

A First Course in Turbulence (MIT Press)

By Henk Tennekes, John L. Lumley

Download now


Read Online ➔

A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley

The subject of turbulence, the most forbidding in fluid dynamics, has usually proved treacherous to the beginner, caught in the whirls and eddies of its nonlinearities and statistical imponderables. This is the first book specifically designed to offer the student a smooth transitional course between elementary fluid dynamics (which gives only last-minute attention to turbulence) and the professional literature on turbulent flow, where an advanced viewpoint is assumed. Moreover, the text has been developed for students, engineers, and scientists with different technical backgrounds and interests. Almost all flows, natural and man-made, are turbulent. Thus the subject is the concern of geophysical and environmental scientists (in dealing with atmospheric jet streams, ocean currents, and the flow of rivers, for example), of astrophysicists (in studying the photospheres of the sun and stars or mapping gaseous nebulae), and of engineers (in calculating pipe flows, jets, or wakes). Many such examples are discussed in the book. The approach taken avoids the difficulties of advanced mathematical development on the one side and the morass of experimental detail and empirical data on the other. As a result of following its midstream course, the text gives the student a physical understanding of the subject and deepens his intuitive insight into those problems that cannot now be rigorously solved. In particular, dimensional analysis is used extensively in dealing with those problems whose exact solution is mathematically elusive. Dimensional reasoning, scale arguments, and similarity rules are introduced at the beginning and are applied throughout. A discussion of Reynolds stress and the kinetic theory of gases provides the contrast needed to put mixing-length theory into proper perspective: the authors present a thorough comparison between the mixing-length models and dimensional analysis of shear flows. This is followed by an extensive treatment of vorticity dynamics, including vortex stretching and vorticity budgets. Two chapters are devoted to boundary-free shear flows and well-bounded turbulent shear flows. The examples presented include wakes, jets, shear layers, thermal plumes, atmospheric boundary layers, pipe and channel flow, and boundary layers in pressure gradients. The spatial structure of turbulent flow has been the subject of analysis in the book up to this point, at which a compact but thorough introduction to statistical methods is given. This prepares the reader to understand the stochastic and spectral structure of turbulence. The remainder of the book consists of applications of the statistical approach to the

study of turbulent transport (including diffusion and mixing) and turbulent spectra.

 [Download A First Course in Turbulence \(MIT Press\) ...pdf](#)

 [Read Online A First Course in Turbulence \(MIT Press\) ...pdf](#)

A First Course in Turbulence (MIT Press)

By Henk Tennekes, John L. Lumley


A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley

The subject of turbulence, the most forbidding in fluid dynamics, has usually proved treacherous to the beginner, caught in the whirls and eddies of its nonlinearities and statistical imponderables. This is the first book specifically designed to offer the student a smooth transitional course between elementary fluid dynamics (which gives only last-minute attention to turbulence) and the professional literature on turbulent flow, where an advanced viewpoint is assumed. Moreover, the text has been developed for students, engineers, and scientists with different technical backgrounds and interests. Almost all flows, natural and man-made, are turbulent. Thus the subject is the concern of geophysical and environmental scientists (in dealing with atmospheric jet streams, ocean currents, and the flow of rivers, for example), of astrophysicists (in studying the photospheres of the sun and stars or mapping gaseous nebulae), and of engineers (in calculating pipe flows, jets, or wakes). Many such examples are discussed in the book. The approach taken avoids the difficulties of advanced mathematical development on the one side and the morass of experimental detail and empirical data on the other. As a result of following its midstream course, the text gives the student a physical understanding of the subject and deepens his intuitive insight into those problems that cannot now be rigorously solved. In particular, dimensional analysis is used extensively in dealing with those problems whose exact solution is mathematically elusive. Dimensional reasoning, scale arguments, and similarity rules are introduced at the beginning and are applied throughout. A discussion of Reynolds stress and the kinetic theory of gases provides the contrast needed to put mixing-length theory into proper perspective: the authors present a thorough comparison between the mixing-length models and dimensional analysis of shear flows. This is followed by an extensive treatment of vorticity dynamics, including vortex stretching and vorticity budgets. Two chapters are devoted to boundary-free shear flows and well-bounded turbulent shear flows. The examples presented include wakes, jets, shear layers, thermal plumes, atmospheric boundary layers, pipe and channel flow, and boundary layers in pressure gradients. The spatial structure of turbulent flow has been the subject of analysis in the book up to this point, at which a compact but thorough introduction to statistical methods is given. This prepares the reader to understand the stochastic and spectral structure of turbulence. The remainder of the book consists of applications of the statistical approach to the study of turbulent transport (including diffusion and mixing) and turbulent spectra.

A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley **Bibliography**

- Sales Rank: #877817 in Books
- Published on: 1972-03-15
- Original language: English
- Number of items: 1
- Dimensions: 9.00" h x .63" w x 6.00" l, 1.45 pounds
- Binding: Hardcover
- 300 pages

 [**Download** A First Course in Turbulence \(MIT Press\) ...pdf](#)

 [**Read Online** A First Course in Turbulence \(MIT Press\) ...pdf](#)

Editorial Review

Users Review

From reader reviews:

Dominic Loflin:

The reserve untitled A First Course in Turbulence (MIT Press) is the e-book that recommended to you to study. You can see the quality of the book content that will be shown to a person. The language that article author use to explained their way of doing something is easily to understand. The article author was did a lot of analysis when write the book, and so the information that they share for you is absolutely accurate. You also could get the e-book of A First Course in Turbulence (MIT Press) from the publisher to make you far more enjoy free time.

Teresa Sullivan:

A lot of people always spent all their free time to vacation or perhaps go to the outside with them family members or their friend. Did you know? Many a lot of people spent they will free time just watching TV, or even playing video games all day long. If you would like try to find a new activity here is look different you can read some sort of book. It is really fun for yourself. If you enjoy the book which you read you can spent all day long to reading a e-book. The book A First Course in Turbulence (MIT Press) it is very good to read. There are a lot of those who recommended this book. They were enjoying reading this book. If you did not have enough space to create this book you can buy often the e-book. You can m0ore effortlessly to read this book through your smart phone. The price is not to cover but this book features high quality.

Juan Turgeon:

As we know that book is significant thing to add our understanding for everything. By a e-book we can know everything we would like. A book is a group of written, printed, illustrated or even blank sheet. Every year had been exactly added. This reserve A First Course in Turbulence (MIT Press) was filled with regards to science. Spend your time to add your knowledge about your scientific research competence. Some people has several feel when they reading a book. If you know how big selling point of a book, you can truly feel enjoy to read a e-book. In the modern era like currently, many ways to get book that you wanted.

Jeremy Gable:

Do you like reading a guide? Confuse to looking for your chosen book? Or your book had been rare? Why so many problem for the book? But just about any people feel that they enjoy regarding reading. Some people likes reading, not only science book but novel and A First Course in Turbulence (MIT Press) or perhaps others sources were given understanding for you. After you know how the fantastic a book, you feel want to

read more and more. Science book was created for teacher as well as students especially. Those books are helping them to include their knowledge. In additional case, beside science book, any other book likes A First Course in Turbulence (MIT Press) to make your spare time much more colorful. Many types of book like here.

Download and Read Online A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley #KNOVSH6Y5MB

Read A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley for online ebook

A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley books to read online.

Online A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley ebook PDF download

A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley Doc

A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley Mobipocket

A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley EPub

KNOVSH6Y5MB: A First Course in Turbulence (MIT Press) By Henk Tennekes, John L. Lumley