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Descriptions: The Particle Derivative; 4. Streamline, Path Line, and Streak Line; 5. Reference Frame and Streamline Pattern; 6. Linear Strain Rate; 7. Shear Strain Rate; 8. Vorticity and Circulation; 9. Relative Motion near a Point: Principal Axes; 10. Kinematic Considerations of Parallel Shear Flows; 11. Kinematic Considerations of Vortex Flows; 12. One-, Two-, and Three-Dimensional Flows; 13. The Streamfunction; 14. Polar Coordinates; Exercises; Supplemental Reading; Chapter 4. Conservation Laws; 1. Introduction
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18. Boussinesq Approximation19. Boundary Conditions; Exercises; Literature Cited; Supplemental Reading; Chapter 5. Vorticity Dynamics; 1. Introduction; 2. Vortex Lines and Vortex Tubes; 3. Role of Viscosity in Rotational and Irrotational Vortices; 4. Kelvin's Circulation Theorem; 5. Vorticity Equation in a Nonrotating Frame; 6. Velocity Induced by a Vortex Filament: Law of Biot and Savart; 7. Vorticity Equation in a Rotating Frame; 8. Interaction of Vortices; 9. Vortex Sheet; Exercises; Literature Cited; Supplemental Reading; Chapter 6. Irrotational Flow
1. Relevance of Irrotational Flow Theory

Sommario/riassunto

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. Fully revised and updated with the addition of a new chapter on biofluid mechanics, Fluid Mechanics, Fourth 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, 4e guides students from the fundamentals to the an