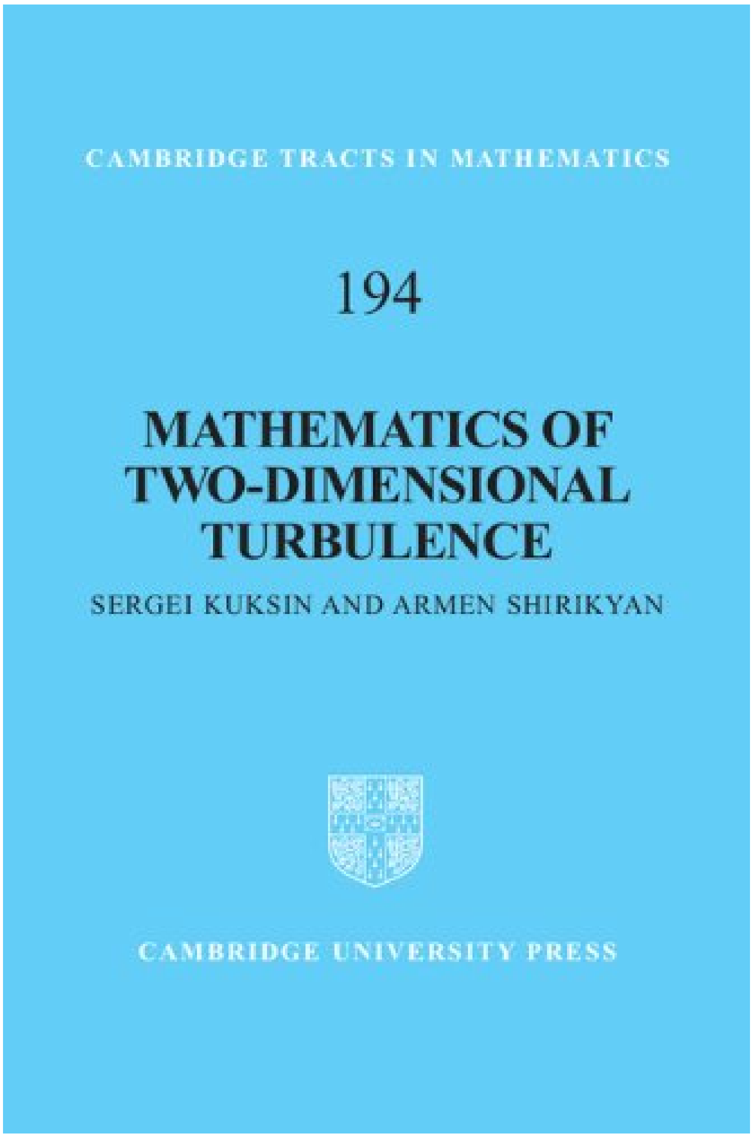
Mathematics of Two-Dimensional Turbulence



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Par Sergei Kuksin, Armen Shirikyan : Mathematics of Two-Dimensional Turbulence before purchasing it in order to gage whether or not it would be worth my time, and all praised Mathematics of Two-Dimensional Turbulence:

Description :

Prsentation de l'diteurThis book is dedicated to the mathematical study of two-dimensional statistical hydrodynamics and turbulence, described by the 2D NavierStokes system with a random force. The authors' main goal is to justify the statistical properties of a fluid's velocity field u(t,x) that physicists assume in their work. They rigorously prove that u(t,x) converges, as time grows, to a statistical equilibrium, independent of initial data. They use this to study ergodic properties of u(t,x) proving, in particular, that observables f(u(t,.)) satisfy the strong law of large numbers and central limit theorem. They also discuss the inviscid limit when viscosity goes to zero, normalising the force so that the energy of solutions stays constant, while their Reynolds numbers grow to infinity. They show that then the statistical equilibria converge to invariant measures of the 2D Euler equation and study these measures. The methods apply to other nonlinear PDEs perturbed by random forces.Prsentation de l'diteurThis book is dedicated to the mathematical study of two-dimensional statistical hydrodynamics and turbulence, described by the 2D NavierStokes system with a random force. The authors' main goal is to justify the statistical properties of a fluid's velocity field u(t,x) that physicists assume in their work. They rigorously prove that u(t,x) converges, as time grows, to a statistical equilibrium, independent of initial data. They use this to study ergodic properties of u(t,x) proving, in particular, that observables f(u(t,.)) satisfy the strong law of large numbers and central limit theorem. They also discuss the inviscid limit when viscosity goes to zero, normalising the force so that the energy of solutions stays constant, while their Reynolds numbers grow to infinity. They show that then the statistical equilibria converge to invariant measures of the 2D Euler equation and study these measures. The methods apply to other nonlinear PDEs perturbed by random forces.Biographie de l'auteurSergei Kuksin is a Professor in the Centre Mathmatiques Laurent Schwartz at cole Polytechnique in Palaiseau, France.Armen Shirikyan is a professor in the mathematics department at the University of Cergy-Pontoise (UCP), France, and served as the Head of Department from April 2008 to August 2012. He gained his PhD from Moscow State University in 1995 and his Habilitation thesis from the University of Paris-Sud in 2003. His current research interests are related to the ergodic theory for randomly forced equations of mathematical physics and controllability of nonlinear PDEs.