

## Chronological Index

**J86-238** Computation of the Potential Flow over Airfoils with Cusped or Thin Trailing Edges. P. L. Ardonceau, *Ecole Nationale Supérieure de Mécanique et d'Aérotechnique, France* (24, 8, p. 1375) Technical Note

Technical Comment by H. N. V. Dutt, *National Aeronautical Laboratory, Bangalore, India* (26, 1, p. 122)

**J87-192** Tangential Velocity and Static Pressure Distributions in Vortex Chambers. Georgios H. Vatistas, *Concordia University, Canada* (25, 8, p. 1139) Technical Note

Errata (26, 2, p. 252)

**J87-275** Finite Difference Analysis of Rotationally Symmetric Shells Under Discontinuous Distributed Loadings. Troy Alvin Smith, *U. S. Army Missile Command, Redstone Arsenal* (25, 12, p. 1611) Article

Errata (26, 5, p. 633)

**J88-001** Computational and Experimental Investigation of Cavity Flowfields. O. Baysal, *Old Dominion University*; and R. L. Stallings Jr., *NASA Langley Research Center* (26, 1, p. 6) Synoptic based on AIAA Paper 87-0114

**J88-002** Unsteady Flow Phenomena in the Near Wake of a Circular Cylinder. R. R. Chamberlain, *University of Alabama* (26, 1, p. 8) Synoptic based on AIAA Paper 87-0371

**J88-003** Turbulence Measurements in a Two-Dimensional Upwash. Barry L. Gilbert, *Grumman Corporate Research Center* (26, 1, p. 10) Article based on AIAA Paper 83-1678

**J88-004** Vortex/Separated Boundary-Layer Interactions at Transonic Mach Numbers. Rabindra D. Mehta, *Stanford University* (26, 1, p. 15) Article

**J88-005** Influence of Nozzle Asymmetry on Supersonic Jets. R. W. Wlezien and V. Kibens, *McDonnell Douglas Research Laboratories* (26, 1, p. 27) Article based on AIAA Paper 86-0277

**J88-006** Motions in Fluid Caused by Microgravitational Acceleration and Their Modification by Relative Rotation. J. Iwan D. Alexander, *NASA Marshall Space Flight Center*; and Charles A. Lundquist, *University of Alabama* (26, 1, p. 34) Article based on AIAA Paper 87-0312

**J88-007** Progress and Challenges in the Application of Artificial Intelligence to Computational Fluid Dynamics. Alison E. Andrews, *NASA Ames Research Center* (26, 1, p. 40) Article

**J88-008** Subsonic Single-Phase Flow in a Gun Simulator. A. F. Bicen, L. Khezzar and J. H. Whitelaw, *Imperial College of Science and Technology, England, UK* (26, 1, p. 47) Article

**J88-009** Two-Component LDV Investigation of Three-Dimensional Shock/Turbulent Boundary-Layer Interactions. J. D. Brown, J. L. Brown and M. I. Kussoy, *NASA Ames Research Center*; M. Holt, *University of California, Berkeley*; and C. C. Horstman, *NASA Ames Research Center* (26, 1, p. 52) Article based on AIAA Paper 87-0553

**J88-010** Wall-Catalytic Fluorine Recombination in an HF Laser Nozzle. E. J. Jumper, *U. S. Air Force Institute of Technology, Wright-Patterson AFB*; R. G. Wilkins, *U. S. Air Force, Wright-Patterson AFB*; and B. L. Preppernau, *U. S. Air Force Wright Aeronautical Laboratories, Wright-Patterson AFB* (26, 1, p. 57) Article based on AIAA Paper 85-1598

**J88-011** Pulsed CO<sub>2</sub> Laser-Induced Effects on Water Droplets. M. Autric, P. Vigliano, D. Dufresne, J. P. Caressa and Ph. Bournot, *Institute of Fluid Mechanics, CNRS, France* (26, 1, p. 65) Article based on AIAA Paper 85-1630

**J88-012** Stiffness Tailoring for Improved Compressive Strength of Composite Plates with Holes. Raphael T. Haftka, *Virginia Polytechnic Institute and State University*; and James H. Starnes Jr., *NASA Langley Research Center* (26, 1, p. 72) Article based on AIAA Paper 85-0721 CP851

**J88-013** Optimum Design of Structures with Multiple Constraints. R. A. Canfield, *U. S. Air Force, Wright-Patterson AFB*; R. V. Grandhi, *Wright State University*; and V. B. Venkayya, *U. S. Air Force, Wright-Patterson AFB* (26, 1, p. 78) Article based on AIAA Paper 86-0388

**J88-014** Control-Augmented Structural Synthesis. R. V. Lust and L. A. Schmit, *University of California, Los Angeles* (26, 1, p. 86) Article based on AIAA Paper 86-1014 CP863

**J88-015** Structural Response of Thin Cylindrical Shells Subjected to Impulsive External Loads. Steven W. Kirkpatrick and Bayard S. Holmes, *SRI International* (26, 1, p. 96) Article

**J88-016** Optimum Approximation for Residual Stiffness in Linear System Identification. Daniel C. Kammer, *SDRC, Inc.* (26, 1, p. 104) Article based on AIAA Paper 87-0813 CP872

**J88-017** van Leer Flux Vector Splitting in Moving Coordinates. Ijaz H. Parpia, *University of Texas at Arlington* (26, 1, p. 113) Technical Note

**J88-018** Turbulent Near Wake of a Symmetrical Body. R. H. Page and C. Ostowari, *Texas A&M University* (26, 1, p. 115) Technical Note

**J88-019** Shock Wave Formation in a Suddenly Compressed Rubber Rod. G. Mazor, G. Ben-Dor, M. Mond and O. Igra, *Ben-Gurion University of the Negev, Israel* (26, 1, p. 116) Technical Note

**J88-020 Hybrid Finite-Element Analysis of Laplace's Equation with Singularities.** Kuen Ting and Wen-Hwa Chen, *National Tsing Hua University, Taiwan, ROC* (26, 1, p. 119) Technical Note

**J88-021 Numerical Study of the Skin Friction on a Spheroid at Incidence.** M. Rosenfeld, M. Israeli and M. Wolfshtein, *Technion--Israel Institute of Technology* (26, 2, p. 129) Article

**J88-022 Visualization and Wake Surveys of Vortical Flow over a Delta Wing.** F. M. Payne, T. T. Ng and R. C. Nelson, *University of Notre Dame*; and L. B. Schiff, *NASA Ames Research Center* (26, 2, p. 137) Article based on AIAA Paper 86-0330

**J88-023 Survey of Heat Transfer in Compressible Separated and Reattached Flows.** W. Merzkirch, *Universität Essen, FRG*; R. H. Page and L. S. Fletcher, *Texas A&M University* (26, 2, p. 144) Article

**J88-024 Finite-Difference Approach to Scattering of Sound Waves in Fluids.** R. T. Ling, *Northrop Aircraft Division* (26, 2, p. 151) Article

