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Flow White Solution Manual

Viscous Fluid Flow White Solution Manual

A superb learning and teaching resource, this structured introduction to fluid mechanics covers everything the engineer needs to know: the nature of fluids, hydrostatics, differential and integral relations, dimensional analysis, viscous flows, and another topics. Solutions to selected problems. 760 illustrations. 1985 edition. This book provides senior undergraduates who are already familiar with inviscid fluid

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dynamics with some of the basic facts about the modelling and analysis of viscous flows.

Dynamics of Polymeric Liquids, Second Edition Volume 2: Kinetic Theory R. Byron Bird, Charles F. Curtiss, Robert C. Armstrong and Ole Hassager Volume Two deals with the molecular aspects of polymer rheology and fluid dynamics. It is the only book currently available dealing with kinetic theory and its relation to nonlinear rheological properties. Considerable emphasis is given to the connection between kinetic theory results and experimental data. The second edition contains new material on the basis for

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molecular modeling, the application of phase-space theory to dilute solutions, kinetic theory of melts and melt mixtures, and network theories. 1987 (0 471-80244-1) 450 pp.

Since 1974, Viscous Fluid Flow has been known for its academic rigor and effectiveness at serving as a convenient “one-stop shop” for those interested in expanding their knowledge of the rich and evolving field of fluid mechanics. The fourth edition contains important updates and over 200 new references while maintaining the tradition of fulfilling the role of a senior or first-year graduate textbook on viscous motion with a

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well-balanced mix of engineering applications. Students are expected to understand the basic foundations of fluid mechanics, vector calculus, partial differential equations, and rudimentary numerical analysis. The material can be selectively presented in a one-semester course or, with more extensive coverage, in two (or even three) semesters.

**Qualitative Features and
Quantitative Analysis Using
Complex Eigenfunction
Expansions
Fundamental Concepts,
Methodological Frameworks, and
Philosophical Perspectives
Elements of Gasdynamics**

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Computational Fluid Dynamics: Principles and Applications

A student textbook which makes extensive use of simple theories to predict and correlate fluid motions. Emphasis is placed on the identification or derivation of relevant models and conditions, and on the development of skill in deriving theoretical solutions for problems by example and practice.

Designed for those interested in using finite element methods in the study of fluid mechanics and heat transfer, *The Finite Element Method in Heat Transfer and Fluid Dynamics* presents this useful

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methodology tailored for a limited but significant class of problems dealing with heat conduction, incompressible viscous flows, and convection heat transfer. The authors' approach consists of a series of incremental steps of increasing complexity. The text is divided into 8 chapters. Chapter 1 describes in detail the continuum boundary value problems that form the central focus of the book. Chapters 2 and 3 introduce and extend the finite element method by application to a simplified, two- and three-dimensional heat conduction problems. Chapters 4 and 5 describe isothermal

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viscous fluid mechanics formulations and the solution of nonlinear equations developed from the flow problem. Chapter 6 covers inelastic non-Newtonian flows and free surface problems. Chapter 7 surveys the complex topic of viscoelastic flow simulation, while Chapter 8 discusses several advanced topics, including turbulence modeling. Each chapter includes example problems ranging from simple benchmarks to practical engineering solutions. In *The Finite Element Method in Heat Transfer and Fluid Dynamics*, readers will find a pragmatic treatment that views numerical

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computation as a means to an end and does not dwell on theory or proof. Mastering its contents brings a firm understanding of the basic methodology, the competence to use existing simulation software, and the ability to develop some simpler, special purpose computer codes.

"With the appearance and fast evolution of high performance materials, mechanical, chemical and process engineers cannot perform effectively without fluid processing knowledge. The purpose of this book is to explore the systematic application of basic engineering principles to fluid flows that

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may occur in fluid processing and related activities. In *Viscous Fluid Flow*, the authors develop and rationalize the mathematics behind the study of fluid mechanics and examine the flows of Newtonian fluids. Although the material deals with Newtonian fluids, the concepts can be easily generalized to non-Newtonian fluid mechanics. The book contains many examples. Each chapter is accompanied by problems where the chapter theory can be applied to produce characteristic results. Fluid mechanics is a fundamental and essential element of advanced research, even for those working in

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different areas, because the principles, the equations, the analytical, computational and experimental means, and the purpose are common.

