Contents

Part I	Instability and Transition. Theory and Experiments	
Instability a	nd Transition. By J.T. Stuart	2
Couette Flor	ental Investigation of Transition to Turbulence in Taylor- w Using Digital Image Processing ey and F.R. Mobbs (With 8 Figures)	7
Dynamical Instabilities and Transition to Turbulence in Spherical Gap Flows. By K. Bühler and J. Zierep (With 13 Figures)		16
On Transition to Turbulence in Boundary Layers By F.T. Smith		27
Instability and Transition of Flow in a Two-Dimensional Channel By P.G. Drazin and I.J. Sobey (With 3 Figures)		37
The Entrainment of Particles by a Turbulent Spot in a Laminar Boundary Layer. By F.G.J. Absil and G. Ooms (With 9 Figures)		42
	oach to Low Prandtl Number Thermal Convection ssaguer, I. Mercader, and S. Blázquez (With 3 Figures) .	49
Part II	Chaotic Behaviour of Non-Linear Systems and Turbule Fields	nt
	naviour in a Non-Linear System: Turbulence in Rayleigh vection. By P. Bergé (With 12 Figures)	56
Chaos Thro	Chaos Through Biperiodicity. By M. Dubois (With 6 Figures)	
A Topological Model for the Onset of Chaotic Motions in the Blasius Boundary Layer. By St. N. Savulescu (With 3 Figures)		72
One-Dimensional Analog of the Saltzman-Lorenz Problem for Thermal Convection By S. Panchev and V. Roussenov (With 3 Figures)		77
Titles printed	in italics refer to invited papers	

Part III Direct and Large Eddy Simulation of Turbulence	
On Direct and Large Eddy Simulation of Turbulence By U. Schumann and R. Friedrich (With 10 Figures)	88
The Pressure-Strain Correlation of a Turbulent Homogeneous Shear Flow Under Strongly-Stable Stratification By T. Gerz and U. Schumann (With 6 Figures)	
Normalization of High-Resolution Raster Display Applied to Turbulent Fields. By M. Farge (With 12 Figures)	
Large Eddy Simulations of Isotropic or Stably-Stratified Turbulence By JP. Chollet, O. Metais, and M. Lesieur (With 4 Figures)	
3D Simulation of 2 Length Scales Turbulent Flows by Homogenization By C. Bègue, T. Chacón, F. Ortegón, and O. Pironneau (With 5 Figures)	135
The Simulation of Dispersion by Convective Turbulence in the Atmosphere	100
By F.T.M. Nieuwstadt and J.P.J.M.M. de Valk (With 4 Figures)	143
Part IV Coupling of Fourier Modes. Spectral Analysis of Turbulence and Related Problems	·
Spectral Evolution of the Navier-Stokes Equations for Low Order Couplings of Fourier Modes By J.G. Brasseur and S. Corrsin (With 8 Figures)	152
Grid Generated Turbulence Exhibiting a Peak in the Spectrum By M. Michard, J. Mathieu, R. Morel, E. Alcaraz, and J.P. Bertoglio	
(With 14 Figures)	
By C. Cambon and L. Jacquin (With 5 Figures)	
Transient Behavior of a Stably Stratified Homogeneous Turbulent Flow	176
By R.C. Sanderson, J.C. Hill, and J.R. Herring (With 5 Figures) A Stochastic Analysis of the Displacements of Fluid Elements in	184
11 Otochastic Marysis of the Displacements of Fluid Memeris in	

Fully Developed Turbulence and Complex Time Singularities By T. Dombre, Y. Gagne, and E. Hopfinger (With 4 Figures)	204
Reynolds Number and Prandtl Number Influence on the Determination of Isotropic Velocity and Temperature Turbulent Length Scales. By C. Rey and JM. Rosant (With 4 Figures)	209
On the Detection of Dissipation Events in a High Reynolds Number Turbulent Boundary Layer	
By L. Jacquin and P. Mestayer (With 9 Figures)	215
Part V Two-Dimensional Velocity Fields. Geophysical and Astrophysical Turbulence	
Geophysical and Astrophysical Turbulence. By H.K. Moffatt (With 8 Figures)	228
Computer Simulation of Decaying Two-Dimensional Turbulence By M.E. Brachet, M. Meneguzzi, H. Politano, and P.L. Sulem (With 6 Figures)	245
Energy Cascades of Kelvin-Helmholtz Instabilities in the Stably Stratified Atmospheric Boundary Layer By M.S. Darby, S.D. Mobbs, and J. Brindley (With 6 Figures)	255
An Experimental Study of the Inverse Cascade of Energy in Two-Dimensional Turbulence. By J.M. Nguyen Duc, Ph. Caperan, and J. Sommeria (With 4 Figures)	265
Inhomogeneous Two-Dimensional Turbulence in the Atmosphere By T.G. Shepherd (With 9 Figures)	269
Laminarization by a Strong Magnetic Field By C. Bardos, C. Sulem, and P.L. Sulem	279
Transition of Magnetohydrodynamical Waves in the Solar Atmosphere. By L. Nocera (With 5 Figures)	284
Sensitivity of Two-Dimensional MHD Turbulence to Alfven Waves and Correlations	
By P.L. Sulem, A. Pouquet, and M. Meneguzzi (With 8 Figures)	29
The Structure of the Turbulent Temperature Field Above Heated Planes. By T.J. Tsirikoglou and D.D. Papailiou (With 7 Figures)	300
On the Equations Governing the Propagation of Disturbances in Turbulent Shear Flow. By V.I. Vasanta Ram (With 1 Figure)	310