**J88-025 Calculation of Transonic Rotor Noise Using a Frequency Domain Formulation.** J. Prieur, *Office National d'Etudes et de Recherches Aéronautiques, France* (26, 2, p. 156) Article based on AIAA Paper 86-1901

**J88-026 New Approximate LU Factorization Scheme for the Reynolds-Averaged Navier-Stokes Equations.** Dartzi Pan, *Stanford University*; and Harvard Lomax, *NASA Ames Research Center* (26, 2, p. 163) Article

**J88-027 Instability of Elliptic Jets.** Philip J. Morris, *Pennsylvania State University* (26, 2, p. 172) Article based on AIAA Paper 86-1868

**J88-028 Unsteady Nature of Shock-Wave/Turbulent Boundary-Layer Interaction.** Kin-Choong Muck, Jannis Andreopoulos and Jean-Paul Dussauge, *Princeton University* (26, 2, p. 179) Article

**J88-029 Analysis of a Microwave-Heated Planar Propagating Hydrogen Plasma.** J. P. Knecht and M. M. Micci, *Pennsylvania State University* (26, 2, p. 188) Article

**J88-030 Ram Accelerator: A New Chemical Method for Accelerating Projectiles to Ultrahigh Velocities.** A. Hertzberg, A. P. Bruckner and D. W. Bogdanoff, *University of Washington* (26, 2, p. 195) Article

**J88-031 Analytical Solutions for the  $n$ th Derivatives of Eigenvalues and Eigenvectors for a Nonlinear Eigenvalue Problem.** M. S. Jankovic, *Esso Resources Canada Limited* (26, 2, p. 204) Synoptic

**J88-032 Shape Design Sensitivity Analysis of Dynamic Structures.** R. A. Meric, *Research Institute for Basic Sciences, Turkey* (26, 2, p. 206) Article

**J88-033 Cumulative Damage and Fatigue Life Prediction.** Tiiu V. Kutt, *AT&T Bell Laboratories*; and M. P. Bieniek, *Columbia University* (26, 2, p. 213) Article based on AIAA Paper 85-0614 CP851

**J88-034 Dynamics of Viscoelastic Structures.** K. J. Buhariwala and J. S. Hansen, *University of Toronto, Canada* (26, 2, p. 220) Article

**J88-035 Experimental Study of Transient Waves in a Plane Grid Structure.** William L. Hallauer Jr. and Dinesh J. Trivedi, *Virginia Polytechnic Institute and State University* (26, 2, p. 228) Article based on AIAA Paper 87-0943

**J88-036 Accurate, Simplified Method for Analyzing Thin Plates Undergoing Large Deflections.** Charles W. Bert and Jeffery L. Martindale, *University of Oklahoma* (26, 2, p. 235) Article based on AIAA Paper 87-0808 CP872

**J88-037 Analysis of Model Equations of Gas Dynamics.** G. Adomian, *Centre for Applied Mathematics, University of Georgia* (26, 2, p. 242) Technical Note

**J88-038 Numerical Evaluation of Whitham's F-Function for Supersonic Projectiles.** David V. Ritzel, *Defence Research Establishment Suffield, Canada*; and James J. Gottlieb, *Institute for Aerospace Studies, Canada* (26, 2, p. 224) Technical Note

**J88-039 Poisson-Kirchhoff Paradox in Flexure of Plates.** K. Vijayakumar, *Indian Institute of Science* (26, 2, p. 247) Technical Note

**J88-040 Boundary Layer Measurements on an Airfoil at a Low Reynolds Number in an Oscillating Freestream.** M. Brendel and T. J. Mueller, *University of Notre Dame* (26, 3, p. 257) Article based on AIAA Paper 87-1332

**J88-041 Vortex Filament Model of the Wake Behind a Missile at High Angle of Attack.** Andrew H. Van Tuyl, *U. S. Naval Surface Weapons Center* (26, 3, p. 264) Article

**J88-042 Composite Grid Generation Code for General 3-D Regions--the EAGLE Code.** Joe F. Thompson, *Mississippi State University* (26, 3, p. 271) Synoptic based on AIAA Paper 87-0275

**J88-043 Turbulence Energy and Diffusion Transport of Third-Moments in a Separating and Reattaching Flow.** R. S. Amano and P. Goel, *University of Wisconsin*; and J. C. Chai, *University of Wisconsin* (26, 3, p. 273) Article

**J88-045 Drag Reduction by Strakes of Noncircular Cylinders.** B. N. Pamadi, C. Pereira and B. H. Laxmana Gowda, *Indian Institute of Technology* (26, 3, p. 292) Article based on AIAA Paper 87-0360

**J88-046 Turbulent Kinetic Energy Budget in the Near-Wall Region.** L. V. Krishnamoorthy and R. A. Antonia, *University of Newcastle, Australia* (26, 3, p. 300) Article

**J88-047 Kinetic Theory Approach to Twin Plane Jets Turbulent Mixing Analysis.** Zuu-Chang Hong, *National Central University, Taiwan, ROC*; and Shu-Hao Chuang, *National Chung-Hsing University, Taiwan, ROC* (26, 3, p. 303) Article

**J88-048 Fast Temperature Determination by Nitrogen Coherent Anti-Stokes Raman Spectroscopy.** S. Fujii and M. Gomi, *National Aerospace Laboratory, Japan* (26, 3, p. 311) Article

**J88-049 Hot-Wire Accuracy in Supersonic Turbulence from Comparisons with Laser-Induced Fluorescence.** Pamela Logan, *Stanford University*; Robert L. McKenzie, *NASA Ames Research Center*; and Daniel Bershader, *Stanford University* (26, 3, p. 316) Article

**J88-050 Temperature and Velocity Profiles in Sooting Free Convection Diffusion Flames.** James A. Ang, Patrick J. Pagni and Thomas G. Mataga, *University of California, Berkeley*; Janice M. Margle and Valerie J. Lyons, *NASA Lewis Research Center* (26, 3, p. 323) Article based on AIAA Paper 86-0575

**J88-051 Buckling Behavior of Compression-Loaded Symmetrically Laminated Angle-Ply Plates with Holes.** Michael P. Nemeth, *NASA Langley Research Center* (26, 3, p. 330) Article based on AIAA Paper 86-0922 CP863

**J88-052 Buckling and Postbuckling of Delaminated Composites Under Compressive Loads Including Transverse Shear Effects.** G. A. Kardomateas and D. W. Schmueser, *General Motors Research Laboratories* (26, 3, p. 337) Article based on AIAA Paper 87-0877 CP872

**J88-053 Postbuckling Behavior of Selected Curved Stiffened Graphite-Epoxy Panels Loaded in Axial Compression.** Norman F. Knight Jr. and James H. Starnes Jr., *NASA Langley Research Center* (26, 3, p. 344) Article based on AIAA Paper 85-0768 CP851

**J88-054 Improved Multilevel Optimization Approach for the Design of Complex Engineering Systems.** Jean-Francois M. Barthelemy, *Virginia Polytechnic Institute and State University*; and Michael F. Riley, *PRC Kentron* (26, 3, p. 353) Article based on AIAA Paper 86-0950 CP863

