



The Navier-Stokes Equations

By Hermann Sohr

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The Navier-Stokes Equations By Hermann Sohr

The primary objective of this monograph is to develop an elementary and self-contained approach to the mathematical theory of a viscous, incompressible fluid in a domain of the Euclidean space, described by the equations of Navier-Stokes. Moreover, the theory is presented for completely general domains, in particular, for arbitrary unbounded, nonsmooth domains. Therefore, restriction was necessary to space dimensions two and three, which are also the most significant from a physical point of view. For mathematical generality, however, the linearized theory is expounded for general dimensions higher than one. Although the functional analytic approach developed here is, in principle, known to specialists, the present book fills a gap in the literature providing a systematic treatment of a subject that has been documented until now only in fragments. The book is mainly directed to students familiar with basic tools in Hilbert and Banach spaces. However, for the readers' convenience, some fundamental properties of, for example, Sobolev spaces, distributions and operators are collected in the first two chapters. - - - The book is written in a well arranged way, easy to survey and with utilization of the newest results. For its study, it is necessary to know only the basic functional analytic tools in Hilbert and Banach spaces. It is determined for an extensive circle of readers, from students up to experts in science and also for specialists in the field. (Zentralblatt MATH) The author's purpose in this book is to develop an "elementary and self-contained approach" to the mathematical theory of the viscous incompressible Navier-Stokes equations from basic functional analytic tools. Another objective is to develop the results in reasonably full generality, in particular to allow for arbitrary nonsmooth, possibly unbounded, spatial domains. (Mathematical Reviews)

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The Navier-Stokes Equations By Hermann Sohr Bibliography

- Sales Rank: #4338738 in Books
- Published on: 2001-10-16
- Released on: 2001-10-16
- Original language: English
- Number of items: 1
- Dimensions: 9.25" h x .86" w x 6.10" l, 1.56 pounds
- Binding: Hardcover
- 377 pages

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Review

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About the Author

Hermann Sohr is professor of mathematics, especially mathematical fluid mechanics, at the University Paderborn, Germany.

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