

CONTENTS

CONTRIBUTORS TO THIS VOLUME	ix
(For a note about the editor please see page xii)	
PREFACE	xiii

SECTION I: TRANSPORT PROPERTIES AND FLOW INSTABILITY

1. Generalized Equations of State for Process Design	3
<i>H. Knapp</i>	
2. Density Correlations for Saturated and Compressed Liquids and Liquid Mixtures	28
<i>G. H. Thomson</i>	
3. Correlations for Molecular Diffusivities in Liquids	48
<i>W. Hayduk</i>	
4. Diffusion in Liquids	73
<i>E. L. Cussler and D. L. McCullum</i>	
5. Mixing and Isotropy in Homogeneous Turbulence	103
<i>J. Lee</i>	
6. Principles of Micromixing	147
<i>J. Baldyga and J. R. Bourne</i>	
7. Rayleigh-Taylor Instability	202
<i>L. Baker</i>	

8. Rayleigh-Taylor Instability in Compressible Media	213
<i>D. L. Book</i>	
9. Taylor Vortices and Instabilities in Circular Couette Flows	236
<i>K. Kataoka</i>	

SECTION II: FLOW DYNAMICS AND FRICTIONAL BEHAVIOR

10. Properties and Concepts of Single Fluid Flows	277
<i>N. P. Cheremisinoff</i>	
11. Theory of Minimum Energy and Energy Dissipation Rate ...	353
<i>C. T. Yang and C. C. S. Song</i>	
12. Principles of Dimensional Analysis	400
<i>T. Z. Fahidy and M. S. Quraishi</i>	
13. Drag in Single Fluid Flows	433
<i>S. K.-Djurdjevic, F. Zdanski and A. Dudukovic</i>	
14. Free Stream Turbulence and Bluff Body Drag	453
<i>W. H. Bell</i>	
15. Stability of Flat Plates and Cylindrical Shells Exposed to Flows	476
<i>Y. Matsuzaki</i>	
16. Steady Transonic Flow	510
<i>E. Dick</i>	
17. Numerical Modeling of Transonic Flows Over Airfoils and Cascades	533
<i>Xin-Hai Zhou, Song-Ling Liu and Fei-Da Fan</i>	
18. Approaches to Analyzing Unsteady Laminar Flow in Long Pipes	560
<i>Mario F. Letelier S.</i>	

19. Stability of Spatially Periodic Flows	589
<i>K. Gotoh and M. Yamada</i>	
20. Turbulent Swirling Pipe Flows	611
<i>C. Kuroda and K. Ogawa</i>	
21. Turbulent Flows Within Straight Ducts	638
<i>A. Nakayama and W. L. Chow</i>	
22. Residence Time Distribution in Straight and Curved Tubes	675
<i>K. D. P. Nigam and A. K. Saxena</i>	
23. Flow Across Tube Banks	763
<i>T. Nishimura</i>	
24. Flow in Rectangular Channels	786
<i>W. R. C. Myers and J. F. Lyness</i>	
25. Structure of Turbulent Channel Flows	825
<i>A. V. Johansson and P. H. Alfredsson</i>	
26. Pressure Losses in Rectangular Bends	870
<i>N. Shiragami and I. Inoue</i>	
27. Modeling Flows in Rectangular Enclosures and Cavities	896
<i>A. K. Sen</i>	
28. Modeling Wavy Film Flows	931
<i>S. P. Lin and C. Y. Wang</i>	
29. Hydrodynamics of Creeping Flow	952
<i>J. Koplik</i>	
30. Steady Non-Newtonian Flow About a Rigid Sphere	983
<i>R. P. Chhabra</i>	
31. Power-Law Fluid Velocity Profiles in Turbulent Pipe Flows	1034
<i>A. V. Shenoy</i>	

32. Molecular Interactions in Drag Reduction in Pipe Flows	1060
<i>N. S. Berman</i>	
33. Generalized Correlation for Friction Loss in Drag Reducing Polymer Solutions	1083
<i>R. Darby</i>	
34. Analyses of Power Law Viscous Materials Using Complex Stream, Potential, and Stress Functions	1105
<i>Y. S. Lee and L. C. Smith</i>	
35. Rheological Properties of Thermoplastics	1155
<i>G. Akay</i>	

SECTION III: FLOW AND TURBULENCE MEASUREMENT

36. Techniques for Turbulence Measurement	1207
<i>S. Tavoularis</i>	
37. The Measurement of Reynold's Stresses	1256
<i>I. P. Castro</i>	
38. Measurement Techniques for Multiphase Flows	1280
<i>N. P. Cheremisinoff</i>	
39. Industrial Flow Measuring Devices	1339
<i>N. P. Cheremisinoff</i>	
40. Design and Operation of Target Flowmeters	1408
<i>W. T. Clark</i>	
41. Optimal Dimensions of Weirs	1434
<i>D. Kumar</i>	
INDEX	1496