

# JOURNAL OF APPLIED MECHANICS

Vol. 77 - 2010

SPIS TREŚCI

no 1

## RESEARCH PAPERS

- 011001 The Flexural Instability of Spinning Flexible Cylinder Partially Filled With Viscous Liquid / **R. D. Firouz-Abadi and H. Haddadpour**
- 011002 Poromechanics Solutions to Plane Strain and Axisymmetric Mandel-Type Problems in Dual-Porosity and Dual-Permeability Medium / **Vinh X. Nguyen and Younane N. Abousleiman**
- 011003 Analytical and Experimental Studies of the Mechanics of Deformation in a Solid With a Wavy Surface Profile / **J. Xiao, A. Carlson, Z. J. Liu, Y. Huang, and J. A. Rogers**
- 011004 Particular Solutions of a Two-Dimensional Infinite Wedge for Various Boundary Conditions With Weak Singularity / **Z. L. Li and Ch. Wang**
- 011005 Modeling and Nonlinear Vibration Analysis of a Rigid Rotor System Supported by the Magnetic Bearing (Effects of Delays of Both Electric Current and Magnetic Flux) / **Tsuyoshi Inoue, Yasuhiko Sugawara, and Motoki Sugiyama**
- 011006 The Bounds on the Coefficients of Restitution for the Frictional Impact of Rigid Pendulum Against a Fixed Surface / **V. A. Lubarda**
- 011007 The Nonlinear Output Frequency Response Functions of One-Dimensional Chain Type Structures / **Z. K. Peng and Z. Q. Lang**
- 011008 Strain Rate Effects and Rate-Dependent Constitutive Models of Lead-Based and Lead-Free Solders / **Fei Qin, Tong An, and Na Chen**
- 011009 Inelastic Analysis of Fracture Propagation in Distal Radius / **S. Pietruszczak and K. Gdela**
- 011010 Experimental Study of Electromagnetic Effects on Solid Copper Jest / **Patrik Appelgren, Melker Skoglund, Patrik Lundberg, Lars Westerling, Anders Larsson, and Tomas Hurtig**
- 011011 Scaling of Strength of Metal-Composite Joints — Part I: Experimental Investigation / **Qiang Yu, Zdeněk P. Bažant, John Bayldon, Jia-Liang Le, Ferhun C. Caner, Wei Heok Ng, Anthony M. Waas, and Isaac M. Daniel**
- 011012 Scaling of Strength of Metal-Composite Joints — Part II: Interface Fracture Analysis / **Jia-Liang Le, Zdeněk P. Bažant, and Qiang Yu**
- 011013 Importance of Higher Order Modes and Refined Theories in Free Vibration Analysis of Composite Plate / **S. Brischetto and E. Carrera**
- 011014 The Magnetic Viscous Damping Effect on the Natural Frequency of a Beam Plate Subject to an In-Plane Magnetic Field / **Jui-Lin Lee and Chun-Bo Lin**
- 011015 Diagnostic-Photographic Determination of Drag/Lift/Torque Coefficients of a High Speed Rigid Body in a Water Column / **Peter C. Chu, Chenwu Fan, and Paul R. Gefken**
- 011016 Internal Resonance of a Floating Roof Subjected to Nonlinear Sloshing / **M. Utsumi, K. Ishida, and M. Hizume**

## **TECHNICAL BRIEFS**

- 014501 Shape of a Soft Container Under Hydrostatic Load / **Gil Iosilevskii**
- 014502 Constitutive Modeling of Electrostrictive Polymers Using a Hyperelasticity-Based Approach / **A. W. Richards and G. M. Odegard**