The most teachable book on incompressible flow— now fully revised, updated, and expanded *Incompressible Flow, Fourth Edition* is the updated and revised edition of Ronald Panton's classic text. It continues a respected tradition of providing the most comprehensive coverage of the subject in an exceptionally clear, unified, and carefully paced introduction to advanced concepts in fluid mechanics. Beginning with basic principles,

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this Fourth Edition patiently develops the math and physics leading to major theories.

Throughout, the book provides a unified presentation of physics, mathematics, and engineering applications, liberally supplemented with helpful exercises and example problems. Revised to reflect students' ready access to mathematical computer programs that have advanced features and are easy to use, Incompressible Flow, Fourth Edition includes: Several more exact solutions of the Navier-Stokes equations Classic-style Fortran programs for the Hiemenz flow, the Psi-Omega

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method for entrance flow, and the laminar boundary layer program, all revised into MATLAB A new discussion of the global vorticity boundary restriction A revised vorticity dynamics chapter with new examples, including the ring line vortex and the Fraenkel-Norbury vortex solutions A discussion of the different behaviors that occur in subsonic and supersonic steady flows Additional emphasis on composite asymptotic expansions Incompressible Flow, Fourth Edition is the ideal coursebook for classes in fluid dynamics offered in mechanical, aerospace, and chemical

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engineering programs.

Spectral Methods for
Incompressible Viscous Flow
Keller-Box Method and Its
Application

Engineering Fluid Mechanics
Computational Fluid Mechanics
and Heat Transfer, Third
Edition

*Most of the problems arising
in science and engineering
are nonlinear. They are
inherently difficult to
solve. Traditional
analytical approximations
are valid only for weakly
nonlinear problems, and
often break down for
problems with strong
nonlinearity. This book
presents the current*

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theoretical developments and applications of the Keller-box method to nonlinear problems. The first half of the book addresses basic concepts to understand the theoretical framework for the method. In the second half of the book, the authors give a number of examples of coupled nonlinear problems that have been solved by means of the Keller-box method. The particular area of focus is on fluid flow problems governed by nonlinear equation.

This new edition of the near-legendary textbook by Schlichting and revised by Gersten presents a

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comprehensive overview of boundary-layer theory and its application to all areas of fluid mechanics, with particular emphasis on the flow past bodies (e.g. aircraft aerodynamics). The new edition features an updated reference list and over 100 additional changes throughout the book, reflecting the latest advances on the subject.

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

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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

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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.*

The last decade has seen a

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dramatic increase of our abilities to solve numerically the governing equations of fluid mechanics. In design aerodynamics the classical potential-flow methods have been complemented by higher modelling-level methods. Euler solvers, and for special purposes, already Navier-Stokes solvers are in use. The authors of this book have been working on the solution of the Euler equations for quite some time. While the first two of us have worked mainly on algorithmic problems, the third has been concerned off and on with modelling and application problems of

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*Euler methods. When we started to write this book we decided to put our own work at the center of it. This was done because we thought, and we leave this to the reader to decide, that our work has attained over the years enough substance in order to justify a book. The problem which we soon faced, was that the field still is moving at a fast pace, for instance because hyper sonic computation problems became more and more important. The Finite Element Method in Heat Transfer and Fluid Dynamics
Analytical Fluid Dynamics
The Practical Use of Theory*

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Through ten editions, Fox and McDonald's Introduction to Fluid Mechanics has helped students understand the physical concepts, basic principles, and analysis methods of fluid mechanics. This market-leading textbook provides a balanced, systematic approach to mastering critical concepts with the proven Fox-McDonald solution methodology. In-depth yet accessible chapters present governing equations, clearly state assumptions, and relate mathematical results to corresponding physical behavior. Emphasis is placed on the use of control volumes to support a practical, theoretically-inclusive problem-solving approach to the subject. Each comprehensive chapter

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includes numerous, easy-to-follow examples that illustrate good solution technique and explain challenging points. A broad range of carefully selected topics describe how to apply the governing equations to various problems, and explain physical concepts to enable students to model real-world fluid flow situations. Topics include flow measurement, dimensional analysis and similitude, flow in pipes, ducts, and open channels, fluid machinery, and more. To enhance student learning, the book incorporates numerous pedagogical features including chapter summaries and learning objectives, end-of-chapter problems, useful equations, and design and open-ended problems

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that encourage students to apply fluid mechanics principles to the design of devices and systems.

