Frank M White Fluid Mechanics 7th Edition

Fluid MechanicsSpringer Handbook of Experimental Fluid MechanicsAn Introduction to Fluid MechanicsViscous Fluid Flow 4eVergleich des Fließverhaltens verschiedener Polymerer mit Hilfe der Laser-Doppler-AnemometrieStrömungslehreSpeckle Photography for Fluid Mechanics MeasurementsPhysics of Continuous Matter, Second EditionFluid Mechanics Source BookFluid Mechanics for Chemical Engineers with Microfluidics and CFDFluid Mechanics Programs for the IBM PCA Physical Introduction to Fluid MechanicsEncyclopedia of Fluid Mechanics: Dynamics of single-fluid flows and mixingFundamentals of Fluid MechanicsEngineering Fluid MechanicsComputational Fluid Dynamics: An Introduction to Modeling and ApplicationsFluid Mechanics: Soviet ResearchMechanical, Materials and Manufacturing EngineeringEncyclopedia of Fluid MechanicsEncyclopedia of Fluid Mechanics: Supplement 1 Frank M. White Cameron Tropea Faith A. Morrison FRANK. MAJDALANI WHITE (JOSEPH.) Marcus Heindl Heinz Schade Nikita A. Fomin B. Lautrup Sybil P. Parker James O. Wilkes Daniel B. Olfe Alexander J. Smits Nicholas P. Cheremisinoff Philip M. Gerhart P. A. Aswatha Narayana Imane Khalil Hong Hua Tan Nicholas P Cheremisinoff

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Fluid Mechanics: Supplement 1 *Frank M. White Cameron Tropea Faith A. Morrison FRANK. MAJDALANI WHITE* (*JOSEPH.*) *Marcus Heindl Heinz Schade Nikita A. Fomin B. Lautrup Sybil P. Parker James O. Wilkes Daniel B. Olfe Alexander J. Smits Nicholas P. Cheremisinoff Philip M. Gerhart P. A. Aswatha Narayana Imane Khalil Hong Hua Tan Nicholas P Cheremisinoff*

offers a comprehensive presentation of the material that demonstrates the progression from physical concepts to engineering applications and helps students quickly see the practical importance of fluid mechanics fundamentals

accompanying dvd rom contains all chapters of the springer handbook page 3 of cover

why study fluid mechanics 1 1 getting motivated flows are beautiful and complex a swollen creek tumbles over rocks and through crevasses swirling and foaming a child plays with sticky tafy stretching and reshaping the candy as she pulls it and twist it in various ways both the water and the tafy are fluids and their motions are governed by the laws of nature our goal is to introduce the reader to the analysis of flows using the laws of physics and the language of mathematics on mastering this material the reader becomes able to harness flow to practical ends or to create beauty through fluid design in this text we delve deeply into the mathematical analysis of flows but before beginning it is reasonable to ask if it is necessary to make this significant mathematical effort after all we can appreciate a flowing stream without understanding why it behaves as it does we can also operate machines that rely on fluid behavior drive a car for exam 15 behavior mathematical analysis ple without understanding the fluid dynamics of the engine and we can even repair and maintain engines piping networks and other complex systems without having studied the mathematics of flow what is the purpose then of learning to mathematically describe fluid the answer to this question is quite practical knowing the patterns fluids form and why they are formed and knowing the stresses fluids generate and why they are generated is essential to designing and optimizing modern systems and devices while the ancients designed wells and irrigation systems without calculations we can avoid the wastefulness and tediousness of the trial and error process by using mathematical models

