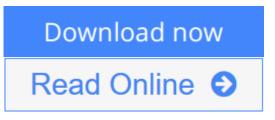# The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications)

By F. Moukalled, L. Mangani, M. Darwish

The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish

This textbook explores both the theoretical foundation of the Finite Volume Method (FVM) and its applications in Computational Fluid Dynamics (CFD). Readers will discover a thorough explanation of the FVM numerics and algorithms used for the simulation of incompressible and compressible fluid flows, along with a detailed examination of the components needed for the development of a collocated unstructured pressure-based CFD solver. Two particular CFD codes are explored. The first is uFVM, a three-dimensional unstructured pressure-based finite volume academic CFD code, implemented within Matlab. The second is OpenFOAM®, an open source framework used in the development of a range of CFD programs for the simulation of industrial scale flow problems.

With over 220 figures, numerous examples and more than one hundred exercise on FVM numerics, programming, and applications, this textbook is suitable for use in an introductory course on the FVM, in an advanced course on numerics, and as a reference for CFD programmers and researchers.

The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications)

By F. Moukalled, L. Mangani, M. Darwish

The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish

This textbook explores both the theoretical foundation of the Finite Volume Method (FVM) and its applications in Computational Fluid Dynamics (CFD). Readers will discover a thorough explanation of the FVM numerics and algorithms used for the simulation of incompressible and compressible fluid flows, along with a detailed examination of the components needed for the development of a collocated unstructured pressure-based CFD solver. Two particular CFD codes are explored. The first is uFVM, a three-dimensional unstructured pressure-based finite volume academic CFD code, implemented within Matlab. The second is OpenFOAM®, an open source framework used in the development of a range of CFD programs for the simulation of industrial scale flow problems.

With over 220 figures, numerous examples and more than one hundred exercise on FVM numerics, programming, and applications, this textbook is suitable for use in an introductory course on the FVM, in an advanced course on numerics, and as a reference for CFD programmers and researchers.

The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish Bibliography

- Sales Rank: #64534 in Books
- Published on: 2015-08-14
- Original language: English
- Number of items: 1
- Dimensions: 1.88" h x 6.12" w x 9.47" l, .0 pounds
- Binding: Hardcover
- 791 pages

⬇ **Download** The Finite Volume Method in Computational Fluid Dy ...pdf

▤ **Read Online** The Finite Volume Method in Computational Fluid ...pdf

Download and Read Free Online The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish

Editorial Review

Review

"The book is very attractive, carefully written and easy to read by those interested in learning about finite volume methods for fluid dynamics. The authors have made an important effort to bridge the gap between classroom material and actual model development questions. The text is well illustrated by means of quality figures helping to understand the described concepts. Furthermore, the book contains pieces of academic codes in MATLAB … . It is certainly a useful, practical and valuable book." (Pilar Garcia-Navarro, Mathematical Reviews, May, 2016)

From the Back Cover

This textbook explores both the theoretical foundation of the Finite Volume Method (FVM) and its applications in Computational Fluid Dynamics (CFD). Readers will discover a thorough explanation of the FVM numerics and algorithms used for the simulation of incompressible and compressible fluid flows, along with a detailed examination of the components needed for the development of a collocated unstructured pressure-based CFD solver. Two particular CFD codes are explored. The first is uFVM, a three-dimensional unstructured pressure-based finite volume academic CFD code, implemented within Matlab. The second is OpenFOAM®, an open source framework used in the development of a range of CFD programs for the simulation of industrial scale flow problems.

With over 220 figures, numerous examples and more than one hundred exercise on FVM numerics, programming, and applications, this textbook is suitable for use in an introductory course on the FVM, in an advanced course on numerics, and as a reference for CFD programmers and researchers.