**J88-055 Efficient Computation of Modal Sensitivities for Systems with Repeated Frequencies.** I. U. Ojalvo, *University of Bridgeport* (26, 3, p. 361) Article

**J88-056 Drag Reduction Potentials of Turbulence Manipulation in Adverse Pressure Gradient Flows.** B. van den Berg, *National Aerospace Laboratory, The Netherlands* (26, 3, p. 367) Technical Note

**J88-057 Applications of Various Coordinate Transformations for Rotating Disk Flow Stability.** Iskender Sahin, *Western Michigan University* (26, 3, p. 368) Technical Note based on AIAA Paper 86-0500

**J88-058 Supersonic Base Pressure and Lipshock.** Eric C. Magi and Sudhir L. Gai, *University College, University of New South Wales, Australia* (26, 3, p. 370) Technical Note

**J88-059 Source Term Decomposition to Improve Convergence of Swirling Flow Calculations.** D. S. Jang and S. Acharya, *Louisiana State University* (26, 3, p. 372) Technical Note

**J88-060 Passive Venting System for Modifying Cavity Flow-fields at Supersonic Speeds.** Floyd J. Wilcox Jr., *NASA Langley Research Center* (26, 3, p. 374) Technical Note

**J88-061 Base Cavity at Angles of Incidence.** Mauri Tanner, *DFVLR--Institute for Theoretical Fluid Mechanics, FRG* (26, 3, p. 376) Technical Note

**J88-062 New Approach to the Analysis and Control of Large Space Structures.** G. Adomian, *General Analytics Corporation* (26, 3, p. 377) Technical Note

**J88-063 Aerodynamics of Complex Bodies of Revolution.** Veysel Atli, *Istanbul Technical University, Turkey* (26, 4, p. 387) Article

**J88-064 Rarefaction Effects for Hypersonic Re-Entry Flow.** Virendra K. Dogra, *Vigyan Research Associates, Inc.*; James N. Moss and Ann L. Simmonds, *NASA Langley Research Center* (26, 4, p. 392) Synoptic based on AIAA Paper 87-0405

**J88-065 Simple Multilayer Panel Method for Partially Separated Flows Around Two-Dimensional Masts and Sails.** Stuart Wilkinson, *University of South Florida* (26, 4, p. 394) Synoptic based on AIAA Paper 87-1270

**J88-066 Diffracting Open-Ended Pipe Treated as a Lifting Surface.** Rudolph Martinez, *Cambridge Acoustical Associates, Inc.* (26, 4, p. 396) Article based on AIAA Paper 86-1952

**J88-067 Prediction of Separated Flows with a New Backflow Turbulence Model.** Uriel C. Goldberg and Sukumar R. Chakravarthy, *Rockwell International Science Center* (26, 4, p. 405) Article

**J88-068 Fast Euler Solver for Transonic Airfoils Part I: Theory.** Andrea Dadone, *University of Bari, Italy*; and Gino Moretti, *GMAF, Inc.* (26, 4, p. 409) Article

**J88-069 Fast Euler Solver for Transonic Airfoils Part II: Applications.** Andrea Dadone, *University of Bari, Italy*; and Gino Moretti, *GMAF, Inc.* (26, 4, p. 417) Article

**J88-070 Transonic Potential Flow Calculations by Two Artificial Density Methods.** G. Volpe, *Grumman Corporate Research Center*; and A. Jameson, *Princeton University* (26, 4, p. 425) Article

**J88-071 Model-Based Failure Detection and Isolation Scheme.** Rahmatallah Shoureshi and Robert F. Hoskin, *Purdue University* (26, 4, p. 430) Article

**J88-072 Impulsive Pressure Generation by Bubble/Pressure-Wave Interaction.** A. Shima and Y. Tomita, *Tohoku University, Japan*; and T. Sugiu, *Asahi Glass Company, Ltd., Japan* (26, 4, p. 434) Article

**J88-073 Delamination Buckling and Growth in a Clamped Circular Plate.** W.-L. Yin, *Georgia Institute of Technology*; and Z. Fei, *Northern Jiaotong University, China* (26, 4, p. 438) Article based on AIAA Paper 85-0832 CP851

**J88-074 Error Analysis and Correction of Discrete Solutions from Finite-Element Codes.** Gaylen A. Thurston, John E. Reissner, Peter A. Stein and Norman F. Knight Jr., *NASA Langley Research Center* (26, 4, p. 446) Article based on AIAA Paper 84-0940 CP844

**J88-075 Structural Optimization Using Beam Elements.** Noriaki Yoshida, *Hokkaido Institute of Technology, Japan*; and Garret N. Vanderplaats, *University of California, Santa Barbara* (26, 4, p. 454) Article based on AIAA Paper 85-0775 CP851

**J88-076 Game Theory Approach for the Integrated Design of Structures and Controls.** S. S. Rao, *Purdue University*; V. B. Venkayya and N. S. Khot, *U. S. Air Force Wright Aeronautical Laboratories, Wright-Patterson AFB* (26, 4, p. 463) Article

**J88-077 Shockless Acceleration of Thin Plates Modeled by a Tracked Random Choice Method.** Bradley J. Plohr, *Los Alamos National Laboratory* (26, 4, p. 470) Article

**J88-078 Elastic-Plastic Dynamic Buckling of Thin-Shell Finite Elements with Asymmetric Imperfections.** T. Y. Yang and D. G. Liaw, *Purdue University* (26, 4, p. 479) Article

**J88-079 Bending of a Uniformly Loaded Annular Plate with Mixed Boundary Conditions.** Kraiwood Kiattikomo, *King Mongkut's Institute of Technology Thonburi, Thailand*; and Vichien Sriswasdi, *Institute of Technology and Vocational Education, Thailand* (26, 4, p. 487) Article

**J88-080 Slender Wing in Ground Effect.** A. Plotkin, *San Diego State University*; and S. S. Dodbele, *Vigyan Research Associates* (26, 4, p. 493) Technical Note

**J88-081 Measurements of Turbulent Flow Behind a Wing-Body Junction.** O. Özcan and M. S. Ölcmen, *Istanbul Technical University, Turkey* (26, 4, p. 494) Technical Note

**J88-082 Turbulent Viscous Drag Reduction with Thin-Element Riblets.** B. Lazos and S. P. Wilkinson, *NASA Langley Research Center* (26, 4, p. 496) Technical Note

**J88-083 Aerodynamic Interaction Tones of a Model Counter-Rotating Propeller.** R. T. Nagel and H. V. L. Patrick, *North Carolina State University* (26, 4, p. 498) Technical Note

**J88-084 On Cone Frustum Pressure Gradient Effects on Transition.** Kenneth F. Stetson, *U. S. Air Force Wright Aeronautical Laboratories, Wright-Patterson AFB* (26, 4, p. 500) Technical Note  
Errata (26, 6, p. 760)

**J88-085 Evidence of Reynolds Number Sensitivity in Supersonic Turbulent Shocklets.** J. A. Johnson III, Y. Zhang and L. E. Johnson, *City College* (26, 4, p. 502) Technical Note