**RESEARCH PAPERS**

- 021001 Aeroelastic Stability of Axially Moving Webs Coupled to Incompressible Flows / **Merrill Vaughan and Arvind Raman**
- 021002 On the Nonsimilarity Boundary-Layer Flows of Second-Order Fluid Over a Stretching Sheet / **Xiangcheng You, Hang Xu, and Shijun Liao**
- 021003 Additional Separated-Variable Solutions of the Biharmonic Equation in Polar Coordinates / **I. H. Stampouloglou and E. E. Theotokoglou**
- 021004 Three-Dimensional Free Vibration Analysis of a Homogeneous Transradially Isotropic Thermoelastic Sphere / **J. N. Sharma and N. Sharma**
- 021005 Fractal Pattern Formation at Elastic-Plastic Transition in Heterogeneous Materials / **J. Li and M. Ostoja-Starzewski**
- 021006 On Formulas for the Velocity of Rayleigh Waves in Prestrained Incompressible Elastic Solids / **Pham Chi Vinh**
- 021007 A Note on the Buckling of an Elastic Plate Under the Influence of Simple Shear Flow / **C. Pozrikidis and Haoxiang Luo**
- 021008 Modeling Impacts Between a Continuous System and a Rigid Obstacle Using Coefficient of Restitution / **Chandrika P. Vyasrayani, John McPhee, and Stephen Birkett**
- 021009 System Dynamics of the Open-Draw With Web Adhesion: Particle Approach / **Sverker Edvardsson and Tetsu Uesaka**
- 021010 Spatial and Temporal Excitation to Generate Traveling Waves in Structures / **Ran Gabai and Izhak Bucher**
- 021011 The Effects of Surface Elasticity on an Elastic Solid With Mode-III Crack: Complete Solution / **C. I. Kim, P. Schiavone, and C.-Q. Ru**
- 021012 Enhanced Campbell Diagram With the Concept of  $H_{\infty}$  in Rotating Machinery: Lee Diagram / **Chong-Won Lee and Yun-Ho Seo**
- 021013 An Application of Mean Square Calculus to Sliding Wear / **Cláudio R. Ávila da Silva, Jr., Giuseppe Pintaude, Hazim Ali Al-Qureshi, and Marcelo Alves Krajnc**
- 021014 On the Tangential Displacement of a Surface Point Due to a Cuboid of Uniform Plastic Strain in a Half-Space / **B. Fulleringer and D. Nélías**
- 021015 An Elasticity Solution for the Global Buckling of Sandwich Beams/Wide Panels With Orthotropic Phases / **George A. Kardomateas**
- 021016 An Exact Result for the Macroscopic Response of Particle-Reinforced Neo-Hookean Solids / **Oscar Lopez-Pamies**
- 021017 The Free and Forced Vibrations of a Closed Elastic Spherical Shell Fixed to an Equatorial Beam — Part I: The Governing Equations and Special Solutions / **J. G. Simmonds and A. P. Hosseinbor**
- 021018 The Free and Forced Vibrations of a Closed Elastic Spherical Shell Fixed to an Equatorial Beam—Part II: Perturbation Approximations / **J. G. Simmonds and A. P. Hosseinbor**
- 021019 The  $M$ -Integral Analysis for a Nano-Inclusion in Plane Elastic Materials Under Uni-Axial or Bi-Axial Loadings / **Tong Hui and Yi-Heng Chen**
- 021020 Experimental Investigations of an Internal Flow Generated by Porous Injection / **Clarisse Fournier, Marc Michard, and Françoise Bataille**

## **TECHNICAL BRIEFS**

- 024501 Effect of Friction on Coupled Contact in a Twisted Wire Cable / **B. K. Gnanavel, D. Gopinath, and N. S. Parthasarathy**
- 024502 Closed Form Expression for the Vibration Problem of a Transversely Isotropic Magneto-Electro-Elastic Plate / **Mei-Feng Liu and Tai-Ping Chang**
- 024503 Closed Form Solution of the Exterior-Point Eshelby Tensor for an Elliptic Cylindrical Inclusion / **B. R. Kim and H. K. Lee**
- 024504 Numerical Study of Boundary Layers With Reverse Wedge Flows Over a Semi-Infinite Flat Plate / **R. Ahmad, K. Naeem, and Waqar Ahmed Khan**
- 024505 Two State *M*-Integral Analysis for a Nano-Inclusion in Plane Elastic Materials Under Uni-Axial or Bi-Axial Loadings / **Tong Hui and Yi-Heng Chen**

