

1. Record Nr.	UNINA9910963374603321
Titolo	Computational fluid dynamics // edited by Frederic Magoules
Pubbl/distr/stampa	Boca Raton, : Chapman and Hall/CRC, 2012
ISBN	0-429-10757-9 1-283-31172-0 9786613311726 1-4398-5662-1
Edizione	[1st ed.]
Descrizione fisica	1 online resource (xxxi, 375 p.) : ill
Collana	Chapman and Hall/CRC numerical analysis and scientific computation series
Classificazione	MAT021000SCI055000TEC009070
Altri autori (Persone)	MagoulesF (Frederic)
Disciplina	532.00285
Soggetti	Fluid dynamics - Mathematics Numerical analysis
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	A Chapman & Hall book.
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Finite Volumes Methods , Jerome Boudet Introduction Conservativity Control volume integration Grid General flux interpolation Resolution and time discretization Consistency, stability, and convergence Upwind interpolation Particular case of structured grids Boundary conditions Weighted Residuals Methods , Fabien Godeferd Introduction Principles of the weighted residuals method Collocation or pseudo-spectral method Least squares method Method of moments Galerkin approximation Subdomains An example Spectral Methods , Fabien Godeferd Introduction Linear problem: Galerkin, tau, and collocation methods Applications: Fourier Applications: Chebyshev Implicit equations Evaluation of nonlinear terms Smoothed-Particle Hydrodynamics (SPH) Methods , Francis Leboeuf and Jean-Christophe Marongiu Introduction SPH approximation of a function Properties of the kernel function W Barycenter of $D(x_i)$ Choices of the kernel function W SPH approximation of differential operators applied on a function Using a Taylor series expansion Concluding remarks Application of SPH Methods to Conservation Equations , Francis Leboeuf and Jean-Christophe Marongiu General form of conservation equation Weak SPH-ALE formulation of the conservation equations

Application to flow conservation equations Boundary conditions
 Applications of SPH and SPH-ALE methods Finite Volume Particle
 Methods (FVPM) , Francis Leboeuf and Jean-Christophe Marongiu
 Introduction Partition of unity Average of a function Derivatives of ?
 Conservation equation and FVPM Concluding remarks Numerical
 Algorithms for Unstructured Meshes , Bruno Koobus, Frederic Alauzet,
 and Alain Dervieux Introduction Spatial representation Toward higher
 spatial order Positivity of mixed element-volume formulations 3D
 multi-scales anisotropic mesh adaptation 3D goal-oriented anisotropic
 mesh adaptation Concluding remarks LES, Variational Multiscale LES,
 and Hybrid Models , Hilde Ouvrard, Maria-Vittoria Salvetti, Simone
 Camarri, Stephen Wornom, Alain Dervieux, and Bruno Koobus
 Introduction Numerical model Large eddy simulation (LES) Variational
 multiscale large eddy simulation (VMS-LES) Hybrid RANS/LES
 Concluding remarks Numerical Algorithms for Free Surface Flow ,
 Alexandre Caboussat, Guillaume Jouvet, Marco Picasso, and Jacques
 Rappaz Introduction A short review on two-phases flow with free
 surfaces Some preliminary remarks on ice and glacier modeling
 Modeling Time splitting scheme A two-grids method for space
 discretization Modeling of interfacial effects Numerical results for liquid
 flow Numerical results for ice flow Concluding remarks Bibliography

Sommario/riassunto

This book concentrates on the numerical of computational fluid
 mechanics (including mathematical models in computational fluid
 mechanics, numerical methods in computational fluid mechanics, finite
 volume, finite difference, finite element, spectral methods, smoothed
 particle hydrodynamics methods, mixed-element-volume methods,
 free surface flow) followed by some focus of new development of
 classical methods, and to the recent methods appearing in this field.
 The topics covered in this book are wide ranging and demonstrate the
 extensive use in computational fluid mechanics. The book opens with a
 presentation of the basis of finite volume methods, weighted residual
 methods and spectral methods. These specific approaches are
 particularly important in the context of fluid mechanics, where they
 cover complementary domains of application. A unified point of view is
 introduced, based on the weighted residuals description. Chapter 1
 presents the finite volume method. Chapter 2 describes the principles
 of weighted residuals methods. Chapter 3 introduces the spectral
 method. Chapter 4 presents computational fluid dynamics based on the
 smoothed particle hydrodynamics (SPH) method. Chapter 5 focuses on
 an improved SPH method based on an arbitrary Lagrange Euler (ALE)
 formalism. Chapter 6, using the similarity with the finite volumes
 method, introduces high order flux schemes between interacting
 points. Chapter 7 presents some numerical methods for compressible
 computational fluid dynamics. Chapter 8 deals with the prediction of
 turbulent complex flows as occur. Chapter 9 discusses the modeling
 and numerical simulation of free surface flows--