

1. Record Nr.	UNINA9910779480303321
Autore	Kuksin Sergej B. <1955->
Titolo	Mathematics of two-dimensional turbulence / / Sergei Kuksin, Armen Shirikyan [[electronic resource]]
Pubbl/distr/stampa	Cambridge : , : Cambridge University Press, , 2012
ISBN	1-139-88898-6 1-139-57957-6 1-139-56919-8 1-139-57275-X 1-139-57352-7 1-139-57100-1 1-139-13711-5 1-283-63871-1 1-139-57009-9
Descrizione fisica	1 online resource (xvi, 320 pages) : digital, PDF file(s)
Collana	Cambridge tracts in mathematics ; ; 194
Classificazione	MAT029000
Disciplina	532/.052701519
Soggetti	Hydrodynamics - Statistical methods Turbulence - Mathematics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Title from publisher's bibliographic system (viewed on 05 Oct 2015).
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Preliminaries -- Two-dimensional Navier-Stokes equations -- Uniqueness of stationary measure and mixing -- Ergodicity and limiting theorems -- Inviscid limit -- Miscellanies.
Sommario/riassunto	This book is dedicated to the mathematical study of two-dimensional statistical hydrodynamics and turbulence, described by the 2D Navier-Stokes 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.