## **ERRATA**

- 027001 Erratum: "Towards the Design of an Optimal Energetic Sink in a Strongly Inhomogeneous Two-Degree-of-Freedom System" [Journal of Applied Mechanics, 2007, 74(6), pp. 1078–1086] / **L. I. Manevitch, E. Gourdon, and C.-H. Lamarque**

**RESEARCH PAPERS**

- 031001 Probability Density Function Solution of Nonlinear Oscillators Subjected to Multiplicative Poisson Pulse Excitation on Velocity / **H. T. Zhu, G. K. Er, V. P. Iu, and K. P. Kou**
- 031002 Modeling of Dynamically Loaded Open-Cell Metallic Foams: Yielding, Collapse, and Strain Rate Effects / **Pedro A. Romero, Winston O. Soboyejo, and Alberto M. Cuitiño**
- 031003 Hybrid Randomness of Initial Imperfections and Axial Loading in Reliability of Cylindrical Shells / **Isaac Elishakoff, Lova Andriamasy, and Maurice Lemaire**
- 031004 A Modified Fractional Calculus Approach to Model Hysteresis / **Mohammed Rabius Sunny, Rakesh K. Kapania, Ronald D. Moffitt, Amitabh Mishra, and Nakhiah Goulbourne**
- 031005 Shear in Structural Stability: On the Engesser – Haringx Discord / **Johan Blaauwendraad**
- 031006 Deformations and Stability of an Elastica Subjected to an Off-Axis Point Constraint / **Jen-San Chen and Wei-Chia Ro**
- 031007 PDMS-Glass Interface Adhesion Energy Determined Via Comprehensive Solutions for Thin Film Bulge/Blister Tests / **Aarash Sofla, Erkin Seker, James P. Landers, and Matthew R. Begley**
- 031008 A Theory Relating Creep and Relaxation for Linear Materials With Memory / **R. C. Koeller**
- 031009 Actuated Bistable Jumping Structures / **Matthew Santer**
- 031010 A Study for the Influence of Work Hardening on Bending Stiffness of Truss Core Panel / **Sunao Tokura and Ichiro Hagiwara**
- 031011 Experimental and Theoretical Study of Ventilation and Heat Loss From Isothermally Heated Clothed Vertical Cylinder in Uniform Flow Field / **Nesreen Ghaddar, Kamel Ghali, Mohamad Al-Othmani, Ingvar Holmer, and Kalev Kuklane**
- 031012 Wrinkling of Tubes by Axial Cycling / **Rong Jiao and Stelios Kyriakides**
- 031013 A Mechanical Approach to Solve Two-Dimensional Static Electrical and Magnetic Fields: Applications to Contact Between Conductors Under Electrical Load / **S. Hao, Q. Wang, and L. M. Keer**
- 031014 The Contact Problem in Ultrasonic Traveling-Wave Motors / **Thomas Sattel, Peter Hagedorn, and Joachim Schmidt**
- 031015 Low Dimensional Approximations to Ferroelastic Dynamics and Hysteretic Behavior Due to Phase Transformations / **Linxiang X. Wang and Roderick V. N. Melnik**
- 031016 Kinematic Limit Analysis of Nonassociated Perfectly Plastic Material by the Bipotential Approach and Finite Element Method / **Ali Chaaba, Lahbib Bousshine, and Gery De Saxce**
- 031017 To the Problem of a Passive Levitation of Bodies in Physical Fields / **G. G. Denisov, V. V. Novikov, and A. E. Fedorov**
- 031018 Recursive Differential Systems in Nonlinear Mechanics / **Claire David, Marine Marcilhac, and Alain Rigolot**
- 031019 Polar Orthotropic Inhomogeneous Circular Plates: Vibration Tailoring / **Demetris Pentaras and Isaac Elishakoff**
- 031020 Multi-Order Stress Intensity Factors Along Three-Dimensional Interface Corners / **Tai-Liang Kuo and Chyanbin Hwu**