**J88-086 Optimum Synthesis of Polymer Matrix Composites for Improved Internal Material Damping Characteristics.** P. Hajela and C.-J. Shih, *University of Florida* (26, 4, p. 504) Technical Note based on AIAA Paper 87-0865 CP872

**J88-087 Analysis of Crossover Between Local and Massive Separation on Airfoils.** Mark Barnett, *United Technologies Research Center* (26, 5, p. 513) Article

**J88-088 Analysis of the Acoustic Planform Method for Rotor Noise Prediction.** Valana L. Wells, *Arizona State University* (26, 5, p. 522) Synoptic

**J88-089 Computation of Steady and Unsteady Vortex-Dominated Flows with Shock Waves.** Osama A. Kandil and H. Andrew Chuang, *Old Dominion University* (26, 5, p. 524) Article

**J88-090 Sound Generation by Ducted Flames.** U. G. Hegde, D. Reuter and B. T. Zinn, *Georgia Institute of Technology* (26, 5, p. 532) Article

**J88-091 Solution of the Neumann Pressure Problem in General Orthogonal Coordinates Using the Multigrid Technique.** U. Ghia, R. Ramamurti and K. N. Ghia, *University of Cincinnati* (26, 5, p. 538) Article based on AIAA Paper 85-0557

**J88-092 Resonance Tubes in a Subsonic Flowfield.** Eric Brocher and Elisabeth Duport, *Institut de Mécanique des Fluides, France* (26, 5, p. 548) Article

**J88-093 Study of Multibody Aerodynamic Interference at Transonic Mach Numbers.** Charles J. Cottrell and Augusto Martinez, *U. S. Air Force Armament Laboratory, Eglin AFB*; and Gary T. Chapman, *NASA Ames Research Center* (26, 5, p. 553) Article based on AIAA Paper 87-0519

**J88-094 Internal Vaporization in Porous Materials Under Laser Irradiation.** D. E. Hastings and A. A. Rigos, *Physical Sciences, Inc.* (26, 5, p. 561) Article

**J88-095 Nonlinear Panel Flutter by Finite-Element Method.** B. S. Sarma, *Defence Research and Development Laboratory, India*; and T. K. Varadan, *Indian Institute of Technology* (26, 5, p. 566) Article

**J88-096 Vibration of a Bimodulus Thick Plate According to a Higher-Order Shear Deformation Theory.** Ji-Liang Doong and Chin-Ping Fung, *National Central University, Taiwan, ROC* (26, 5, p. 575) Article

**J88-097 Effects of Cutouts on the Dynamic Response of Curved Rectangular Composite Panels.** Garry J. Cyr, Ronald L. Hinrichsen and Richard A. Walley, *U.S. Air Force Institute of Technology, Wright-Patterson AFB* (26, 5, p. 582) Article

**J88-098 Boundary Integral Equations for Recovery of Design Sensitivities in Shape Optimization.** M. R. Barone and R. J. Yang, *General Motors Research Laboratories* (26, 5, p. 589) Article

**J88-099 Variational Method for Design Sensitivity Analysis in Nonlinear Structural Mechanics.** J. B. Cardoso and J. S. Arora, *University of Iowa* (26, 5, p. 595) Article

**J88-100 Optimal Structural Design with Control Gain Norm Constraint.** N. S. Khot, *Flight Dynamics Laboratory, Wright-Patterson AFB*; H. Öz, *Ohio State University*; R. V. Grandhi, *Wright State University*; F. E. Eastep, *University of Dayton*; and V. B. Venkayya, *Flight Dynamics Laboratory, Wright-Patterson AFB* (26, 5, p. 604) Article based on AIAA Paper 87-0019

**J88-101 Two New Approximate Methods for Analyzing Free Vibration of Structural Components.** Charles W. Bert, Sung K. Jang and Alfred G. Striz, *University of Oklahoma* (26, 5, p. 612) Article based on AIAA Paper 87-0950 CP873

**J88-102 Mean Value Measurements of a Turbulent Swirling-Jet.** M. Samet and S. Einav, *Tel-Aviv University, Israel* (26, 5, p. 619) Technical Note

**J88-103 Vortex Flow Method for the Blade-Vortex Interaction Problem.** Andrew T. Hsu and James C. Wu, *Georgia Institute of Technology* (26, 5, p. 621) Technical Note based on AIAA Paper 86-1094

**J88-104 Recirculation Structure of the Coannular Swirling Jets in a Combustor.** Y. C. Chao, *National Cheng Kung University, Taiwan, ROC* (26, 5, p. 623) Technical Note based on AIAA Paper 87-0305

**J88-105 Solutions of One-Dimensional Steady Nozzle Flow Revisited.** Meng-Sing Liou, *NASA Lewis Research Center* (26, 5, p. 625) Technical Note

**J88-106 Basis for the Analysis of Solid Continua Using the Integrated Force Method.** K. Vijayakumar, A. V. Krishna Murty and S. N. Patnaik, *Indian Institute of Science* (26, 5, p. 628) Technical Note

**J88-107 On a General Method of Vibration Analysis on Curvilinear Coordinates.** Sunil K. Sinha, *General Electric Company* (26, 5, p. 629) Technical Note

**J88-109 Near-Wall Turbulence Models for Complex Flows Including Separation.** H. C. Chen and V. C. Patel, *University of Iowa* (26, 6, p. 641) Article based on AIAA Paper 87-1300

**J88-110 Multigrid Acceleration of the Flux-Split Euler Equations.** W. Kyle Anderson and James L. Thomas, *NASA Langley Research Center*; and David L. Whitfield, *Mississippi State University* (26, 6, p. 649) Article

**J88-111 Efficient Euler Solver with Many Applications.** Gino Moretti, *G.M.A.F., Inc.* (26, 6, p. 655) Article

**J88-112 Analysis of Three-Dimensional Turbulent Wakes by a Momentum Integral Technique.** B. Lakshminarayana and J. Zhang, *Pennsylvania State University* (26, 6, p. 661) Article based on AIAA Paper 87-1437

**J88-113 Measurements in Turbulent Swirling Flow Through an Abrupt Axisymmetric Expansion.** P. A. Dellenback, D. E. Metzger and G. P. Neitzel, *Arizona State University* (26, 6, p. 669) Article

**J88-114 Numerical Study of Gas-Particle Flow in a Solid Rocket Nozzle.** C. J. Hwang, *National Cheng Kung University, Taiwan, ROC*; and G. C. Chang, *Chung Shan Institute of Science and Technology, Taiwan, ROC* (26, 6, p. 682) Article based on AIAA Paper 87-2168

**J88-115 Lagrangian Simulation of a Reacting Mixing Layer at Low Heat Release.** Ahmed F. Ghoniem, *Massachusetts Institute of Technology*; and Peyman Givi, *Flow Research Company* (26, 6, p. 690) Article based on AIAA Paper 87-0225

