

Table of Contents

Preface

Challenges and Opportunities in Experimental and Computational Mechanics	1
A Prototype Tactile Mouse for GUI Presentation Y. Kanto	9
Numerical Simulation of Contact Problem of Combined Flat Container Based on ANSYS Y. Wang, Q.K. Liu, L.G. Wang and R.Z. Xu	15
Large Scale Finite Element Analysis with a Balancing Domain Decomposition Method R. Shioya, M. Ogino, H. Kanayama and D. Tagami	21
Effective Adaptation of Hexahedral Mesh using Local Refinement and Error Estimation Y. Wada, M. Gheni, M. Matsumoto and M. Kikuchi	27
Fracture Toughness of Single Crystal $\text{Al}_2\text{O}_3/\text{YAG}$ Eutectic Composite up to 1973K K. Hirano, Y. Unno, Y. Harada and M. Kikuchi	33
Equivalent Differential Computation of the Elastic Moduli of Randomly Short-Fiber Reinforced Composite Q. Sun, L. Wu and J. Bai	39
Life Cycle Assessment and Long Term CO_2 Reduction Estimation of Ultra Lightweight Vehicles Using CFRP H. Zushi, J. Takahashi, K. Kageyama, H. Murayama, H. Nagai and J. Matsui	45
Effect of Horizontal Crack on Lamb Wave Propagation in a Composite Plate C. Wu, S. Duan and Q. Huang	51
Determination of the Dynamic Fracture Initiation Toughness of Metal-Ceramic Composites Y.L. Li, K.T. Ramesh and E.S.C. Chin	57
Shear Fatigue Test and Life Prediction of Composite Laminates Y.Z. Li, K.D. Zhang and B.P. Zhang	63
Analysis of Initiation and Extension of Transverse Lamina Cracking in Multidirectionally Laminated Composites by Total Force Method-Finite Element Method T. Kato, K. Kageyama, I. Kimpara, I. Ohsawa, M. Kanai, S. Abe and Y. Masuda	69
A Study of the Interfacial Fracture Toughness of 3-D Braided Brittle Matrix Composite Materials L. Tao, G.Q. Jiao, B. Wang and P.R. Jia	75
Interfacial Strength of Glass Fiber Composite H. Homma, F.E. Gunawan, M. Yamauchi and F.T. Kurniawati	81
Dynamic Behavior of Woven Composite Beams under HPB Impact Loading N. Liu, G.C. Jin, X.F. Yao and G.T. Li	87
Analysis of Scan Mirror Motion and Its Compensation for Three-Axis-Stabilized Satellite Z.F. Yu and Z.C. Yang	93
The Development of a Servo Dynamic Biaxial Loading Device A. Shimamoto, T. Shimomura and J.H. Nam	99
Structural Test of Aircraft and Analytical Synthetic System S. Duan, F.S. Wang and J.M. Feng	105
Effect of External Stores on the Flutter Characteristics of a Straight/Swept Aircraft Wing B. Li, Z.C. Yang and L.C. Zhao	111
Virtual Earphone: Integration of Beam Forming by Speaker Array and Real-Time Visual Face Tracking H. Mizoguchi, T. Kanamori, S. Kagami, K. Hiraoka, M. Tanaka, T. Shigehara and T. Mishima	117
Active Platform for Suppressing Train-Induced Microvibration of High Tech Facilities Z.C. Yang and Y.L. Xu	123
Stress Analysis of Cup Type Strain Wave Gearing M. Kikuchi, R. Nitta, Y. Kiyosawa and X.Y. Zhang	129
Transient Response of Airport Runway Y. Dai, Z. Zhong and P. Tong	135
Dynamic Analysis of Moving Road Vehicle under a Sudden Crosswind W.H. Guo and Y.L. Xu	141