Introductory text, geared toward advanced undergraduate and graduate students, applies mathematics of Cartesian and general tensors to physical field theories and demonstrates them in terms of the theory of fluid mechanics. 1962 edition.

This 2006 book details exact solutions to the Navier-Stokes equations for senior undergraduates and graduates or research reference. Designed for higher level courses in viscous fluid flow, this text presents a comprehensive treatment of the subject. This revision retains the approach and organization for which

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the first edition has been highly regarded, while bringing the material completely up-to-date. It contains new information on the latest technological advances and includes many more applications, thoroughly updated problems and exercises.

Intermediate Fluid Mechanics

An Album of Fluid Motion

A Physical Introduction to Fluid Mechanics

Boundary-Layer Theory

Computational Fluid Dynamics

(CFD) is an important design tool in engineering and also a substantial research tool in various physical sciences as well as in biology. The objective of this book is to provide university students with a solid

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foundation for understanding the numerical methods employed in today ' s CFD and to familiarise them with modern CFD codes by hands-on experience. It is also intended for engineers and scientists starting to work in the field of CFD or for those who apply CFD codes. Due to the detailed index, the text can serve as a reference handbook too. Each chapter includes an extensive bibliography, which provides an excellent basis for further studies. This unique volume introduces and discusses the methods of validating computer simulations in scientific research. The core concepts, strategies, and techniques of validation are explained by an international team of pre-eminent

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authorities, drawing on expertise from various fields ranging from engineering and the physical sciences to the social sciences and history. The work also offers new and original philosophical perspectives on the validation of simulations. Topics and features: introduces the fundamental concepts and principles related to the validation of computer simulations, and examines philosophical frameworks for thinking about validation; provides an overview of the various strategies and techniques available for validating simulations, as well as the preparatory steps that have to be taken prior to validation; describes commonly used

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reference points and mathematical frameworks applicable to simulation validation; reviews the legal prescriptions, and the administrative and procedural activities related to simulation validation; presents examples of best practice that demonstrate how methods of validation are applied in various disciplines and with different types of simulation models; covers important practical challenges faced by simulation scientists when applying validation methods and techniques; offers a selection of general philosophical reflections that explore the significance of validation from a broader perspective. This truly interdisciplinary handbook will

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appeal to a broad audience, from professional scientists spanning all natural and social sciences, to young scholars new to research with computer simulations.

Philosophers of science, and methodologists seeking to increase their understanding of simulation validation, will also find much to benefit from in the text.

The fourth edition of this text includes the addition of over 500 new problems, divided into categories of applied problems, comprehensive applied problems, design projects, word problems and FE (fundamentals of engineering exam) problems. The book has been given an updated, modern design and includes many useful

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pedagogical and motivational aids such as a perforated Key Equations Card, boxed equations, and opening chapter photos.

This well-written book explains the theory of spectral methods and their application to the computation of viscous incompressible fluid flow, in clear and elementary terms. With many examples throughout, the work will be useful to those teaching at the graduate level, as well as to researchers working in the area.

A Classification of Flows and Exact Solutions

Vectors, Tensors and the Basic Equations of Fluid Mechanics

Fluid Mechanics

Incompressible Flow

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This book provides analytical solutions to a number of classical problems in transport processes, i.e. in fluid mechanics, heat and mass transfer. Expanding computing power and more efficient numerical methods have increased the importance of computational tools. However, the interpretation of these results is often difficult and the computational results need to be tested against the analytical

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results, making analytical solutions a valuable commodity. Furthermore, analytical solutions for transport processes provide a much deeper understanding of the physical phenomena involved in a given process than do corresponding numerical solutions. Though this book primarily addresses the needs of researchers and practitioners, it may also be beneficial for graduate students just entering the field. Thoroughly updated to