**J88-116 Nonequilibrium Effects in Oblique Shock-Wave Reflection.** Harland M. Glaz, *University of Maryland*; Phillip Colella, *Lawrence Livermore National Laboratory*; James P. Collins and Ralph E. Ferguson, *U. S. Naval Surface Warfare Center* (26, 6, p. 698) Article based on AIAA Paper 87-1293

**J88-117 Response of Hot-Element Wall Shear-Stress Gages in Laminar Oscillating Flows.** William J. Cook and Timothy A. Giddings, *Iowa State University*; and John D. Murphy, *NASA Langley Research Center* (26, 6, p. 706) Article based on AIAA Paper 86-1100

**J88-118 Analysis of Asymmetric Composite Laminates.** C. T. Sun and H. Chin, *Purdue University* (26, 6, p. 714) Article based on AIAA Paper 87-0771 CP872

**J88-119 Higher-Order Theory of Homogeneous Plate Flexure.** A. V. Krishna Murthy, *Indian Institute of Science*; and S. Vellaichamy, *Aeronautical Development Agency, India* (26, 6, p. 719) Article

**J88-120 Spectral Basis Theory for the Identification of Structural Dynamic Systems.** James A. Fabunmi, *AEDAR Corporation* (26, 6, p. 726) Article

**J88-121 Sine Dwell or Broadband Methods for Modal Testing.** Jay-Chung Chen and Ben K. Wada, *Jet Propulsion Laboratory, California Institute of Technology* (26, 6, p. 733) Article

**J88-122 Simultaneous Analysis and Design for Eigenvalue Maximization.** Yung S. Shin, Raphael T. Haftka and Raymond H. Plaut, *Virginia Polytechnic Institute and State University* (26, 6, p. 738) Article

**J88-123 Extension of Inverse Design Techniques for Multi-component Airfoils.** M. Siladic and G. F. Carey, *University of Texas at Austin* (26, 6, p. 745) Technical Note

**J88-124 Complete Smooth Wall Velocity Profile in a Turbulent Boundary Layer.** P. A. Aswatha Narayana, *Indian Institute of Technology*; and G. V. Ramana, *Stanford University* (26, 6, p. 748) Technical Note

**J88-125 Prediction of Radially Spreading Turbulent Jets.** M. R. Malin, *CHAM Limited, England, UK* (26, 6, p. 750) Technical Note

**J88-126 Quadrature Formula for a Double-Pole Singular Integral.** Rajendra K. Bera, *National Aeronautical Laboratory* (26, 6, p. 752) Technical Note

**J88-127 Grid Embedding Technique Using Cartesian Grids for Euler Solutions.** R. A. Mitcheltree, *North Carolina State University*; M. D. Salas, *NASA Langley Research Center*; and H. A. Hassan, *North Carolina State University* (26, 6, p. 754) Technical Note

**J88-128 Buckling Analysis of Sandwich Columns of Linearly Varying Thickness.** N. Paydar, *Purdue University* (26, 6, p. 756) Technical Note

**J88-129 Acoustics of Transonic Blade-Vortex Interactions.** A. R. George and A. S. Lyrintzis, *Cornell University* (26, 7, p. 769) Article based on AIAA Paper 86-1854

**J88-130 Noise Field of a Propeller with Angular Inflow.** R. Stuff, *University of Petroleum and Minerals, Saudi Arabia* (26, 7, p. 777) Article

**J88-131 Active Control of Reheat Buzz.** G. J. Bloxside, A. P. Dowling, N. Hooper and P. J. Langhorne, *Cambridge University, England, UK* (26, 7, p. 783) Article based on AIAA Paper 87-0433

**J88-132 Duct Resonance and Its Effect on the Performance of High-Pressure Ratio Axisymmetric Ejectors.** Adnan M. Abdel-Fattah and Shane C. Favaloro, *Defense Science and Technology Organization, Australia* (26, 7, p. 791) Article based on AIAA Paper 87-7055

**J88-133 Numerical Simulation of Supersonic Flow Over a Three-Dimensional Cavity.** Donald P. Rizzetta, *U. S. Air Force Wright Aeronautical Laboratories, Wright-Patterson AFB* (26, 7, p. 799) Article based on AIAA Paper 87-1288

**J88-134 New PNS Code for Chemical Nonequilibrium Flows.** D. K. Prabhu and J. C. Tannehill, *Iowa State University*; and J. G. Marvin, *NASA Ames Research Center* (26, 7, p. 808) Article based on AIAA Paper 87-0284

**J88-135 Experimental Study of the Development of Longitudinal Pairs Embedded in a Turbulent Boundary Layer.** Wayne R. Pauley and John K. Eaton, *Stanford University* (26, 7, p. 816) Article based on AIAA Paper 87-1309

**J88-136 Multigrid Solution of the Two-Dimensional Euler Equations on Unstructured Triangular Meshes.** D. J. Mavriplis, *NASA Langley Research Center* (26, 7, p. 824) Article

**J88-137 Analysis of Complex Hypersonic Flows with Strong Viscous/Inviscid Interaction.** G. D. Power and T. J. Barber, *United Technologies Research Center* (26, 7, p. 832) Article based on AIAA Paper 87-1189

**J88-138 Diagonal Implicit Multigrid Algorithm for the Euler Equations.** David A. Caughey, *Cornell University* (26, 7, p. 841) Article based on AIAA Paper 87-0354

**J88-139 Calculation of Stresses in Stiffened Composite Panels.** M. W. Hyer and David Cohen, *Virginia Polytechnic Institute and State University* (26, 7, p. 852) Article based on AIAA Paper 87-0731 CP872

**J88-140 Structural Optimization with Frequency Constraints.** R. V. Grandhi, *Wright State University*; and V. B. Venkayya, *Flight Dynamics Laboratory, Wright-Patterson AFB* (26, 7, p. 858) Article based on AIAA Paper 87-0787 CP872

**J88-141 Calculation of Eigenvector Derivatives for Structures with Repeated Eigenvalues.** William C. Mills-Curran, *Sandia National Laboratories* (26, 7, p. 867) Article

**J88-142 Calculation of Eigenvalue and Eigenvector Derivatives for Nonlinear Beam Vibrations.** J. W. Hou and J. Z. Yuan, *Old Dominion University* (26, 7, p. 872) Article based on AIAA Paper 86-0963 CP863

**J88-143 Propulsive Vortical Signature of Plunging and Pitching Airfoils.** Peter Freymuth, *University of Colorado* (26, 7, p. 881) Technical Note based on AIAA Paper 88-0323

**J88-144 On Nonlinear Aspects of Hypersonic Boundary-Layer Stability.** Kenneth F. Stetson, *U. S. Air Force Wright Aeronautical Laboratories, Wright-Patterson AFB* (26, 7, p. 883) Technical Note

**J88-145 Influence of a Favorable Pressure Gradient on the Growth of a Turbulent Spot.** R. Sankaran and R. A. Antonia, *University of Newcastle, Australia* (26, 7, p. 885) Technical Note

**J88-146 Radial Flow Between Two Closely Placed Flat Disks.** G. H. Vastistas, *Concordia University, Canada* (26, 7, p. 887) Technical Note

