Mathematical Topics in Fluid Mechanics: Volume 1: Incompressible Models

By Pierre-Louis Lions

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Oxford University Press. Paperback. Book Condition: new. BRAND NEW, Mathematical Topics in Fluid Mechanics: Volume 1: Incompressible Models, Pierre-Louis Lions, One of the most challenging topics in applied mathematics over the past decades has been the development of the theory of nonlinear partial differential equations. Many of the problems in mechanics, geometry, probability, etc lead to such equations when formulated in mathematical terms. However, despite a long history of contributions, there exists no central core theory, and the most important advances have come from the study of particular equations and classes of equations arising in specific applications. This two volume work forms a unique and rigorous treatise on various mathematical aspects of fluid mechanics models. These models consist of systems of nonlinear partial differential equations like the incompressible and compressible Navier-Stokes equations. The main emphasis in Volume 1 is on the mathematical analysis of incompressible models. After recalling the fundamental description of Newtonian fluids, an original and self-contained study of both the classical Navier-Stokes equations (including the inhomogenous case) and the Euler equations is given. Known results and many new results about the existence and regularity of solutions are presented with complete proofs. The discussion contains many interesting insights and...

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