## **TECHNICAL BRIEFS**

- 034501 A Note on the Effect of the Choice of Weak Form on GMRES  
Convergence for Incompressible Nonlinear Elasticity Problems / **Pras  
Pathmanathan, Jonathan P. Whiteley, S. Jonathan Chapman,  
and David J. Gavaghan**
- 034502 Influence of Ductile Damage Evolution on the Collapse Load of Frames  
/ **Edwin L. Chica, Antolín L. Ibán, José M. G. Terán, and Pablo  
M. López-Reyes**

**RESEARCH PAPERS**

- 041001 Mechanics of Quantum-Dot Self-Organization by Epitaxial Growth on Small Areas / **Robert V. Kukta**
- 041002 Three-Dimensional Vibration Analysis of Toroidal Sectors With Solid Circular Cross-Sections / **D. Zhou, Y. K. Cheung, and S. H. Lo**
- 041003 A Reduced Second-Order Approach for Linear Viscoelastic Oscillators / **Sondipon Adhikari**
- 041004 Multitask Constrained Motion Control Using a Mass-Weighted Orthogonal Decomposition / **Vincent De Sapio and Jaeheung Park**
- 041005 Prediction of Formation of Wavy Surfaces in Rolled Plates by Post-Buckling Analysis / **Jinseok Kim, Shrikant Pattnaik, and Jay Kim**
- 041006 Nonlocal Shear Deformable Shell Model for Post-Buckling of Axially Compressed Double-Walled Carbon Nanotubes Embedded in an Elastic Matrix / **Hui-Shen Shen and Chen-Li Zhang**
- 041007 The Influence of Higher-Order Mode Shapes for Reduced-Order Models of Electrostatically Actuated Microbeams / **Stefanie Gutschmidt**
- 041008 Viscoplastic Effects Occurring in Impacts of Aluminum and Steel Bodies and Their Influence on the Coefficient of Restitution / **Robert Seifried, Hirofumi Minamoto, and Peter Eberhard**
- 041009 Shock Waves in Dynamic Cavity Expansion / **Tal Cohen, Rami Masri, and David Durban**
- 041010 Effect of Velocity-Slip Boundary Conditions on Jeffery–Hamel Flow Solutions / **M. A. Al-Nimr, Vladimir A. Hammoudeh, and M. A. Hamdan**
- 041011 Magnetorheological Fluid Flow in Microchannels / **Joseph Whiteley, Faramarz Gordaninejad, and Xiaojie Wang**
- 041012 Buckling of Stressed and Pressurized Thin Films on Substratum / **Éloi Dion, Jean Grilhé, Jérôme Colin, and Christophe Coupeau**
- 041013 Adhesion Between Thin Cylindrical Shells With Parallel Axes / **Carmel Majidi and Kai-tak Wan**
- 041014 Phase-Field Modeling of Domain Structure Energetics and Evolution in Ferroelectric Thin Films / **Antonios Kontsos and Chad M. Landis**
- 041015 Enhanced Ductility in Sheet Metals Produced by Cladding a Ductile Layer / **X. X. Chen, P. D. Wu, D. J. Lloyd, J. D. Embury, and Y. Huang**
- 041016 Thermomechanical Analysis of Film-on-Substrate System With Temperature-Dependent Properties / **YongAn Huang, ZhouPing Yin, and YouLun Xiong**
- 041017 Geometrical Anisotropy in Biphase Particle Reinforced Composites / **Shivakumar I. Ranganathan, Paolo Decuzzi, Lewis T. Wheeler, and Mauro Ferrari**
- 041018 *N*-Phase Elliptical Inhomogeneities With Internal Uniform Stresses in Plane Elasticity / **Xu Wang**
- 041019 Time-Decaying Uniform Stresses Inside an Anisotropic Elliptical Inhomogeneity With Nonuniform Interfacial Slip / **Xu Wang**

**TECHNICAL BRIEFS**

- 044501 Nonclassical Linearization Criteria in Nonlinear Stochastic Dynamice / **Isaac Elishakoff and Lova Andriamasy**
- 044502 The Propagation of Star-Shaped Brittle Cracks / **Nazile B. Rassoulova**