inhaltsangabe einleitung das fließverhalten von polymerschmelzen spielt im gesamten bereich der kunststoffverarbeitung eine sehr wichtige rolle aufgrund ihrer viskoelastizität ist die exakte mathematische beschreibung des strömungsverhaltens und der deformationsgeschichte von schmelzeflüssigen kunststoffen auch bei zunächst einfach erscheinenden produktionsprozessen z b extrusion von platten stangen oder anderen halbzeugen durch eine düse jedoch mit erheblichen schwierigkeiten verbunden trotz intensiver forschungsaktivitäten in den letzten jahren existieren in diesem bereich noch immer viele unbeantwortete fragen was größtenteils darauf zurückzuführen ist dass die rheologischen eigenschaften von makromolekular aufgebauten stoffen nicht allein durch ihre chemische struktur bestimmt werden sondern noch in erheblichem maße durch faktoren wie mittleres molekulargewicht molmassenverteilung und verzweigungsstruktur beeinflussbar sind da diese wechselwirkungen noch nicht vollständig aufgeklärt sind ist eine mathematisch physikalische beschreibung sowie die daraus folgende möglichkeit genaue computerunterstützte simulationen von fließvorgängen durchführen zu können nur eingeschränkt möglich für die auslegung und optimierung von werkzeug und düsengeometrien im hinblick auf die maßgenauigkeit des fertigproduktes sowie für die wahl geeigneter prozessparameter um hohe durchsatzraten bzw kurze zykluszeiten zu gewährleisten und somit möglichst kostengünstig produzieren zu können ist dies allerdings von hoher bedeutung beispiele für noch nicht oder nur teilweise verstandene fließphänomene und deren zusammenhang mit dem aufbau eines polymeren sind das auftreten des sogenannten schmelzebruchs extrudatdeformation die in der regel bei einer kritischen durchsatzrate auftritt und die existenz von sekundärströmungen stationäre wirbelströme die sich bei bestimmten polymerschmelzen und lösungen im einlaufbereich einer düse ausbilden und eine veränderung des fließprofils sowie eine vergrößerung des einlaufdruckverlustes zur folge haben diese fragestellungen haben eine besondere aktualität erlangt seitdem man durch eine verbesserte katalysatortechnik in der lage ist die struktur eines polymeren gezielt einzustellen das hauptziel dieser arbeit ist es einen beitrag zum verständnis des sekundärströmungsphänomens zu leisten indem dieses bei der extrusion verschiedener kunststoffschmelzen durch eine planare düseneinlaufgeometrie

die vierte auflage dieses standardwerkes behandelt unverändert die grundlagen der strömungsmechanik in bewährter didaktischer aufbereitung als übersichtliche lehreinheiten mit umfangreichem feedback konsequent von der kontinuumshypothese ausgehend vermittelt es klare vorstellungen von physikalischen ursachen und den zugrunde liegenden idealisierungen der behandelten modelle wichtige kenntnisse zum verständnis technischer anwendungen und für numerische berechnungen werden somit einheitlich dargestellt mit der vierten auflage findet eine umfangreiche redaktionelle Überarbeitung der 3 auflage aus 2007 statt inhaltlich wurden die abschnitte thermodynamische wirkungsgrade und umströmung von kreiszylindern ergänzt

speckle photography is an advanced experimental technique used for the non intrusive quantitative determination of density velocity and temperature fields in gas liquid and plasma flows the book presents the diffraction theory of speckle formation as well as a statistical description of speckle fields it also describes experimental set ups and the equipment needed to implement these methods computer aided data acquisition and processing are considered and examples for their use are given an essential part of the book is devoted to the estimation of turbulence parameters in turbulent flows and to the description of speckle tomography the most promising approach in the tomography of complex 3d flows

physics of continuous matter exotic and everyday phenomena in the macroscopic world second edition provides an introduction to the basic ideas of continuum physics and their application to a wealth of macroscopic phenomena the text focuses on the many approximate methods that offer insight into the rich physics hidden in fundamental continuum mechanics equations like its acclaimed predecessor this second edition introduces mathematical tools on a need to know basis new to the second edition this edition includes three new chapters on elasticity of slender rods energy and entropy it also offers more margin drawings and photographs and improved images of simulations along with reorganizing much of the material the author has revised many of the physics arguments and mathematical presentations to improve clarity and consistency the collection of problems at the end of each chapter has been expanded as well these problems further

develop the physical and mathematical concepts presented with worked examples throughout this book clearly illustrates both qualitative and quantitative physics reasoning it emphasizes the importance in understanding the physical principles behind equations and the conditions underlying approximations a companion website provides a host of ancillary materials including software programs color figures and additional problems

