1.	Record Nr.	UNINA9910132165303321
	Autore	Tardu Sedat
	Titolo	Transport and coherent structures in wall turbulence / / Sedat Tardu
	Pubbl/distr/stampa	London, England ; ; Hoboken, New Jersey : , : ISTE : , : Wiley, , 2014 ©2014
	ISBN	1-118-57677-2 1-118-57666-7 1-118-57681-0
	Descrizione fisica	1 online resource (490 p.)
	Collana	Fluid Mechanics Series
	Disciplina	532.0527
	Soggetti	Turbulence
	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	Cover page; Half-Title page; Title page; Copyright page; Contents; Introduction; Main Notations; Roman letters; Subscript and superscript notation; Vectorial operators; Greek symbols; Abbreviations; 1: General Points; 1.1. Introduction; 1.2. General equations; 1.2.1. Eulerian relations; 1.2.1.1. Continuity equation; 1.2.1.2. Momentum balance equations; 1.3. Notations; 1.4. Reynolds equations; 1.5. Exact relations in a fully developed turbulent channel flow; 1.6. Equations for a turbulent boundary layer; 1.7. Scales in a wall-bounded turbulent flow; 1.8. Eddy viscosity closures 1.9. Turbulent intensities of the velocity components1.10. Fine structure; 1.11. Vorticity; 1.11.1. Characteristics of vorticity field near to the wall; 1.11.2. Turbulent intensities of the fluctuating vorticity components; 2: Transport Phenomena in Wall Turbulence; 2.1. Introduction; 2.2. Transport equations; 2.3. Models of return to isotropy; 2.4. Transport of turbulent kinetic energy; 2.5. Transport of the velocity gradient; 2.6. Transport of the Reynolds stress -uv; 2.7. Effects of the Reynolds number on transport; 2.8. Dissipation; 2.8.1. Dissipation of kinetic energy 2.8.2. Dissipation linked to the transport equations for the Reynolds stresses2.9. Pressure; 2.9.1. Wall pressure; 2.9.2. Spectral density; 2.9.3. Decomposition into slow and rapid components; 2.10.

	Anisotropy; 2.11. Rapid distortion; 3: Near-Wall Coherent Structures: History, Identification and Detection; 3.1. Introduction; 3.2. History; 3.3. Single-point Eulerian detection; 3.3.1. Detection in quadrant II; 3.3.2. Detection by the u-level (u-l); 3.3.3. Detection by VITA and VISA; 3.4. Stochastic estimation; 3.5. Wavelets and wall turbulence; 3.6. Critical points and topology 3.6.1. Critical points3.6.2. Application of the concept of critical points to the topology of turbulence; 3.6.3. Extension of the detection Q - ; 3.6.4. A few significant results relating to the topology of wall turbulence; 3.7. Pressure field and vortices; 3.8. Vorticity and vortices; 3.9. Transport of invariants; 3.10. "Lambda-2" criterion; 3.11. Relations between the topological invariants and the 2 technique; 3.12. Summary; 3.13. Lagrangian detection; 4: Coherent Wall Structures: Dynamics and Contribution to Turbulent Activity; 4.1. Introduction 4.2. Structural morphology of wall turbulence. Quasi-streamwise vortices or hairpin vortices?4.3. Frequency distribution of energetic events in the inner sublayer; 4.4. Quadrant-based structure of the Reynolds shear stress; 4.5. Streaks; 4.6. Wavelet analysis, at low Reynolds numbers, of the vorticity layers surrounding the streaks; 4.7. Effect of coherent structures on local wall friction; 4.8. Effect of coherent structures on wall pressure; 4.9. Active and passive structures; 4.10 Particle trajectories: Lagrangian approach; 4.10.1. Lagrangian description and transport by turbulent diffusion 4.10.2. Lagrangian description of transport by energetic events
Sommario/riassunto	Wall bounded turbulent flows are of major importance in industrial and environmental fluid mechanics. The structure of the wall turbulence is intrinsically related to the coherent structures that play a fundamental role in the transport process. The comprehension of their regeneration mechanism is indispensable for the development of efficient strategies in terms of drag control and near wall turbulence management. This book provides an up-to-date overview on the progress made in this specific area in recent years.