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include the latest developments in the field, this classic text on finite-difference and finite-volume computational methods maintains the fundamental concepts covered in the first edition. As an introductory text for advanced undergraduates and first-year graduate students, *Computational Fluid Mechanics and Heat Transfer, Third Edition* provides the background necessary for solving complex problems in

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fluid mechanics and heat transfer. Divided into two parts, the book first lays the groundwork for the essential concepts preceding the fluids equations in the second part. It includes expanded coverage of turbulence and large-eddy simulation (LES) and additional material included on detached-eddy simulation (DES) and direct numerical simulation (DNS). Designed as a valuable resource for

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practitioners and students, new homework problems have been added to further enhance the student's understanding of the fundamentals and applications.

Computational Fluid Mechanics and Heat Transfer, Fourth Edition is a fully updated version of the classic text on finite-difference and finite-volume computational methods. Divided into two parts, the text covers essential concepts, and then moves

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on to fluids equations in the second part. Designed as a valuable resource for practitioners and students, new examples and homework problems have been added to further enhance the student's understanding of the fundamentals and applications. Provides a thoroughly updated presentation of CFD and computational heat transfer Covers more material than other texts, organized for classroom instruction

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and self-study Presents a range of flow computation strategies and extensive computational heat transfer coverage Includes more extensive coverage of computational heat transfer methods Features a full Solutions Manual and Figure Slides for classroom projection Written as an introductory text for advanced undergraduates and first-year graduate students, the new

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edition provides the background necessary for solving complex problems in fluid mechanics and heat transfer.

The second edition of Analytical Fluid Dynamics presents an expanded and updated treatment of inviscid and laminar viscous compressible flows from a theoretical viewpoint. It emphasizes basic assumptions, the physical aspects of flow, and the appropriate formulations of the governing

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equations for subsequent analytical treatment.

Topics covered include

Fundamentals of Fluid Mechanics

Applied Mechanics

Reviews

Analytical Solutions for Transport Processes

Numerical Solutions of the Euler Equations for Steady Flow Problems

Viscous Fluid Flow

Provides an account of internal, external and unsteady slow viscous flows, including the advances. This book shows how the method of eigenfunctions, in conjunction with least squares, can be used to solve problems of low Reynolds number

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flows, including three-dimensional internal and unsteady flows. Engineering Fluid Mechanics guides students from theory to application, emphasizing critical thinking, problem solving, estimation, and other vital engineering skills. Clear, accessible writing puts the focus on essential concepts, while abundant illustrations, charts, diagrams, and examples illustrate complex topics and highlight the physical reality of fluid dynamics applications. Over 1,000 chapter problems provide the “deliberate practice”—with feedback—that leads to material mastery, and discussion of real-world applications provides a frame of reference that enhances student comprehension. The study of fluid mechanics pulls from chemistry, physics, statics, and calculus to

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describe the behavior of liquid matter; as a strong foundation in these concepts is essential across a variety of engineering fields, this text likewise pulls from civil engineering, mechanical engineering, chemical engineering, and more to provide a broadly relevant, immediately practicable knowledge base. Written by a team of educators who are also practicing engineers, this book merges effective pedagogy with professional perspective to help today's students become tomorrow's skillful engineers.

Fluid mechanics, the study of how fluids behave and interact under various forces and in various applied situations-whether in the liquid or gaseous state or both-is introduced and comprehensively covered in this widely adopted text. Revised and

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updated by Dr. David Dowling, Fluid Mechanics, Fifth Edition is suitable for both a first or second course in fluid mechanics at the graduate or advanced undergraduate level. The leading advanced general text on fluid mechanics, Fluid Mechanics, 5e includes a free copy of the DVD "Multimedia Fluid Mechanics," second edition. With the inclusion of the DVD, students can gain additional insight about fluid flows through nearly 1,000 fluids video clips, can conduct flow simulations in any of more than 20 virtual labs and simulations, and can view dozens of other new interactive demonstrations and animations, thereby enhancing their fluid mechanics learning experience. Text has been reorganized to provide a better flow from topic to topic and to consolidate portions that belong

