# Fluid Mechanics for Chemical Engineers

Prentice Hall International Series in the Physical and Chemical Engineering Sciences



# <u>James O Wilkes Fluid Mechanics For Chemical</u> <u>Engineers Solution</u>

**Mark Steyvers** 

**Solutions Manual for Fluid Mechanics for Chemical Engineers** James O. Wilkes, 2005 Fluid Mechanics for Chemical Engineers with Microfluidics and CFD. James O. Wilkes, 2006 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 Jacket Fluid Mechanics for Chemical Engineers James O. Wilkes, Stacy G. Bike, 1999 Designed for undergraduate and first year courses in Fluid Mechanics this text consists of two parts four chapters on macroscopic or relatively large scale phenomena followed by eight chapters on microscopic or relatively small scale phenomena Fluid Mechanics for Chemical Engineers James O. Wilkes, 2017-07-20 The Chemical Engineer's Practical Guide to Fluid Mechanics Now Includes COMSOL Multiphysics 5 Since most chemical processing applications are conducted either partially or totally in the fluid phase chemical engineers need mastery of fluid mechanics Such knowledge is especially valuable in the biochemical chemical energy fermentation materials mining petroleum pharmaceuticals polymer and waste processing industries Fluid Mechanics for Chemical Engineers with Microfluidics CFD and COMSOL Multiphysics 5 Third Edition systematically introduces fluid mechanics from the perspective of the chemical engineer who must understand actual physical behavior and solve real world problems Building on the book that earned Choice Magazine's Outstanding Academic Title award this edition also gives a comprehensive introduction to the popular COMSOL Multiphysics 5 software This third edition contains extensive coverage of both microfluidics and computational fluid dynamics systematically demonstrating CFD through detailed examples using COMSOL Multiphysics 5 and ANSYS Fluent The chapter on turbulence now presents valuable CFD techniques to investigate practical situations such as 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 and fundamental principles of flow through equipment Part II turns to microscopic fluid mechanics 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 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 ANSYS Fluent and COMSOL Multiphysics Nearly 100 completely worked practical examples include 12 new COMSOL 5 examples boundary layer flow non Newtonian flow jet flow die flow lubrication momentum diffusion turbulent flow and others More than 300 end of chapter problems of varying complexity are presented including several from University of Cambridge exams The author covers all material needed for

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