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Nota di contenuto	Front Cover; Fluid Flow for Chemical Engineers; Copyright Page; Contents; List of examples; Preface to the second edition; Nomenclature; Chaptre 1. Fluids in motion; 1.1 Units and dimensions; 1.2 Description of fluids and fluid flow; 1.3 Types of flow; 1.4 Conservation of mass; 1.5 Energy relationships and the Bernoulli equation; 1.6 Momentum of a flowing fluid; 1.7 Stress in fluids; 1.8 Sign conventions for stress; 1.9 Stress components; 1.10 Volumetric flow rate and average velocity in a pipe; 1.11 Momentum transfer in laminar flow; 1.12 Non-Newtonian behaviour 1.13 Turbulence and boundary layersChapter 2. Flow of incompressible Newtonian fluids in pipes and channels; 2.1 Reynolds number and flow patterns in pipes and tubes; 2.2 Shear stress in a pipe; 2.3 Friction factor and pressure drop; 2.4 Pressure drop in fittings and curved pipes; 2.5 Equivalent diameter for non-circular pipes; 2.6 Velocity profile for laminar Newtonian flow in a pipe; 2.7 Kinetic energy in laminar flow; 2.8 Velocity distribution for turbulent flow in a pipe; 2.9 Universal velocity distribution for turbulent flow in a pipe; 2.10 Flow in open channels

Chapter 3. Flow of incompressible non-Newtonian fluids in pipes3.1 Elementary viscometry; 3.2 Rabinowitsch-Mooney equation; 3.3 Calculation of flow rate-pressure drop relationship for laminar flow using t-y data; 3.4 Wall shear stress-flow characteristic curves and scale-up for laminar flow; 3.5 Generalized Reynolds number for flow in pipes; 3.6 Turbulent flow of inelastic non-Newtonian fluids in pipes; 3.7 Power law fluids; 3.8 Pressure drop for Bingham plastics in laminar flow; 3.9 Laminar flow of concentrated suspensions and apparent slip at the pipe wall; 3.10 Viscoelasticity
Chapter 4. Pumping of liquids4.1 Pumps and pumping; 4.2 System heads; 4.3 Centrifugal pumps; 4.4 Centrifugal pump relations; 4.5 Centrifugal pumps in series and in parallel; 4.6 Positive displacement pumps; 4.7 Pumping efficiencies; 4.8 Factors in pump selection; Chapter 5. Mixing of liquids in tanks; 5.1 Mixers and mixing; 5.2 Small blade high speed agitators; 5.3 Large blade low speed agitators; 5.4 Dimensionless groups for mixing; 5.5 Power curves; 5.6 Scale-up of liquid mixing systems; 5.7 The purging of stirred tank systems; Chapter 6. Flow of compressible fluids in conduits
6.1 Energy relationships6.2 Equations of state; 6.3 Isothermal flow of an ideal gas in a horizontal pipe; 6.4 Non-isothermal flow of an ideal gas in a horizontal pipe; 6.5 Adiabatic flow of an ideal gas in a horizontal pipe; 6.6 Speed of sound in a fluid; 6.7 Maximum flow rate in a pipe of constant cross-sectional area; 6.8 Adiabatic stagnation temperature for an ideal gas; 6.9 Gas compression and compressors; 6.10 Compressible flow through nozzles and constrictions; Chapter 7. Gas-liquid two-phase flow; 7.1 Flow patterns and flow regime maps; 7.2 Momentum equation for two-phase flow
7.3 Flow in bubble columns

Sommario/riassunto

This major new edition of a popular undergraduate text covers topics of interest to chemical engineers taking courses on fluid flow. These topics include non-Newtonian flow, gas-liquid two-phase flow, pumping and mixing. It expands on the explanations of principles given in the first edition and is more self-contained. Two strong features of the first edition were the extensive derivation of equations and worked examples to illustrate calculation procedures. These have been retained. A new extended introductory chapter has been provided to give the student a thorough basis to understand the me