- 044503 Energy Analysis of Viscoelasticity Effect in Pipe Fluid Transients / **Huan-Feng Duan, Mohamed S. Ghidaoui, and Yeou-Koung Tung**
- 044504 Errors Caused by Non-Work-Conjugate Stress and Strain Measures and Necessary Corrections in Finite Element Programs / **Wooseok Ji, Anthony M. Waas, and Zdeněk P. Bažant**
- 044505 An Alternative Derivation of the Quaternion Equations of Motion for Rigid-Body Rotational Dynamice / **Firdaus E. Udwadia and Aaron D. Schutte**



## **GUEST EDITORIAL**

050301 The International Symposium on Ballistics / **Ian G. Cullis, Marc Giraud, and Bo Janzon**

## **FOREWORD**

050501 25<sup>th</sup> International Symposium on Ballistics, Beijing, China, 17–21 May 2010 / **Bo Janzon**

## **RESEARCH PAPERS**

### **INTERIOR BALLISTICS**

- 051401 Implementation of Approximate Riemann Solver to Two-Phase Flows in Mortar Systems / **Ragini Acharya and Kenneth Kuo**
- 051402 Experimental Study and Numerical Simulation of Propellant Ignition and Combustion for Cased Telescoped Ammunition in Chamber / **Xin Lu, Yanhuang Zhou, and Yonggang Yu**
- 051403 Understanding Interior Ballistic Processes in a Flash Tube / **Ryan W. Houim and Kenneth K. Kuo**
- 051404 Study on Expansion Process and Interaction of High Speed Twin Combustion-Gas Jets in Liquid / **Yonggang Yu, Shanheng Yan, Na Zhao, Xin Lu, and Yanhuang Zhou**
- 051405 Mechanism of Interior Ballistic Peak Phenomenon of Guns and Its Effects / **Chenli Tao, Yurong Zhang, Sanqun Li, Changzhi Jia, Yongjian Li, Xifa Zhang, and Zhengjia He**
- 051406 Aerodynamic Analysis of Projectile in Gun System Firing Process / **Wei Yu and Xiaobing Zhang**

### **EXTERIOR BALLISTICS**

- 051501 Study on Missile Formation Reconfiguration Optimized Trajectory Generation and Control / **Naigang Cui, Changzhu Wei, Jifeng Guo, and Biao Zhao**
- 051502 Rolling Moment Characteristic Analysis of Wrap-Around Fins / **Chen Xin-Hong and Zhao Run-Xiang**
- 051503 A Method of Generating a Pitch-Up Trajectory Based on a Virtual Target Guidance Law / **Yu Fu and Naigang Cui**

### **LAUNCH DYNAMICS**

- 051601 Analysis of Dynamic Characteristics for Rarefaction Wave Gun During the Launching / **Xiao-bing Zhang and Ying-ze Wang**
- 051602 Statistical Comparisons Between Qualification Tests for Gun-Fired Projectiles / **J. A. Cordes, J. Lee, T. L. Myers, G. Hader, L. Reinhardt, C. Kessler, N. Gray, and M. A. Guevara**

### **WARHEAD MECHANICS**

- 051701 The Use of the Gamma-Ray Absorption Technique as a Quality Control Procedure in the Manufacture of Powder Metal Shaped Charge Liners / **J. J. Lawrie, F. J. Mostert, P. J. König, and K. D. Werneyer**

#### TERMINAL BALLISTICS

- 051801 Experimental and Numerical Investigations on the Origins of the Bodywork Effect (K-Effect) / **F. Coghe, N. Nsiampa, L. Rabet, and G. Dyckmans**
- 051802 The Conception of the Segmented Kinetic Energy Penetrators for Tank Guns / **Mariusz Magier**
- 051803 Penetration of Porous Jett / **Eitan Hirsch and Meir Maysel**
- 051804 Vulnerability of Mortar Projectiles by Intercepting Fragmentation Warheads / **Markus Graswald, Ronald E. Brown, Jose O. Sinibaldi, Timo Nolte, and Hendrik Rothe**
- 051805 The Role of Kelvin–Helmholtz Instabilities on Shaped Charge Jet Interaction With Reactive Armor Plater / **Andreas Helte and Ewa Lidén**