the chemical engineer s practical guide to contemporary fluid mechanics since most chemical processing applications are conducted either partially or totally in the fluid phase chemical engineers need a strong understanding of fluid mechanics such knowledge is especially valuable for solving problems in the biochemical chemical energy fermentation materials mining petroleum pharmaceuticals polymer and waste processing industries fluid mechanics for chemical engineers second edition with microfluidics and cfd systematically introduces fluid mechanics from the perspective of the chemical engineer who must understand actual physical behavior and solve real world problems building on a first edition that earned choice magazine s outstanding academic title award this edition has been thoroughly updated to reflect the field s latest advances this second edition contains extensive new coverage of both microfluidics and computational fluid dynamics systematically demonstrating cfd through detailed examples using flowlab and comsol multiphysics the chapter on turbulence has been extensively revised to address more complex and realistic challenges including turbulent mixing and recirculating flows part i offers a clear succinct easy to follow introduction to macroscopic fluid mechanics including physical properties hydrostatics basic rate laws for mass energy and momentum and the fundamental principles of flow through pumps pipes and other equipment part ii turns to microscopic fluid mechanics which covers differential equations of fluid mechanics viscous flow problems some including polymer processing laplace s equation irrotational and porous media flows nearly unidirectional flows from boundary layers to lubrication calendering and thin film applications turbulent flows showing how the k ε method extends conventional mixing length theory bubble motion two phase flow and fluidization non newtonian fluids including inelastic and viscoelastic fluids microfluidics and electrokinetic flow effects including electroosmosis electrophoresis streaming potentials and

electroosmotic switching computational fluid mechanics with flowlab and comsol multiphysics fluid mechanics for chemical engineers second edition with microfluidics and cfd includes 83 completely worked practical examples several of which involve flowlab and comsol multiphysics there are also 330 end of chapter problems of varying complexity including several from the university of cambridge chemical engineering examinations the author covers all the material needed for the fluid mechanics portion of the professional engineer s examination the author s site engin umich edu fmche provides additional notes on individual chapters problem solving tips errata and more

uncover effective engineering solutions to practical problems with its clear explanation of fundamental principles and emphasis on real world applications this practical text will motivate readers to learn the author connects theory and analysis to practical examples drawn from engineering practice readers get a better understanding of how they can apply these concepts to develop engineering answers to various problems by using simple examples that illustrate basic principles and more complex examples representative of engineering applications throughout the text the author also shows readers how fluid mechanics is relevant to the engineering field these examples will help them develop problem solving skills gain physical insight into the material learn how and when to use approximations and make assumptions and understand when these approximations might break down key features of the text the underlying physical concepts are highlighted rather than focusing on the mathematical equations dimensional reasoning is emphasized as well as the interpretation of the results an introduction to engineering in the environment is included to spark reader interest historical references throughout the chapters provide readers with the rich history of fluid mechanics

engineering fluid mechanics discusses applications of bernoulli s equation momentum theorem turbomachines and dimensional analysis discusses mechanics of laminar and turbulent flows boundary layers incompressible inviscid flows compressible flows and computational fluid dynamics introduction to wave hydrodynamics experimental techniques and analysis of experimental uncertainty

a new approach to cfd that leverages modeling software and is light on math this concise highly illustrated resource gets you started using a new streamlined method for approaching computational fluid dynamics cfd that utilizes commercial software and requires minimal mathematical computations developed from curricula taught by the authors computational fluid dynamics an introduction to modeling and applications shows how to use high powered numerical analyses and data structures to analyze and solve problems that involve fluid flows and heat transfer you will learn how to use the latest computer programs such as fluent to perform the complex calculations required coverage includes conservation laws in thermal fluid sciences the finite volume method two dimensional steady state laminar incompressible fluid flow three dimensional steady state turbulent incompressible fluid flow convection heat transfer for two dimensional steady state incompressible flow three dimensional fluid flow and heat transfer modeling in a heat exchanger three dimensional fluid flow and heat transfer modeling in a heat sink solving the linear and non linear system of equations methods for solving navier stokes equations and much more

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this supplement to the comprehensive series encyclopedia of fluid mechanics steps back from the topical approach to fluid mechanics and embraces the overall subject from an entirely mathematical viewpoint within the pure science of mathematics the motion of particles and fluids is described and studies without the uncertainty that can accompany experimental investigations this volume addresses the mathematical details of model formation and development which constitutes the basis for numerical experimentation it is intended to stimulate and report current and emerging concepts in pure research on flow dynamics

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