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Introduction to Turbulent Transport of Particles, Temperature and Magnetic Fields

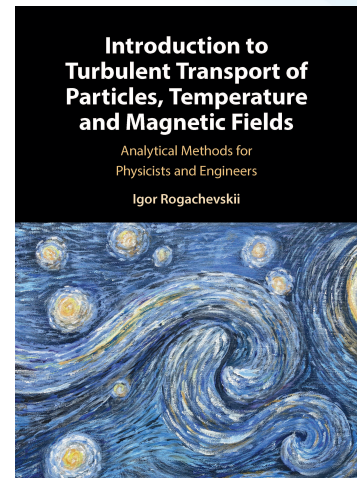
Analytical Methods for Physicists and Engineers

Igor Rogachevskii

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Turbulence and the associated turbulent transport of scalar and vector fields is a classical physics problem that has dazzled scientists for over a century, yet many fundamental questions remain. Igor Rogachevskii, in this concise book, systematically applies various analytical methods to the turbulent transfer of temperature, particles and magnetic field. Introducing key concepts in turbulent transport including essential physics principles and statistical tools, this interdisciplinary book is suitable for a range of readers such as theoretical physicists, astrophysicists, geophysicists, plasma physicists, and researchers in fluid mechanics and related topics in engineering. With an overview to various analytical methods such as mean-field approach, dimensional analysis, multi-scale approach, quasi-linear approach, spectral tau approach, path-integral approach and analysis based on budget equations, it is also an accessible reference tool for advanced graduates, PhD students and researchers.

Preface. 1. Turbulent transport of temperature field; 2. Particles and gases in density stratified turbulence; 3. Turbulent transport of magnetic field; 4. Analysis based on budget equations; 5. Path-integral approach; 6. Practice problems and solutions. Notations and definitions. Bibliography. Author index. Subject index.



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