#### ARMOR AND PERSONAL PROTECTION

- 051901 Explosive Sensitivity Influence on One- and Two-Layered Reactive Armors' Behavior / **Adam Wiśniewski**
- 051902 Experimental Measure of Parameters: The Johnson – Cook Material Model of Extruded Mg – Gd – Y Series Alloy / **Fan Yafu, Wang Qudong, Ning Jun-sheng, Chen Jie, and Ji Wei**

## IN MEMORIAM

060101 In Memoriam: James K. Knowles 1931–2009 / **Rohan Abeyaratne**

## RESEARCH PAPERS

- 061001 Lateral Bifurcation Behavior of a Four-Axle Railway Passenger Car / **Xuejun Gao, Yinghui Li, and Qing Gao**
- 061002 A Generalized Continuum Formulation for Composite Microcracked Materials and Wave Propagation in a Bar / **Patrizia Trovalusci, Valerio Varano, and Giuseppe Rega**
- 061003 Eigenstructure of First-Order Velocity-Stress Equations for Waves in Elastic Solids of Trigonal 32 Symmetry / **Lixiang Yang, Yung-Yu Chen, and S.-T. John Yu**
- 061004 A Variational Approach and Finite Element Implementation for Swelling of Polymeric Hydrogels Under Geometric Constraints / **Min Kyoo Kang and Rui Huang**
- 061005 Extending Castigliano's Theorems to Model the Behavior of Coupled Systems / **Clive L. Dym**
- 061006 A Nonlinear Van Der Waals Force Model for Multiwalled Carbon Nanotubes Modeled by a Nested System of Cylindrical Shells / **X. Q. He, S. Kitipornchai, C. M. Wang, Y. Xiang, and Q. Zhou**
- 061007 Vibration Cancellation in a Plate Using Orthogonal Eigenstructure Control / **M. A. Rastgaar, M. Ahmadian, and S. C. Southward**
- 061008 Angular Rate From the Nine Accelerometer Instrument / **Jan P. B. Vreeburg**
- 061009 An Exact Three-Dimensional Beam Element With Nonuniform Cross Section / **M. Jafari and M. J. Mahjoob**
- 061010 Thermoelastic Modeling of Rotor Response With Shaft Rub / **S. Ziaei-Rad, E. Kouchaki, and M. Imregun**
- 061011 The Dynamic Strength of a Representative Double Layer Prismatic Core: A Combined Experimental, Numerical, and Analytical Assessment / **Enrico Ferri, V. S. Deshpande, and A. G. Evans**
- 061012 Burst Oscillations in the Accelerating Bicycle / **David J. N. Limebeer and Amrit Sharma**
- 061013 Stiffness Matrix Properties for Reduced Order Models of Linear Structural Systems / **Jun Yu, Maura Imbimbo, and Raimondo Betti**
- 061014 Nonhyperelastic Nature of an Elastomeric High Strain Material / **Choon-Sik Jhun and John C. Criscione**
- 061015 Onset of Nonlinearity in the Elastic Bending of Blocks / **M. Destrade, M. D. Gilchrist, and J. G. Murphy**
- 061016 Buckling Analyses of Double-Wall Carbon Nanotubes: A Shell Theory Based on the Interatomic Potential / **W. B. Lu, J. Wu, X. Feng, K. C. Hwang, and Y. Huang**
- 061017 Characteristic Values in the Scaling of Differential Equations in Engineering / **Patricio F. Mendez**

## TECHNICAL BRIEFS

- 064501 Constitutive Modeling and Rupture Predictions of Al-6061-T6 Tubes Under Biaxial Loading Paths / **Y. P. Korkolis, S. Kyriakides, T. Giagmouris, and L.-H. Lee**

064502 Plane-Strain Bending With Isotropic Strain Hardening at Large Strains /  
**Sergei Alexandrov and Yeong-Maw Hwang**

**ERRATA**

067001 Erratum: "Reciprocity Theorems for Diffusion, Flow, and Waves"  
[Journal of Applied Mechanics, 2004, 71(1), pp. 145–150] / **Kees**  
**Wapenaar and Jacob Fokkema**

Oprac. BPK