

Contents

Part I Theory

Uncertainties in Turbulence.	3
Arkady Tsinober	
Complete Description of Turbulence in Terms of Hopf Functional and LMN Hierarchy: New Symmetries and Invariant Solutions	9
Marta Waclawczyk	
Application of an Integral Fluctuation Theorem to Turbulent Flows	19
N. Reinke, D. Nickelsen, A. Engel and J. Peinke	
A Marker for Studying the Turbulent Energy Cascade in Real Space	27
J.I. Cardesa and J. Jiménez	
Scale Energy of Turbulence Based on Two-Point Velocity Correlation	33
Fujihito Hamba	
A Numerical Study of the Shear-Less Turbulent/Non-turbulent Interface.	37
G. Cocconi, A. Cimarelli, B. Frohnepfel and E. De Angelis	
The Imbalance Between Enstrophy Production and Destruction in Homogeneous Isotropic Unsteady Turbulence.	41
P.C. Valente, R. Onishi and C.B. da Silva	
From Time to Space and Back: Convection and Wave Velocities in Turbulent Shear Flows	47
B. Ganapathisubramani and R. de Kat	

Concurrent Scale Interactions in the Far-Field of a Turbulent Mixing Layer	55
O.R.H. Buxton and B. Ganapathisubramani	
Euler Angle and Axis—“Fingerprints” of a Subgrid-Scale Stress Model	59
Zixuan Yang and Bing-Chen Wang	
Low-Cost Energy-Preserving RK Schemes for Turbulent Simulations	65
Francesco Capuano, Gennaro Coppola and Luigi de Luca	
Assessment of Subfilter Scalar Dissipation Rate and Mixture Fraction Variance Models	69
J. Ventosa-Molina, O. Lehmkuhl, C.D. Pérez-Segarra and A. Oliva	
Backward Energy Transfer and Subgrid Modeling Approaches in Wall-Turbulence	75
A. Cimarelli and E. De Angelis	
Building Proper Invariants for Eddy-Viscosity Models	79
F.X. Trias, A. Gorobets and A. Oliva	
Analysis of a Hybrid RANS/LES Model Using RANS Reconstruction	83
M. Nini, A. Abbà, M. Germano and M. Restelli	
On the Coupling of Direct Numerical Simulation and Resolvent Analysis	87
F. Gómez, H.M. Blackburn, M. Rudman, A.S. Sharma and B.J. McKeon	
Modeling Helicity Dissipation-Rate Equation	93
Nobumitsu Yokoi	
Analysis of the Bivariate EMD Behavior for Separating Coherent Structures from Interference Fluctuations in Isotropic Homogeneous Turbulence	97
Mehdi Sadeghi, Fabrice Foucher, Karim Abed-Meraim and Christine Mounaïm-Rousselle	
Turbulent Shear Flows Described by the Algebraic Difference-Quotient Turbulence Model	105
Peter W. Egolf and Kolumban Hutter	
Lyapunov Stability Criteria for Reacting Ionic Fluid Flows.	111
Martina Costa Reis and Adalberto Bono Maurizio Sacchi Bassi	
DNS and LES of Viscoplastic-Type Non-Newtonian Fluid Flows	117
A. Carmona, O. Lehmkuhl, C.D. Pérez-Segarra and A. Oliva	

Part II Wall Bounded Flows

Flow Features in Three-Dimensional Turbulent Duct Flows with Different Aspect Ratios	123
Ricardo Vinuesa, Philipp Schlatter and Hassan M. Nagib	
DNS of the Turbulent Flow Evolving in a Plane Channel from the Entry to the Fully Developed State.	127
M. Capuano, A. Cadiou, M. Buffat and L. Le Penven	
Downstream Evolution of Perturbations in a Zero Pressure Gradient Turbulent Boundary Layer	133
E. Rodriguez-Lopez, P.J.K. Bruce and O.R.H. Buxton	
Scale Dependent Stochastic Self-energy Model of the Energy Transfers in Turbulent Channel Flows.	139
V. Kitsios, J.A. Sillero, J.S. Frederiksen and J. Soria	
Effect of Irregular Surface in a Turbulent Channel	145
David Sassun and Paolo Orlandi	
On the Effects of Surface Morphology on the Structure of Wall-Turbulence	149
Marco Placidi and Bharathram Ganapathisubramani	
Contradictions in the Large-Wavelength Approximation of Turbulent Flow Past a Wavy Bottom.	155
Paolo Luchini	
Wall Oscillation Induced Drag Reduction of Turbulent Boundary Layers	161
Martin Skote, Maneesh Mishra, Prabal Singh Negi, Yanhua Wu, Hsiao Mun Lee and Philipp Schlatter	
Wall-Turbulence Structure with Pressure Gradient Around 2D Hump.	167
Aiko Yakeno, Soshi Kawai, Taku Nonomura and Kozo Fujii	
Turbulent Asymptotic Suction Boundary Layers: Effect of Domain Size and Development Time	173
Alexandra Bobke, Ramis Örlü and Philipp Schlatter	
Heat Transfer in a Shallow Cavity.	179
Fatima Madi Arous	
Temperature Effects in Hot-Wire Measurements on Higher-Order Moments in Wall Turbulence	185
Alessandro Talamelli, Fabio Malizia, Ramis Örlü, Andrea Cimarelli and Philipp Schlatter	

