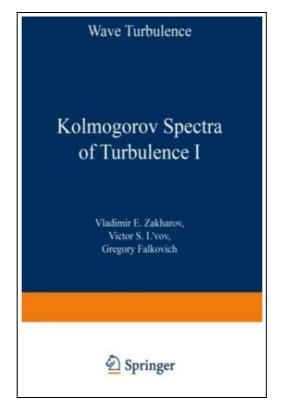
# Kolmogorov Spectra of Turbulence I



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#### KOLMOGOROV SPECTRA OF TURBULENCE I



Condition: New. Publisher/Verlag: Springer, Berlin | Wave Turbulence | Since the human organism is itself an open system, we are naturally curious about the behavior of other open systems with fluxes of matter, energy or information. Of the possible open systems, it is those endowed with many degrees of freedom and strongly deviating from equilibrium that are most challenging. A simple but very significant example of such a system is given by developed turbulence in a continuous medium, where we can discern astonishing features of universality. This two-volume monograph deals with the theory of turbulence viewed as a general physical phenomenon. In addition to vortex hydrodynamic turbulence, it considers various cases of wave turbulence in plasmas, magnets, atmosphere, ocean and space. A sound basis for discussion is provided by the concept of cascade turbulence with relay energy transfer over different scales and modes. We shall show how the initial cascade hypothesis turns into an elegant theory yielding the Kolmogorov spectra of turbulence as exact solutions. We shall describe the further development of the theory discussing stability prob lems and modes of Kolmogorov spectra formation, as well as their matching with sources and sinks. This volume is dedicated to developed wave turbulence in different media. | 0. Introduction.- 1. Equations of Motion and the Hamiltonian Formalism.- 1.1 The Hamiltonian Formalism for Waves in Continuous Media.- 1.1.1 The Hamiltonian in Normal Variables.- 1.1.2 Interaction Hamiltonian for Weak Nonlinearity.- 1.1.3 Dynamic Perturbation Theory. Elimination of Nonresonant Terms.- 1.1.4 Dimensional Analysis of the Hamiltonian Coefficients.- 1.2 The Hamiltonian Formalism in Hydrodynamics.- 1.2.1 Clebsh Variables for Ideal Hydrodynamics.- 1.2.2 Vortex Motion in Incompressible Fluids.- 1.3 Sound in Continuous Media.- 1.2.4 Interaction of Vortex and Potential Motions in Compressible Fluids.- 1.2.5 Waves on Fluid Surfaces.- 1.3 Hydrodynamic-Type Systems.- 1.3.1 Langmuir and Ion-Sound Wa



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