**J88-147 Transverse Mode Properties of Beam-Rotated Unstable Resonators for Free Electron Lasers.** R. William Jones, *U. S. Army Strategic Defense Command*; and James F. Perkins, *Perkins Associates* (26, 8, p. 897) Article based on AIAA Paper 87-1277

**J88-148 Thermal Measurements for Jets in Disturbed and Undisturbed Crosswind Conditions.** Candace E. Wark and John F. Foss, *Michigan State University* (26, 8, p. 901) Synoptic

**J88-149 Representation of Experimental Data by Fourier Functions for Differentiation.** Ö. Turan and R. S. Azad, *University of Manitoba, Canada* (26, 8, p. 903) Synoptic

**J88-150 Application of the Complex Cepstrum to Locate Acoustic Sources Near Reflective Surfaces.** C. R. Fuller, S. Tavakkoli, C. J. Hurst and W. F. O'Brien, *Virginia Polytechnic Institute and State University*; and K. B. Elliott, *NASA Langley Research Center* (26, 8, p. 905) Article based on AIAA Paper 87-0014

**J88-151 Absolute Instability in Hot Jets.** Peter A. Monkewitz, *University of California, Los Angeles*; and Kiho D. Sohn, *Hughes Aircraft Company* (26, 8, p. 911) Article based on AIAA Paper 86-1882

**J88-152 Turbularization of an Acoustic Boundary Layer on a Transpiring Surface.** Robert A. Beddini and Ted A. Roberts, *University of Illinois at Urbana-Champaign* (26, 8, p. 917) Article

**J88-153 Aeroacoustics of Supersonic Jet Flows from a Contoured Plug-Nozzle.** Darshan S. Dosanjh, *Syracuse University*; and Indu S. Das, *Pennsylvania State University* (26, 8, p. 924) Article based on AIAA Paper 86-1946

**J88-154 Flow Structure in the Near-Wall Zone of a Turbulent Separated Flow.** E. W. Adams and J. P. Johnston, *Stanford University* (26, 8, p. 932) Article based on AIAA Paper 88-0610

**J88-155 Investigation of the Interacting Flow of Nonsymmetric Jets in Crossflow.** J. M. Wu, A. D. Vakili and F. M. Yu, *University of Tennessee Space Institute* (26, 8, p. 940) Article

**J88-156 Development of Airfoil Wake in a Longitudinally Curved Stream.** V. Ramjee, E. G. Tulapurkara and R. Rajasekar, *Indian Institute of Technology* (26, 8, p. 948) Article

**J88-157 Dynamic Pressure Loads Associated with Twin Supersonic Plume Resonance.** John M. Seiner, James C. Manning and Michael K. Ponton, *NASA Langley Research Center* (26, 8, p. 954) Article based on AIAA Paper 86-1539

**J88-158 Ion-Wind Effects on Poiseuille and Blasius Flow.** J. R. Van Rosendale, *University of Utah*; M. R. Malik, *High Technology Corporation*; and M. Y. Hussaini, *NASA Langley Research Center* (26, 8, p. 961) Article

**J88-159 Pressure-Strain and Pressure-Scalar Gradient Correlations in Variable-Density Turbulent Flows.** Warren C. Strahle, *Georgia Institute of Technology* (26, 8, p. 969) Article based on AIAA Paper 87-1351

**J88-160 Computation of Unsteady Transonic Flows by the Solution of Euler Equations.** V. Venkatakrishnan and A. Jameson, *Princeton University* (26, 8, p. 974) Article based on AIAA Paper 85-1514 CP854

**J88-161 Buckling of Unbalanced Anisotropic Sandwich Plates with Finite Bonding Stiffness.** C. G. Kim and C. S. Hong, *Korea Advanced Institute of Science and Technology* (26, 8, p. 982) Article

**J88-162 Scaling of Impact-Loaded Carbon-Fiber Composites.** John Morton, *Virginia Polytechnic Institute and State University* (26, 8, p. 989) Article based on AIAA Paper 87-0867 CP872

**J88-163 Adaptive Structure Concept for Future Space Applications.** Koryo Miura, *Institute of Space and Astronautical Science, Japan*; and Hiroshi Furuya, *Nagoya University, Japan* (26, 8, p. 995) Article

**J88-164 Efficient Direct Measurement Mode Survey Test Procedure.** Alvar M. Kabe, *The Aerospace Corporation* (26, 8, p. 1003) Article based on AIAA Paper 87-0962 CP873

**J88-165 Stagnation Streamline Turbulence.** Dale B. Taulbee and Le Tran, *University of New York at Buffalo* (26, 8, p. 1011) Technical Note

**J88-166 Simple Expressions for Higher Vibration Modes of Uniform Euler Beams.** John Dugundji, *Massachusetts Institute of Technology* (26, 8, p. 1013) Technical Note

**J88-167 Active Vibration Isolation by Polymeric Piezoelectret with Variable Feedback Gains.** Horn S. Tzou and Malind Gadre, *University of Kentucky* (26, 8, p. 1014) Technical Note

**J88-168 Lower-Upper Symmetric-Gauss-Seidel Method for the Euler and Navier-Stokes Equations.** Seokkwan Yoon, *NASA Ames Research Center*; and Antony Jameson, *Princeton University* (26, 9, p. 1025) Synoptic based on AIAA Paper 87-0600

**J88-169 Frequency-Domain Method for the Computation of Propeller Acoustics.** J. B. H. M. Schulten, *National Aerospace Laboratory NLR, The Netherlands* (26, 9, p. 1027) Article based on AIAA Paper 87-2674

**J88-170 Hole Tone Generated from Almost Choked to Highly Choked Jets.** Y. Umeda, H. Maeda and R. Ishii, *Kyoto University, Japan* (26, 9, p. 1036) Article

**J88-171 Multigrid Acceleration of a Relaxation Procedure for the Reduced Navier-Stokes Equations.** A. Himansu and S. G. Rubin, *University of Cincinnati* (26, 9, p. 1044) Article based on AIAA Paper 87-1145 CP874

**J88-172 Interactive and Large-Domain Solutions of Higher-Order Viscous-Flow Equations.** F. Stern, S. Y. Yoo and V. C. Patel, *University of Iowa* (26, 9, p. 1052) Article

**J88-173 LU Implicit Multigrid Algorithm for the Three-Dimensional Euler Equations.** Jeffrey W. Yokota, *NASA Lewis Research Center*; and D. A. Caughey, *Cornell University* (26, 9, p. 1061) Article

**J88-174 Finite-Volume Method for the Calculation of Compressible Chemically Reacting Flows.** Thomas R. A. Bussing and Earl M. Murman, *Massachusetts Institute of Technology* (26, 9, p. 1070) Article based on AIAA Paper 85-0331

**J88-175 Full-Potential Integral Solution for Transonic Flows with and without Embedded Euler Domains.** Osama A. Kandil and Hong Hu, *Old Dominion University* (26, 9, p. 1079) Article