Part VI	Coherent Structures in Turbulent Flows. Conditional Averaging. Pattern Recognition	
Coherent St	ructures. By H.E. Fiedler (With 6 Figures)	320
	Topology of Organised Structures in a Turbulent Plane Wake By R.A. Antonia, L.W.B. Browne, and D.K. Bisset (With 8 Figures)	
	Coherent Structures in the Wall Layer y, P. Holmes, J.L. Lumley, and E. Stone (With 7 Figures)	346
Including A	Decomposition of the Axisymmetric Jet Mixing Layer zimuthal Dependence auser and W.K. George (With 9 Figures)	357
•	Cut-and-Connect of Vortex Filaments i and A.K.M.F. Hussain (With 2 Figures)	367
	at the Near-Wall Turbulence Structure o Choi (With 6 Figures)	373
By A.V. Joh	ution of Shear-Layer Structures in Near-Wall Turbulence nansson, P.H. Alfredsson, and H. Eckelmann ures)	383
	ructures in Turbulent Pipe Flow clacker and M. Sieber (With 8 Figures)	391
Behaviour of Coherent Structures in a Turbulent Boundary Layer with Wall Suction. By L. Fulachier, T. Benabid, F. Anselmet, R.A. Antonia, and L.V. Krishnamoorthy (With 8 Figures)		399
Gradient dl	n of Sweeps with the Help of the Instantaneous Velocity U/dy dolph, H. Eckelmann, and S.G. Nychas (With 5 Figures)	408
Turbulence Structure in a Cylinder Wake By M. Hayakawa and A.K.M.F. Hussain (With 7 Figures)		416
	ructures and Their Relation to Instability Processes in a Jet. By S. Drobniak and J.W. Elsner (With 14 Figures)	424
Temporal a	al Study of an Incompressible, Plane Mixing Layer by and Spectral Analysis lle, Z. Chahine, and J.P. Bonnet (With 9 Figures)	435

Part VII	Experimental Techniques: Hot-Wire Anemometry, Vorticity Meters, Electrochemical Methods, Image Analysis	
Plane Shear		
By J.F. Foss	s, S.K. Ali, and R.C. Haw (With 5 Figures)	446
	the Vortical Structure of the Turbulent Boundary Layer int, P. Vukoslavĉević, and J.M. Wallace (With 7 Figures)	456
Principle	Vorticity Measurements by a Method Based on a MHD	
By A. Tsino	ber, E. Kit, and M. Teitel (With 5 Figures)	465
Turbulent F	Measurements in Two- and Three-Dimensional Highly lows with Separation	
	el, H.H. Fernholz, and M. Hess (With 13 Figures)	470
	experiments on Static Non-Linear Effects in a Single Hot- ring Technique. By M. Hoffmeister (With 4 Figures)	480
Hot Wire in	Wall Proximity. By G. Janke (With 12 Figures)	488
Fluid and D	y Gradient Fluctuations in Turbulent Flow (Newtonian ilute Polymer Solutions) uri, C. Deslouis, S. Robin, and B. Tribollet	
(With 7 Figure 1)	ures)	49 9
	rsis of the Spinning Cylinder near Wake ns, J. Escoda, Jna. Gavaldà, and F. Diaz	
(With 6 Fig	ures)	508
Part VIII	Engineering Applications of Turbulence and the Effect External Disturbances	of
	s Industrielles de la Turbulence, ses Progrès Récents, son P. Perrier (With 6 Figures)	516
	Turbulence Structure in Flight lrud (With 12 Figures)	524
Boundary La	ner in Which Outer Layer Disturbances Affect Turbulent ayer Skin Friction vill (With 10 Figures)	533
Flow	Turbulence to Large Amplitude Oscillations in Channel, G. Binder, and R. Blackwelder (With 10 Figures)	546

Turbulence in Oscillatory Boundary Layers By B.M. Sumer, B. L. Jensen, and J. Fredsøe (With 12 Figures)	556
The Structure of Turbulence Measured in a Relaxing Boundary Layer By U.R. Müller (With 16 Figures)	568
List of Participants	577
Index of Contributors	585