Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications)

By Paolo Orlandi

Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi

This book deals with the simulation of the incompressible Navier-Stokes equations for laminar and turbulent flows. The book is limited to explaining and employing the finite difference method. It furnishes a large number of source codes which permit to play with the Navier-Stokes equations and to understand the complex physics related to fluid mechanics.

Numerical simulations are useful tools to understand the complexity of the flows, which often is difficult to derive from laboratory experiments. This book, then, can be very useful to scholars doing laboratory experiments, since they often do not have extra time to study the large variety of numerical methods; furthermore they cannot spend more time in transferring one of the methods into a computer language. By means of numerical simulations, for example, insights into the vorticity field can be obtained which are difficult to obtain by measurements. This book can be used by graduate as well as undergraduate students while reading books on theoretical fluid mechanics; it teaches how to simulate the dynamics of flow fields on personal computers. This will provide a better way of understanding the theory. Two chapters on Large Eddy Simulations have been included, since this is a methodology that in the near future will allow more universal turbulence models for practical applications. The direct simulation of the Navier-Stokes equations (DNS) is simple by finite-differences, that are satisfactory to reproduce the dynamics of turbulent flows. A large part of the book is devoted to the study of homogeneous and wall turbulent flows.

In the second chapter the elementary concept of finite difference is given to solve parabolic and elliptical partial differential equations. In successive chapters the 1D, 2D, and 3D Navier-Stokes equations are solved in Cartesian and cylindrical coordinates. Finally, Large Eddy Simulations are performed to check the importance of the subgrid scale models. Results for turbulent and laminar flows are discussed, with particular emphasis on vortex dynamics.

This volume will be of interest to graduate students and researchers wanting to compare experiments and numerical simulations, and to workers in the mechanical and aeronautic industries.

Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications)

By Paolo Orlandi

Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi

This book deals with the simulation of the incompressible Navier-Stokes equations for laminar and turbulent flows. The book is limited to explaining and employing the finite difference method. It furnishes a large number of source codes which permit to play with the Navier-Stokes equations and to understand the complex physics related to fluid mechanics.

Numerical simulations are useful tools to understand the complexity of the flows, which often is difficult to derive from laboratory experiments. This book, then, can be very useful to scholars doing laboratory experiments, since they often do not have extra time to study the large variety of numerical methods; furthermore they cannot spend more time in transferring one of the methods into a computer language. By means of numerical simulations, for example, insights into the vorticity field can be obtained which are difficult to obtain by measurements.

This book can be used by graduate as well as undergraduate students while reading books on theoretical fluid mechanics; it teaches how to simulate the dynamics of flow fields on personal computers. This will provide a better way of understanding the theory. Two chapters on Large Eddy Simulations have been included, since this is a methodology that in the near future will allow more universal turbulence models for practical applications. The direct simulation of the Navier-Stokes equations (DNS) is simple by finite-differences, that are satisfactory to reproduce the dynamics of turbulent flows. A large part of the book is devoted to the study of homogeneous and wall turbulent flows.

In the second chapter the elementary concept of finite difference is given to solve parabolic and elliptical partial differential equations. In successive chapters the 1D, 2D, and 3D Navier-Stokes equations are solved in Cartesian and cylindrical coordinates. Finally, Large Eddy Simulations are performed to check the importance of the subgrid scale models. Results for turbulent and laminar flows are discussed, with particular emphasis on vortex dynamics.

This volume will be of interest to graduate students and researchers wanting to compare experiments and numerical simulations, and to workers in the mechanical and aeronautic industries.

Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi Bibliography

- Sales Rank: #4767541 in Books
- Published on: 2006-01-01
- Original language: English
- Number of items: 1
- Dimensions: 9.25" h x .85" w x 6.10" l, 1.19 pounds
- Binding: Paperback
- 356 pages
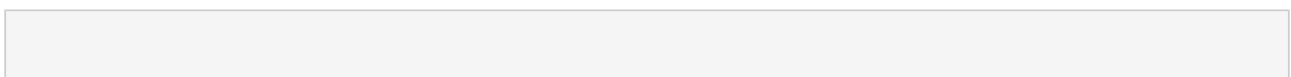
Download and Read Free Online Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi

Editorial Review

Review
`Yet the overall structure is clean and the important information is there; on the whole one feels inclined to forgive the rough spots and make the effort to read between the lines, considering also that more editing might have led to much less timely publication.'
Meccanica, 35 (2000)

Users Review

From reader reviews:

Dorathy Byers:

With other case, little persons like to read book Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications). You can choose the best book if you appreciate reading a book. As long as we know about how is important some sort of book Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications). You can add know-how and of course you can around the world by a book. Absolutely right, because from book you can understand everything! From your country until foreign or abroad you can be known. About simple matter until wonderful thing it is possible to know that. In this era, we could open a book as well as searching by internet product. It is called e-book. You should use it when you feel weary to go to the library. Let's go through.

Charles Carter:

The book Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) make you feel enjoy for your spare time. You need to use to make your capable considerably more increase. Book can for being your best friend when you getting stress or having big problem along with your subject. If you can make looking at a book Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) to get your habit, you can get far more advantages, like add your own personal capable, increase your knowledge about many or all subjects. You can know everything if you like open up and read a book Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications). Kinds of book are several. It means that, science book or encyclopedia or other people. So , how do you think about this e-book?

Maurice Henkel:

This Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) is great book for you because the content and that is full of information for you who always deal with world and possess to make decision every minute. This particular book reveal it facts accurately using great organize word or we can claim no rambling sentences within it. So if you are read the idea hurriedly you can have whole information in it. Doesn't mean it only offers you straight forward sentences but tough core information with lovely delivering sentences. Having Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) in your hand like getting the world in your arm, details in it is not ridiculous one particular. We

can say that no guide that offer you world throughout ten or fifteen tiny right but this reserve already do that. So , this really is good reading book. Hello Mr. and Mrs. busy do you still doubt which?

Allison Devore:

Is it an individual who having spare time subsequently spend it whole day by watching television programs or just lying on the bed? Do you need something totally new? This Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) can be the response, oh how comes? A book you know. You are so out of date, spending your time by reading in this brand-new era is common not a nerd activity. So what these books have than the others?

Download and Read Online Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi #T4MI12ZCDYK

Read Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi for online ebook

Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi 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 Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi books to read online.

Online Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi ebook PDF download

Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi Doc

Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi Mobipocket

Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi EPub

T4MI12ZCDYK: Fluid Flow Phenomena: A Numerical Toolkit (Fluid Mechanics and Its Applications) By Paolo Orlandi