**J88-176 Plenum Chamber Effect on Wind-Tunnel Resonance by the Finite-Element Method.** In Lee, *Stanford University* (26, 9, p. 1087) Article based on AIAA Paper 86-0898 CP863

**J88-177 Analysis of Cracked Laminates with Holes Using the Boundary Force Method.** P. W. Tan and C. A. Bigelow, *NASA Langley Research Center* (26, 9, p. 1094) Article based on AIAA Paper 87-0862 CP872

**J88-178 Buckling and Final Failure of Graphite/PEEK Stiffener Sections.** Scott M. Causbie, *Boeing Commercial Airplane Company*; and Paul A. Lagace, *Massachusetts Institute of Technology* (26, 9, p. 1100) Article

**J88-179 Stresses and Rate of Twist in Single-Cell Thin-Walled Beams with Anisotropic Walls.** Charles Libove, *Syracuse University* (26, 9, p. 1107) Article

**J88-180 On-Orbit Damage Assessment for Large Space Structures.** Jay-Chung Chen and John A. Garba, *Jet Propulsion Laboratory, California Institute of Technology* (26, 9, p. 1119) Article based on AIAA Paper 87-8070 CP872

**J88-181 Solution Methods for One-Dimensional Viscoelastic Problems.** John M. Stubstad and George J. Simitses, *Georgia Institute of Technology* (26, 9, p. 1127) Article based on AIAA Paper 87-0804 CP872

**J88-182 Nonlinear Response and Stability Analysis of Beams Using Finite Elements in Time.** O. A. Bauchau and C. H. Hong, *Rensselaer Polytechnic Institute* (26, 9, p. 1135) Article

**J88-183 Numerical Simulation of Tip Vortices of Wings in Subsonic and Transonic Flows.** G. R. Srinivasan, *JAI Associates, Inc.*; W. J. McCroskey, J. D. Baeder and T. A. Edwards, *NASA Ames Research Center* (26, 10, p. 1153) Article based on AIAA Paper 86-1095

**J88-184 Ring Vortex/Cylinder Sound Production Revisited.** Jay C. Hardin, *NASA Langley Research Center*; and D. S. Pope, *PRC Kentron, Inc.* (26, 10, p. 1163) Article based on AIAA Paper 87-2671

**J88-185 Effect of Nose Bluntness and Cone Angle on Slender-Vehicle Transition.** L. E. Ericsson, *Lockheed Missiles and Space Company, Inc.* (26, 10, p. 1168) Article based on AIAA Paper 87-1415

**J88-186 Computation of Rotational Transonic Flows Using a Decomposition Method.** K. Giannakoglou, P. Chaviaropoulos and K. D. Papailiou, *Athens National Technical University, Greece* (26, 10, p. 1175) Article

**J88-187 Navier-Stokes Calculations Using Cartesian Grids: I. Laminar Flows.** Paul D. Frymier Jr. and H. A. Hassan, *North Carolina State University*; and M. D. Salas, *NASA Langley Research Center* (26, 10, p. 1181) Article

**J88-188 Vortical Wakes Over a Prolate Spheroid.** C. E. Costis and D. P. Telionis, *Virginia Polytechnic Institute and State University* (26, 10, p. 1189) Article based on AIAA Paper 83-0419

**J88-189 Interactions Between Turbulent Wakes and Boundary Layers.** D. Agoropoulos and L. C. Squire, *Cambridge University, England, UK* (26, 10, p. 1194) Article

**J88-190 Effect of Multifrequency Forcing on the Near-Field Development of a Jet.** T. T. Ng and T. A. Bradley, *University of Notre Dame* (26, 10, p. 1201) Article

**J88-191 Time-Iterative Solutions of Viscous Supersonic Nozzle Flows.** Chau-Lyan Chang, Yigal Kronzon and Charles L. Merkle, *Pennsylvania State University* (26, 10, p. 1208) Article based on AIAA Paper 87-1289

**J88-192 Velocity Surveys in a Gas-Flow Spark Gap Switch.** John M. Kuhlman, *West Virginia University*; Edward G. Ruf, *Northrop Electronics Division*; and G. Marshall Molen, *Tennessee Technical University* (26, 10, p. 1216) Article based on AIAA Paper 87-0163

**J88-193 Numerical Investigation of Crossflow Separation on a Three-Caliber Tangent Ogive Cylinder.** Leslie A. Yates and Gary T. Chapman, *NASA Ames Research Center* (26, 10, p. 1223) Article

**J88-194 Influence of Droplet Spacing on Drag Coefficient in Nonevaporating, Monodisperse Streams.** J. A. Mulholland, *U. S. Environmental Protection Agency*; R. K. Srivastava, *Acurex Corporation*; and J. O. L. Wendt, *University of Arizona* (26, 10, p. 1231) Article



**J88-195 Analysis of Artificial Dissipation Models for the Transonic Full-Potential Equation.** George S. Dulikravich, *Pennsylvania State University* (26, 10, p. 1238) Article based on AIAA Paper 88-0711

**J88-196 Model Profiles of Temperature and Density up to 80 km Based on Extremes at Selected Altitudes.** Paul Tattelman and Arthur J. Kantor, *U. S. Air Force Geophysics Laboratory, Hanscom AFB*; and James H. Willand, *ST Systems Corporation* (26, 10, p. 1246) Article

**J88-197 Computation of Inviscid/Viscous Flowfield in Pulsed Lasers.** B. Srivastava, F. Faria-e-Maia and J. Moran, *Avco Research Laboratory* (26, 10, p. 1254) Article based on AIAA Paper 87-1453

**J88-198 Thermal Runaway Due to Strain-Heating Feedback.** K. T. Wan, F. A. Cozzarelli and D. J. Inman, *State University of New York at Buffalo* (26, 10, p. 1263) Article

**J88-199 Influence of Mechanical Couplings on the Buckling and Postbuckling of Anisotropic Plates.** David W. Jensen and Paul A. Lagace, *Massachusetts Institute of Technology* (26, 10, p. 1269) Article

**J88-200 Transient Response of Joint-Dominated Space Structures: A New Linearization Technique.** G. A. Foelsche, J. H. Griffin and J. Bielak, *Carnegie Mellon University* (26, 10, p. 1278) Article

**J88-201 Planar Imaging of Jet Mixing in Crossflow.** A. Vranos and D. S. Liscinsky, *United Technologies Research Center* (26, 11, p. 1297) Synoptic

**J88-202 Reassessment of the Scale-Determining Equation for Advanced Turbulence Models.** David C. Wilcox, *DCW Industries, Inc.* (26, 11, p. 1299) Article based on AIAA Paper 84-0176

**J88-203 Multiscale Model for Turbulent Flows.** David C. Wilcox, *DCW Industries, Inc.* (26, 11, p. 1311) Article based on AIAA Paper 86-0029

**J88-204 High-Resolution Upwind Schemes for the Three-Dimensional Incompressible Navier-Stokes Equations.** Peter-M. Hartwich and Chung-Hao Hsu, *Vigyan Research Associates, Inc.* (26, 11, p. 1321) Article based on AIAA Paper 87-0547

