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2.6.3. "Laminar/turbulent" decomposition 2.7. Algebraic closures for the mixing length in internal flows; 2.8. Some illustrations using direct numerical simulations at low Reynolds numbers; 2.8.1. Turbulent intensities; 2.8.2. Fine structure; 2.8.3. Transport of turbulent kinetic energy and reformulation of the logarithmic sublayer; 2.8.4. Transport of the Reynolds shear stress $-uv$; 2.9. Transition to turbulence in a boundary layer on a flat plate; 2.10. Equations for the turbulent boundary layer; 2.11. Mean vorticity; 2.12. Integral equations; 2.13. Scales in a turbulent boundary layer 2.14. Power law distributions and simplified integral approach 2.15. Outer layer; 2.16. Izakson-Millikan-von Mises overlap; 2.17. Integral quantities; 2.18. Wake region; 2.19. Drag coefficient in external turbulent flows; 2.20. Asymptotic behavior close to the wall; 2.21. Coherent wall structures - a brief introduction; Chapter 3. Inner and Outer Scales: Spectral Behavior; 3.1. Introduction; 3.2. Townsend-Perry analysis in the fully-developed turbulent sublayer; 3.3. Spectral densities; 3.3.1. Longitudinal fluctuating velocity; 3.3.2. Spanwise fluctuating velocity 3.3.3. Fluctuating wall-normal velocity 3.3.4. Reynolds shear stress; 3.3.5. Summary: active and passive structures; 3.4. Clues to the Kx^{-1} behavior, and discussion; 3.5. Spectral density E_w and cospectral density E_{uv} ; 3.6. Two-dimensional spectral densities; Chapter 4. Reynolds Number-Based Effects; 4.1. Introduction; 4.2. The von Karman constant and the renormalization group; 4.2.1. Renormalization group (RNG); 4.2.2. The von Karman constant derived from the RNG; 4.3. Complete and incomplete similarity; 4.3.1. General considerations. Power law distributions 4.3.2. Implications for mixing length

Sommario/riassunto

Wall turbulence is encountered in many technological applications as well as in the atmosphere, and a detailed understanding leading to its management would have considerable beneficial consequences in many areas. A lot of inspired work by experimenters, theoreticians, engineers and mathematicians has been accomplished over recent decades on this important topic and Statistical Approach to Wall Turbulence provides an updated and integrated view on the progress made in this area. Wall turbulence is a complex phenomenon that has several industrial applications, such as in aerodynamics, turbo
