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Nota di contenuto	Frontmatter -- Preface -- Contents -- Chapter 1. Introduction -- Chapter 2. Stochastic simulation of vector Gaussian random fields -- Chapter 3. Stochastic Lagrangian models of turbulent flows: Relative dispersion of a pair of fluid particles -- Chapter 4. A new Lagrangian model of 2-particle relative turbulent dispersion -- Chapter 5. The combined Eulerian-Lagrangian model -- Chapter 6. Stochastic Lagrangian models for 2-particle relative dispersion in high-Reynolds-number turbulence -- Chapter 7. Stochastic Lagrangian models for 2-particle motion in turbulent flows. Numerical results -- Chapter 8. The 1-particle stochastic Lagrangian model for turbulent dispersion in horizontally homogeneous turbulence -- Chapter 9. Direct and adjoint Monte Carlo for the footprint problem -- Chapter 10. Lagrangian stochastic models for turbulent dispersion in an atmospheric boundary layer -- Chapter 11. Analysis of the relative dispersion of two particles by Lagrangian stochastic models and DNS methods -- Chapter 12. Evaluation of mean concentration and fluxes in turbulent flows by Lagrangian stochastic models -- Chapter 13. Stochastic Lagrangian footprint calculations over a surface with an abrupt change of roughness height -- Chapter 14. Stochastic flow simulation in 3D porous media -- Chapter 15. A Lagrangian stochastic model for the transport in statistically homogeneous porous media -- Chapter 16.

Sommario/riassunto

The book presents advanced stochastic models and simulation methods for random flows and transport of particles by turbulent velocity fields and flows in porous media. Two main classes of models are constructed: (1) turbulent flows are modeled as synthetic random fields which have certain statistics and features mimicing those of turbulent fluid in the regime of interest, and (2) the models are constructed in the form of stochastic differential equations for stochastic Lagrangian trajectories of particles carried by turbulent flows. The book is written for mathematicians, physicists, and engineers studying processes associated with probabilistic interpretation, researchers in applied and computational mathematics, in environmental and engineering sciences dealing with turbulent transport and flows in porous media, as well as nucleation, coagulation, and chemical reaction analysis under fluctuation conditions. It can be of interest for students and post-graduates studying numerical methods for solving stochastic boundary value problems of mathematical physics and dispersion of particles by turbulent flows and flows in porous media.
