

## CONTENTS

<b>Preface</b>	1
Thirty years of Dynamic Modeling. U. PIOMELLI AND P. MOIN	3
Engineering aspects of hypersonic turbulent flows at suborbital enthalpies. J. URZAY AND M. DI RENZO	7
Performance of wall-modeled LES for external aerodynamics in the NASA juncture flow. A. LOZANO-DURÁN, S. T. BOSE AND P. MOIN	33
Subgrid-scale modeling sensitivities in wall-modeled large-eddy simulations of a high-lift aircraft configuration. K. GOC, S. T. BOSE AND P. MOIN	49
Toward a flow-structure-based wall-modeled large-eddy simulation paradigm. A. ELNAHNAS, A. LOZANO-DURÁN AND P. MOIN	59
Incorporating non-equilibrium effects in an ODE-based wall model. K. P. GRIFFIN, L. FU AND P. MOIN	73
Wall-stress modeling for laminar boundary layers in coarse grids. C. A. GONZALEZ, M. KARP AND P. MOIN	85
Requirements and sensitivity analysis of RANS-free wall-modeled LES. M. WHITMORE, A. LOZANO-DURÁN AND P. MOIN	97
Wall-modeled LES of three-dimensional intersecting shock wave/turbulent boundary-layer interactions. L. FU, S. T. BOSE AND P. MOIN	109
Aerodynamic and acoustic characteristics of twin supersonic rectangular jets using large-eddy simulations. J. JEUN, G. J. WU, S. K. LELE, A. KARNAM, F. BAIER AND E. GUTMARK	121
Coherence and feedback in supersonic rectangular jet screech. G. J. WU, S. K. LELE AND J. JEUN	133
Global eigenfunctions of supersonic jets: vortical, acoustic, and thermal components. M. KARP AND M. J. P. HACK	145

Toward modeling rocket nozzles through artificial boundary conditions. K. MAEDA	157
Lagrangian dynamics of the tensor diffusivity model for turbulent subfilter stresses. P. L. JOHNSON	167
On the assessment of symmetries in large-eddy simulation subgrid-scale models. J. GUO AND O. SHENDE	175
Estimating performance bounds of machine-learning Reynolds-stress models via optimal tensor basis expansions. A. J. BANKO AND J. K. EATON	185
Self-critical machine-learning wall-modeled LES for external aerodynamics. A. LOZANO-DURÁN AND H. J. BAE	197
Forecasting extreme dissipation events in wall turbulence using machine learning. S. R. HARRIS AND M. J. P. HACK	211
A nonuniform perturbation to quantify RANS model uncertainties. Z. HUANG, A. MISHRA AND G. IACCARINO	223
Global direct and adjoint modes of a hypersonic flow over a cone. T. J. FLINT AND M. J. P. HACK	233
Well-posed marching of disturbances using the spatial perturbation equations. S. R. HARRIS, P. MOIN AND M. J. P. HACK	241
An NP-hard problem solver for the Pareto-efficient combustion framework. Q. DOUASBIN AND M. IHME	253
Effect of operating conditions on core noise for a realistic gas-turbine combustor. C. X. SHAO AND M. IHME	265
A characteristic length scale for density gradients in supercritical monocomponent flows near pseudoboiling. L. JOFRE AND J. URZAY	275
Cascade-based Eulerian-to-Lagrangian subgrid-scale modeling of bubble breakup in breaking waves. W. H. R. CHAN, A. LOZANO-DURÁN AND P. MOIN	281

A kinetic energy-and entropy-preserving scheme for the simulation of compressible two-phase turbulent flows. S. S. JAIN AND P. MOIN	299
Linear stability of a thin fluid film interacting with its surrounding bulk fluid. S. MIRJALILI AND W. H. R. CHAN	313
Modeling heat and mass transfer across interfaces in two-phase flows using phase-field methods. S. MIRJALILI, S. S. JAIN AND A. MANI	327
Diffuse-interface capturing methods for compressible multiphase fluid flows and elastic-plastic deformation in solids: Part I. Methods. M. C. ADLER, S. S. JAIN, J. R. WEST, A. MANI AND S. K. LELE	341
Diffuse-interface capturing methods for compressible multiphase fluid flows and elastic-plastic deformation in solids: Part II. Results and discussion. S. S. JAIN, M. C. ADLER, J. R. WEST, A. MANI AND S. K. LELE	357
Two-dimensional scale-dependent Rayleigh-Taylor dynamics with variable acceleration in a finite-size domain. H. HWANG AND S. I. ABARZHI	371
Three-dimensional scale-dependent Rayleigh-Taylor dynamics with variable acceleration in a finite-size domain: Part I. Solutions of bubbles in linear and nonlinear regimes. H. HWANG AND S. I. ABARZHI	383
Three-dimensional scale-dependent Rayleigh-Taylor dynamics with variable acceleration in a finite-size domain: Part II. Solutions of spikes in linear and nonlinear regimes. H. HWANG AND S. I. ABARZHI	397
Linear two-dimensional Rayleigh-Taylor dynamics with variable acceleration: Comparisons between theory and simulations. H. HWANG, W. H. R. CHAN, S. S. JAIN AND S. I. ABARZHI	409
<b>Roster</b>	<b>421</b>