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Nota di contenuto	1. The interplay of waves and turbulence: a preview -- 2. Elementary fluid dynamics -- 3. Motion in a rotating fluid -- 4. Motion in a stratified fluid -- 5. The equations of electrodynamics -- 6. Motion in a conducting fluid: magnetohydrodynamics -- 7. Instabilities and transition to turbulence -- 8. Elementary properties of turbulence -- 9. The language of turbulence: kinematics and statistics -- 10. Hydrodynamic turbulence I: classical theories -- 11. Hydrodynamic turbulence II: steps towards rotating, stratified and MHD turbulence -- 12. Rapidly rotating turbulence -- 13. Towards geophysics: shallow-water, rapidly rotating turbulence -- 14. Homogeneous stratified turbulence -- 15. Stratified shear flows and the atmospheric boundary layer -- 16. MHD turbulence at low magnetic Reynolds number -- 17.

Turbulence in the core of the Earth: the geodynamo -- 18. MHD turbulence at high magnetic Reynolds number -- 19. Turbulent astrophysical flows.

Sommario/riassunto

There are two recurring themes in astrophysical and geophysical fluid mechanics: waves and turbulence. This book investigates how turbulence responds to rotation, stratification or magnetic fields, identifying common themes, where they exist, as well as the essential differences which inevitably arise between different classes of flow. The discussion is developed from first principles, making the book suitable for graduate students as well as professional researchers. The author focuses first on the fundamentals and then progresses to such topics as the atmospheric boundary layer, turbulence in the upper atmosphere, turbulence in the core of the earth, zonal winds in the giant planets, turbulence within the interior of the sun, the solar wind, and turbulent flows in accretion discs. The book will appeal to engineers, geophysicists, astrophysicists and applied mathematicians who are interested in naturally occurring turbulent flows.