**J88-205 Experimental Investigation of the Aerodynamic Break-up of Liquid Drops.** A. Wierzbna, *Institute of Aviation, Poland*; and K. Takayama, *Institute of High Speed Mechanics, Tohoku University, Japan* (26, 11, p. 1329) Article

**J88-206 Unsteady Flow in a Supercritical Supersonic Diffuser.** R. T. Biedron and T. C. Adamson Jr., *University of Michigan* (26, 11, p. 1336) Article based on AIAA Paper 87-0162

**J88-207 Finite-Volume Calculation of Inviscid Transonic Airfoil-Vortex Interaction.** Murali Damodaran and David A. Caughey, *Cornell University* (26, 11, p. 1346) Article based on AIAA Paper 87-1244

**J88-208 Simultaneous Viscous-Inviscid Interaction Calculation Procedure for Transonic Turbulent Flows.** D. Lee and R. H. Pletcher, *Iowa State University* (26, 11, p. 1354) Article based on AIAA Paper 87-1155 CP874

**J88-209 Chemical Laser Systems Analysis.** John R. Doughty, *Ben-Gurion University of the Negev, Israel* (26, 11, p. 1363) Article

**J88-210 Coupled Multiline CW HF Lasers: Experimental Performance.** Jay M. Bernard, Richard A. Chodsko and Harold Mirels, *The Aerospace Corporation* (26, 11, p. 1369) Article based on AIAA Paper 87-1448

**J88-211 Aeroelastic Divergence of Swept-Forward Composite Wings Including Warping Restraint Effect.** L. Librescu and A. A. Khdeir, *Virginia Polytechnic Institute and State University* (26, 11, p. 1373) Article

**J88-212 Timoshenko Beam Finite Elements Using Trigonometric Basis Functions.** G. R. Heppler, *University of Waterloo, Canada*; and J. S. Hansen, *University of Toronto, Canada* (26, 11, p. 1378) Article based on AIAA Paper 87-0843 CP872

**J88-213 Effects of Boundary Conditions on the Free Vibrations of Circular Cylindrical Shells.** Tatsuzo Koga, *University of Tsukuba, Japan* (26, 11, p. 1387) Article

**J88-214 Multiple Interaction and Localization Phenomena in the Postbuckling of Compressed Thin-Walled Members.** A. Luongo and M. Pignataro, *University of Rome, Italy* (26, 11, p. 1395) Article

**J88-215 Crossflow Transport Induced by Vortices.** M. Kurosaka and W. H. Christiansen, *University of Washington*; J. R. Goodman, L. Tirres and R. A. Wohlman, *University of Tennessee Space Institute* (26, 11, p. 1403) Technical Note

**J88-216 Interpretation of Jet Mixing Using Fractals.** F. C. Gouldin, *Cornell University* (26, 11, p. 1405) Technical Note

**J88-217 Smoke Wire Visualization of Unsteady Separation Over an Oscillating Airfoil.** Jong Seong Kim and Seung O. Park, *Korea Advanced Institute of Science and Technology* (26, 11, p. 1408) Technical Note

**J88-218 Viscous Effects on the Resonance of a Slotted Wind Tunnel Using Finite Elements.** In Lee, *Stanford University* (26, 11, p. 1410) Technical Note

**J88-219 Iterative Methods for Design Sensitivity Analysis.** B. G. Yoon and A. D. Belegundu, *Pennsylvania State University* (26, 11, p. 1413) Technical Note

**J88-220 Higher-Order Finite Element for Short Beams.** Fuh-Gwo Yuan and Robert E. Miller, *University of Illinois at Urbana-Champaign* (26, 11, p. 1415) Technical Note

**J88-221 Rotor Blade Aeroelasticity in Forward Flight with an Implicit Aerodynamic Formulation.** R. Celi and P. P. Friedmann, *University of California, Los Angeles* (26, 12, p. 1425) Article based on AIAA Paper 87-0921 CP873

**J88-222 Experimental/Computational Study of Viscous Flow in a Contracting Rectangular Elbow.** J. C. Kreatsoulas, D. Lee, A. Ballantyne and C. J. Knight, *Avco Research Laboratory, Inc.* (26, 12, p. 1434) Article based on AIAA Paper 88-0186

**J88-223 Experimental Study of Isothermal Swirling Flows in a Dump Combustor.** M. Samimy and C. A. Langenfeld, *Ohio State University* (26, 12, p. 1442) Article

**J88-224 Unsteady Transonic Flow Simulation on a Full-Span-Wing-Body Configuration.** Guru P. Guruswamy, *Sterling Federal Systems, Inc.*; and Peter M. Goojrian, *NASA Ames Research Center* (26, 12, p. 1450) Article based on AIAA Paper 87-1240

**J88-225 Euler Procedure for Correcting Two-Dimensional Transonic Wind-Tunnel Wall Interference.** Magdi H. Rizk and Donald R. Lovell, *Flow Research Company*; and Timothy J. Baker, *Princeton University* (26, 12, p. 1457) Article

**J88-226 Holographic Measurements of Transition and Turbulent Bursting in Supersonic Axisymmetric Boundary Layers.** A. George Havener, *University of Dayton* (26, 12, p. 1467) Article based on AIAA Paper 83-1724

**J88-227 Computation of Three-Dimensional Viscous Linear Cascade Flows.** Dochul Choi and Charles J. Knight, *Avco Research Laboratory, Inc.* (26, 12, p. 1477) Article based on AIAA Paper 88-0363

**J88-228 Numerical Integration of the Blade-to-Blade Surface Euler Equations in Vibrating Cascades.** G. A. Gerolymos, *SNECMA, France* (26, 12, p. 1483) Article

**J88-229 Three-Dimensional Elastic Analysis of a Composite Double Cantilever Beam Specimen.** I. S. Raju and K. N. Shivakumar, *Analytical Services and Materials, Inc.*; and J. H. Crews Jr., *NASA Langley Research Center* (26, 12, p. 1493) Article based on AIAA Paper 87-0864 CP872

**J88-230 Inextensional Free Vibrations of Circular Cylindrical Shells.** Tatsuzo Koga, *University of Tsukuba, Japan*; and Arihumi Saito, *Toshiba, Ltd., Japan* (26, 12, p. 1499) Article

**J88-231 Comparison of Several Methods for Calculating Vibration Mode Shape Derivatives.** Thomas R. Sutter, Charles J. Camarda, Joanne L. Walsh and Howard M. Adelman, *NASA Langley Research Center* (26, 12, p. 1506) Article based on AIAA Paper 86-0873 CP863

**J88-232 Finite-Element Model for Composite Beams with Arbitrary Cross-Sectional Warping.** Alan D. Stemple and Sung W. Lee, *University of Maryland* (26, 12, p. 1512) Article based on AIAA Paper 87-0773 CP872

**J88-233 Nonlinear Analysis of a Cantilever Beam.** Howard E. Hinnant, *NASA Ames Research Center*; and Dewey H. Hodges, *Georgia Institute of Technology* (26, 12, p. 1521) Article based on AIAA Paper 87-0953 CP872