 3.5. Three-dimensional Boundary Layers 3.6. Duct Flows(38) 3.7. Jets, Wakes and Plumes; 3.8. Atmospheric and Oceanic Turbulence; 3.9. Separated Flows; 3.10. Heat and Mass Transfer; 3.11 Turbulence in Non-Newtonian Fluids; CHAPTER 4. Measurement Techniques; 4.1. Hot Wires, Films and Thermistors; 4.2.

Constant-current and Constant-temperature Operation ; 4.3. Doppler-shift Anemometers (Laser Anemometer, Sonic Anemometer); 4.4. Glow-discharge(21) or Corona-discharge(22) Anemometers; 4.5. The Pulsed-wire Anemometer; 4.6. Particle Visualization; 4.7. Use of Steady-flow Techniques for Fluctuation Measurement
4.8. Measurement of Surface Pressure Fluctuations4.9. Specialized Techniques of Turbulence Measurement; CHAPTER 5. The Hot-wire Anemometer; 5.1. Heat Transfer; 5.2. The Effect of Fluid Temperature; 5.3. The Effect of Flow Direction; 5.4. Contamination of Probes; 5.5. Probe Design and Manufacture; 5.6. Spatial Resolution; 5.7. Frequency Response; CHAPTER 6. Analysis of Fluctuating Signals; 6.1. Analogue Computing Elements; 6.2. Input and Output Impedance, and Frequency Response; 6.3. Noise and Hum; 6.4. Averaging Time; 6.5. Automatic Recording of Time-average Quantities
6.6. Digital Recording of Fluctuating Signals(45)CHAPTER 7. Temperature and Concentration Measurements; 7.1. Separation of Velocity and Temperature Fluctuations; 7.2. High-speed Flow; 7.3. Probes for Supersonic Flow; 7.4. Sensitivity of a Hot Wire to Velocity and Total-temperature Fluctuations; 7.5. Small Temperature Differences; 7.6. Measurements in the Presence of Concentration Differences; CHAPTER 8. Summary of Practical Details; 8.1. Choice of Anemometer (Section 4.2); 8.2. Choice of Probe (Sections 5.3, 5.5); 8.3. Calibration (Section 5.1.3); 8.4. Errors; 8.5. Arrangements of Apparatus 8.6. Distortion of the Flow by the Presence of the Probe

| Sommario/riassunto | An Introduction to Turbulence and Its Measurement is an introductory text on turbulence and its measurement. It combines the physics of turbulence with measurement techniques and covers topics ranging from measurable quantities and their physical significance to the analysis of fluctuating signals, temperature and concentration measurements, and the hot-wire anemometer. Examples of turbulent flows are presented. This book is comprised of eight chapters and begins with an overview of the physics of turbulence, paying particular attention to Newton's second law of motion, the Newtonian viscous f |