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together. Changes made to the book's pedagogy accommodate the needs of students who have completed minimal prior study of fluid mechanics. More than 200 new or revised end-of-chapter problems illustrate fluid mechanical principles and draw on phenomena that can be observed in everyday life. Includes free Multimedia Fluid Mechanics 2e DVD

Viscous Fluid Flow

Viscous Flow

Viscous Flows

Fluid Mechanics, Heat and Mass

Transfer

Master fluid mechanics with the #1 text in the field! Effective pedagogy, everyday examples, an outstanding collection of practical problems--these are just a few reasons why Munson,

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Young, and Okiishi's Fundamentals of Fluid Mechanics is the best-selling fluid mechanics text on the market. In each new edition, the authors have refined their primary goal of helping you develop the skills and confidence you need to master the art of solving fluid mechanics problems. This new Fifth Edition includes many new problems, revised and updated examples, new Fluids in the News case study examples, new introductory material about computational fluid dynamics (CFD), and the availability of FlowLab for solving simple CFD problems. Access special resources online New copies of this text include access to resources on the book's website, including: * 80 short Fluids Mechanics Phenomena videos, which

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illustrate various aspects of real-world fluid mechanics. * Review Problems for additional practice, with answers so you can check your work. * 30 extended laboratory problems that involve actual experimental data for simple experiments. The data for these problems is provided in Excel format. * Computational Fluid Dynamics problems to be solved with FlowLab software. Student Solution Manual and Study Guide A Student Solution Manual and Study Guide is available for purchase, including essential points of the text, "Cautions" to alert you to common mistakes, 109 additional example problems with solutions, and complete solutions for the Review Problems. The increasing importance of

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concepts from compressible fluid flow theory for aeronautical applications makes the republication of this first-rate text particularly timely. Intended mainly for aeronautics students, the text will also be helpful to practicing engineers and scientists who work on problems involving the aerodynamics of compressible fluids. Covering the general principles of gas dynamics to provide a working understanding of the essentials of gas flow, the contents of this book form the foundation for a study of the specialized literature and should give the necessary background for reading original papers on the subject. Topics include introductory concepts from thermodynamics, including entropy, reciprocity relations, equilibrium conditions, the

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law of mass action and condensation; one-dimensional gasdynamics, one-dimensional wave motion, waves in supersonic flow, flow in ducts and wind tunnels, methods of measurement, the equations of frictionless flow, small-perturbation theory, transonic flow, effects of viscosity and conductivity, and much more. The text includes numerous detailed figures and several useful tables, while concluding exercises demonstrate the application of the material in the text and outline additional subjects. Advanced undergraduate or graduate physics and engineering students with at least a working knowledge of calculus and basic physics will profit immensely from studying this outstanding

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volume.

The Second Edition contains information on new technological advances, such as Turbulence Modeling, Modern Analytic Techniques in Approximation Solutions; Computational Fluid Dynamics; and Triple-Deck Theory, along with applications, new problems, and updated references.

The book is for a senior/graduate level elective in Mechanical Engineering, with strong professional international appeal.

This new book builds on the original classic textbook entitled: An Introduction to Computational Fluid Mechanics by C. Y. Chow which was originally published in 1979. In the decades that have passed since this

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book was published the field of computational fluid dynamics has seen a number of changes in both the sophistication of the algorithms used but also advances in the computer hardware and software available. This new book incorporates the latest algorithms in the solution techniques and supports this by using numerous examples of applications to a broad range of industries from mechanical and aerospace disciplines to civil and the biosciences. The computer programs are developed and available in MATLAB. In addition the core text provides up-to-date solution methods for the Navier-Stokes equations, including fractional step time-advancement, and pseudo-spectral methods. The computer codes at the

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following website:

www.wiley.com/go/biringen

A Streambed-particle Model-study
Facility Using Hydroxyethylcellulose
Solutions as a Fluid

Fox and McDonald's Introduction to
Fluid Mechanics

Computational Fluid Mechanics and
Heat Transfer

Viscous Fluid Flow 4e