About the Author

Fadl Moukalled received his PhD degree in Mechanical Engineering from Louisiana State University in 1987. During that same year he joined the Mechanical Engineering Department at the American University of Beirut where currently he serves as a Professor. He is research interests cover several aspects of the finite volume method and its use in computational fluid dynamics. A founding member of the CFD Group at AUB, he worked on convection schemes, pressure based segregated algorithms for incompressible and compressible flows, adaptive grid methods, multigrid methods, transient schemes for free surface flows, multiphase flows, and fully coupled pressure based solvers for incompressible, compressible, and multiphase flows.

Luca Mangani received his PhD degree form the University of Florence in 2006, where he worked on the development of a state-of-the-art turbo machinery code in OpenFOAM® for heat transfer and combustion analysis. After three years of post-doc work, he joined the Lucerne University of Applied Sciences and Arts as Senior Research and chief engineer for CFD simulations. Since 2014 he is serving as an Associate Professor at the fluid mechanics and hydro-machines department, where he manages a variety of projects with industrial partners aimed at developing advanced and novel CFD tools. His research interests include pressure and density-based solvers, segregated and fully coupled algorithms, fluid-structure interaction (FSI),

turbulence, and conjugate heat transfer modeling.

Marwan Darwish received his PhD degree in Materials Processing from BRUNEL University in 1991. He then joined the BICOM institute for one year as a post-doc before joining the Mechanical Engineering Department at the American University of Beirut in 1992, where he currently serves as a Professor. His research interest covers a range of topics including solidification, advanced numerics, free surface flow, high resolution schemes, multiphase flows, coupled algorithms, and algebraic multigrid. He is a founding member of the CFD Group at AUB.

Users Review

From reader reviews:

Ines Patterson:

Spent a free the perfect time to be fun activity to accomplish! A lot of people spent their sparetime with their family, or their own friends. Usually they carrying out activity like watching television, likely to beach, or picnic in the park. They actually doing same thing every week. Do you feel it? Do you wish to something different to fill your personal free time/ holiday? May be reading a book can be option to fill your totally free time/ holiday. The first thing you ask may be what kinds of reserve that you should read. If you want to attempt look for book, may be the guide untitled The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) can be fine book to read. May be it may be best activity to you.

Alfonso Miller:

Precisely why? Because this The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) is an unordinary book that the inside of the reserve waiting for you to snap the idea but latter it will surprise you with the secret the item inside. Reading this book alongside it was fantastic author who also write the book in such incredible way makes the content on the inside easier to understand, entertaining method but still convey the meaning fully. So , it is good for you for not hesitating having this ever again or you going to regret it. This book will give you a lot of benefits than the other book get such as help improving your talent and your critical thinking means. So , still want to hold off having that book? If I were you I will go to the e-book store hurriedly.

David Bruce:

Many people spending their period by playing outside with friends, fun activity using family or just watching TV 24 hours a day. You can have new activity to spend your whole day by reading a book. Ugh, think reading a book can really hard because you have to accept the book everywhere? It alright you can have the e-book, bringing everywhere you want in your Cell phone. Like The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) which is getting the e-book version. So , why not try out this book? Let's find.

Lorraine Wheat:

You may get this The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) by check out the bookstore or Mall. Merely viewing or reviewing it could to be your solve difficulty if you get difficulties to your knowledge. Kinds of this guide are various. Not only through written or printed but in addition can you enjoy this book by simply e-book. In the modern era like now, you just looking by your local mobile phone and searching what your problem. Right now, choose your own personal ways to get more information about your e-book. It is most important to arrange you to ultimately make your knowledge are still upgrade. Let's try to choose right ways for you.

Download and Read Online The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish #8JGL6YVAIS5

Read The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish for online ebook

The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish 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 The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish books to read online.

Online The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish ebook PDF download

The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish Doc

The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish Mobipocket

The Finite Volume Method in Computational Fluid Dynamics: An Advanced Introduction with OpenFOAM® and Matlab (Fluid Mechanics and Its Applications) By F. Moukalled, L. Mangani, M. Darwish EPub