

# Contents

---

## Part I      Fundamentals

---

Fundamental Aspects of Turbulent Shear Flows – Introductory Remarks. By J. C. André . . . . .	3
The Dimension and Intermittency of Atmospheric Dynamics. By D. Schertzer and S. Lovejoy (With 11 Figures) . . . . .	7
Three-Dimensional Vortex Dynamics near a Wall. By H. Viets, R. J. Bethke and D. Bougine (With 12 Figures) . . . . .	34
Diffusion Behind a Line Source in Grid Turbulence. By M. S. Anand and S. B. Pope (With 7 Figures) . . . . .	46
Two-Point Closure Used for a Sub-Grid Scale Model in Large Eddy Simulations. By J. P. Chollet (With 7 Figures) . . . . .	62
Reynolds-Stress Closure Model for Conditional Variables. By J. Janicka and W. Kollmann (With 14 Figures) . . . . .	73
Parameterization of Turbulent Transport in Swirling Flows – I: Theoretical Considerations. By D. Ettestad and J. L. Lumley (With 4 Figures)	87
A Comparison of Triple-Moment Temperature-Velocity Correlations in the Asymmetric Heated Jet with Alternative Closure Models. By I. Dekeyser and B. E. Launder (With 8 Figures) . . . . .	102

---

## Part II      Free Flows

---

Introduction to Papers on Free Turbulent Flow. By I. S. Gartshore . . . . .	121
Statistical Characteristics of the Turbulent Wake Behind an Intersecting Cruciform Circular Cylinder. By H. Osaka and I. Nakamura (With 14 Figures) . . . . .	124
Effects of Streamline Curvature on Laminar and Turbulent Wakes. By H. S. Koyama (With 17 Figures) . . . . .	141
Experimental Investigation of the Turbulent Structure of Vortex Wakes. By O. Leuchter and J. L. Solignac (With 14 Figures) . . . . .	156
Numerical Study of the Phenomenon of Turbulence Suppression in a Plane Shear Layer. By M. Nallasamy and A. K. M. F. Hussain (With 15 Figures) . .	169
Structural Features of the Near Region of an Asymmetric Turbulent Wake. By M. Shokr, J. F. Keffer and J. G. Kawall (With 12 Figures) . . . . .	182

VII

An Investigation of Reynolds Stress Structures in Plane Turbulent Wakes. By G. Fabris and A. Nakayama (With 9 Figures) . . . . .	192
Turbulent Boundary Layer-Wake Interaction. By E. P. Tsiolakis, E. Krause and U. R. Müller (With 13 Figures) . . . . .	204

---

### Part III    **Boundary Layers**

---

Boundary Layers. By M. M. Gibson (With 1 Figure) . . . . .	219
Heat Transfer Mechanism and Associated Turbulence Structure in the Near-Wall Region of a Turbulent Boundary Layer. By Y. Iritani, N. Kasagi and M. Hirata (With 13 Figures) . . . . .	223
The Behaviour of a Compressible Turbulent Boundary Layer Under Incipient Separation Conditions. By K. C. Muck and A. J. Smits (With 9 Figures) . . . .	235
Secondary Currents in a Straight Channel Flow and the Relation to Its Aspect Ratio. By I. Nezu, H. Nakagawa and A. Tominaga (With 15 Figures) . .	246
A Computational Preston Tube Method. By W. Nitsche, R. Thünker and C. Haberland (With 15 Figures) . . . . .	261
Measurements of the Wall Shear Stress in Boundary Layer Flows. By M. Acharya and M. P. Escudier (With 9 Figures) . . . . .	277
Hysteresis of Turbulent Stresses in Wall Flows Subjected to Periodic Disturbances. By K. Hanjalić and N. Stošić (With 11 Figures) . . . . .	287
Periodic Turbulent Shear Flows. By B. R. Ramaprian, S. W. Tu and A. N. Menendez (With 11 Figures) . . . . .	301

---

### Part IV    **Reacting Flows**

---

Reacting Flows – Introductory Remarks. By R. W. Bilger . . . . .	313
Simultaneous Measurement of Velocity and Scalars in a Turbulent Non- premixed Flame by Combined-Laser Doppler Velocimetry and Laser Raman Scattering. By R. W. Dibble and R. W. Schefer (With 5 Figures) . . . . .	319
Assessment of Two Turbulence Models for Turbulent Round Diffusion Jets with Combustion. By F. C. Lookwood and P. Stolakis (With 10 Figures) . . .	328
Calculated Scalar Dissipation in Two-Dimensional Flows. By Wm. T. Ashurst, A. R. Kerstein, E. Effelsberg and N. Peters (With 4 Figures) . . . . .	345
Nonequilibrium Chemistry in an Isothermal Turbulent Flow. By N. R. Mudford and R. W. Bilger (With 11 Figures) . . . . .	355
Lagrangian Models for Turbulent Combustion. By R. Borghi and E. Pourbaix (With 4 Figures) . . . . .	369
A Model for Flame Extinction in Turbulent Flow. By S. Byggstøyl and B. F. Magnussen (With 11 Figures) . . . . .	381
<i>Index of Contributors</i> . . . . .	397