Quantification of Global Intermittency in Stably Stratified Ekman Flow	191
Cedrick Ansonge and Juan Pedro Mellado	
A Comparison Between DBD and Corona Actuators with Non-Straight Electrodes	197
Federico Messanelli and Marco Belan	
Part III Pipe Flows	
The Final Design of the Long Pipe in CICLOPE	205
G. Bellani and A. Talamelli	
A New High-Order Method for Simulating Turbulent Pipe Flow	211
Peter Lenaers, Philipp Schlatter, Geert Brethouwer and Arne V. Johansson	
Structure Investigation in Pipe Flow at High Reynolds Numbers.	217
Emir Öngüner, El-Sayed Zanoun, Franziska König and Christoph Egbers	
Heat Transfer in Turbulent Boundary Layers of Pipe Flow: A Wavelet Transforms Approach	221
Makrand A. Khanwale, C.S. Sona and Channamillkarjun S. Mathpati	
Part IV Free Flows	
Influence of an Extended Non-equilibrium Region on the Far-Field of Grid Turbulence	229
R.J. Hearst and P. Lavoie	
Anisotropy of Multiscale Grid Turbulence	239
Paolo D’Addio and Paolo Orlandi	
Flow Field Topology of Impinging Jets with Fractal Inserts	243
Giacchino Cafiero, Stefano Discetti and Tommaso Astarita	
Experimental Study on Hot-Wire Spatial Resolution in Turbulent Round Jet.	249
Tommaso Fiorini, Gabriele Bellani, Andrea Cimarelli and Alessandro Talamelli	
Three-Dimensional Instabilities in the Wake of a Wall-Mounted Low-Aspect-Ratio Pyramid	253
Zahra Hosseini and Robert J. Martinuzzi	

The Fine Structure of a Slender Scalar Plume in Sheared Turbulence	259
Christina Vanderwel and Stavros Tavoularis	
Wake Dynamics Behind a Normal Thin Flat Plate at Moderate Reynolds Numbers	265
Arman Hemmati, David H. Wood and Robert J. Martinuzzi	
Part V Complex Flows	
Storm in a Soap Bubble	273
P. Fischer, C.-H. Bruneau and Y.-L. Xiong	
Turbulent Boundary Layer Upstream, Over and Downstream a Cylindrical 2D Bump	279
Julie A. Vernet, Ramis Örlü and P. Henrik Alfredsson	
Effects of a Wall on the Dynamics of Turbulence Teardrops and Fingerprints	285
Patrick Bechlars and Richard D. Sandberg	
Numerical Study of the Intermittency Region in Two-Fluid Turbulent Flow	289
S.V. Kraheberger, T. Waławczyk and M. Waławczyk	
Multi-scale Analysis of Turbulent Rayleigh-Bénard Convection	295
Riccardo Togni, Andrea Cimorelli and Elisabetta De Angelis	
Numerical Analysis of Frazil Ice Formation in Turbulent Convection	299
A. Abbà, P. Olla and L. Valdettaro	
Large Eddy Simulation of Turbulent Flows: Benchmarking on a Rectangular Prism	305
L. Patruno, M. Ricci, A. Cimorelli, S. de Miranda, A. Talamelli and F. Ubertini	
Turbulent Flow of a Suspension of Rigid Spherical Particles in Plane Channels	311
Luca Brandt, Francesco Picano and Wim-Paul Breugem	

Progress in Turbulence VI

Proceedings of the iTi Conference on Turbulence 2014

Peinke, J.; Kampers, G.; Oberlack, M.; Waćławczyk, M.;

Talamelli, A. (Eds.)

2016, XIII, 315 p. 140 illus., 53 illus. in color., Hardcover

ISBN: 978-3-319-29129-1