Numerical Assessment of a Tension Kolsky Bar Y.L. Li and K.T. Ramesh	147
Hybrid Stress Analysis inside a Specimen under Mixed-Mode Loading by Speckle Photography K. Machida, K. Usui, Y. Sawa and H. Okamura	153
A Study of the Connection Mechanism of Cast-In High Chromium Cast Iron – Carbon Cast Steel by Cast-In Process X. Liu, S. Shen and Q.Y. Xu	159
Traceable Measurements in Materials Characterization Y. Mitani	165
Experimental Studies of Damage to Typical Aircraft Structure Subjected to Discrete Impact Z.C. Yang, Y.Z. Li and W.M. Cui	171
Experimental Analysis and Modeling of Thermal Error for the Spindle of Machining Center M. Ahmat, L. Zheng and Y.P. Yuan	177
Relieving of Welding Residual Stress by Applying Cyclic Load S. Harada, Y. Kobayashi, Y. Kuroshima, K. Iwamoto and T. Amimoto	183
Application of Digital Micro-Mirror Device to Deformation Measurement Q. Gao, M. Fujigaki and Y. Morimoto	189
Thermal Postbuckling and Bending Behavior of Circular Plates with Temperature Dependent Material Properties L.S. Ma and T.J. Wang	195
Evaluation of Fatigue Damage in Steel Using Laser Speckle A. Kato and F. Okuya	201
Study of Plastic Hardening-Large Deformed Torsion Test and Simulation H.J. Zhao, Z. Zhuang and Q.S. Zheng	207
Thermal Image Analysis of Elasto-Visco/Plastic Deformation and Fracture in Notched Members H. Sakamoto and H. Sakamoto	213
Influence of Microstructure on Materials Fatigue Life with Different MSZ Coverage Rates under Contact Loads Z. Deng, Y. Zhao and Y.S. Hong	219
A Study of Combustion Chamber Deposit Formation in Small Two-Stroke Cycle Engines N. Fujita, Y. Abulizi, M. Kitano and H. Yoshida	225
Numerical Simulation of NO_x Emissions from a Power Plant Steam Boiler C. Bratianu and C. Oprea	231
Numerical Method for Simulation of Three Dimensional Flow in Outlet Passage of Pump Station J.H. Guo, H.X. Chen and J. Lu	237
Entry Length and Wall Shear Stress in Uniformly Collapsed Veins M. Thiriet, S. Naili and C. Ribreau	243
Experimental Investigations of the Impacts of Sidecast Dredging Process on Water Environment Y. Zhang, J. Fan and D. Wang	249
Simulation of Critical Proppant Concentrations in an Hydraulic Fracture in an Oil Reservoir M. Kurashige, H. Arai and K. Imai	255
CTOA of Aluminum Fracture Specimen L. Ma, P.W. Lam, M.T. Kokaly, J.H. Jackson and A.S. Kobayshi	261
Evaluation of Interfacial Fracture Toughness of Thermal Barrier Coating under Heat Cycles L. Gao, K. Nakasa, M. Kato and H. Nishida	267
Coalescence Mechanism of Multiple Flaws in Brittle Medium under Compressive Loads P. Lin, R.H.C. Wong, Y.F. Fu, C.A. Tang and W.Y. Zhou	273
Modelling the Shear Fracture Process of Concrete Using a Mesomechanical Model W.C. Zhu, S.H. Wang and C.A. Tang	279
Simulation of the Compressive Fracture of Brittle and Disordered Solids A. Saimoto, Y. Imai, T. Hashida and H. Nisitani	285

On the Interaction between an Arbitrarily Shaped Hole and a Line Crack N. Hasebe, X.F. Wang and M. Kondo	291
Analysis of an Elliptical Internal Crack near to a Free Surface using a Singular Integral Equation of the Body Force Method K. Oda, Y. Muraoka and N. Noda	297
Study of the Plastic Stress Intensity Factor for V-Shaped Notch Problems K. Ushijima, D.H. Chen and N. Kitte	303
Crack Opening/Closing Behaviors under Biaxial Cyclic Loadings in Carbon Steel K. Hatanaka, J.J. Ohgi, F. Fujiwara and H. Ogawa	309
Influence of Soft Interlayer on Crack Growth Behavior in Bimetal Plate P.R. Jia, G.Q. Jiao, N. Li and J. He	315
Fatigue Properties of Inconel 718 in Long Life Region at Elevated Temperature N. Yan, N. Kawagoishi, Q. Chen, Q.Y. Wang, H. Nisitani and E. Kondo	321
Plasticity-Induced Martensitic Transformation around Fatigue Cracks in Type SUS304 Austenitic Stainless Steel Y. Nakasone, Y. Iwasaki, T. Shimizu and S. Kasumi	327
Application of Linear Notch Mechanics to the Fatigue Strength of Notched Steel Specimens T. Fukuda, H. Nisitani, T. Teranishi and K. Fujimura	333
Numerical Test of AE Kaiser Effect in Rock Fracture Process C.A. Tang and P. Lin	339
Analysis and Simulation of Cracking Patterns in Ceramics Coating under Thermal Stress S. Gao and K. Nakasa	345
Numerical Approach to Hydraulic Fracturing in Heterogeneous and Permeable Rocks T.H. Yang, L.C. Li, L.G. Tham and C.A. Tang	351
The Influence of Micro-Crack Interaction on the Strength of Polycrystalline Ceramics J. Cao, Y. Sakaida, Y. Nagano and H. Kawamoto	357
Analysis of Concrete Fracture Evolution by Simulation and Acoustic Emission S.H. Wang, C.A. Tang, W.C. Zhu and K. Zhang	363
Development and Application of the Strain Energy Density Criterion to Three-Dimensional I-II Mixed-Mode Fracture F. Xu, Y.L. Li and W. Guo	369
Stress Intensity Factors for Interaction between Interface Crack and Internal Crack and for Kinked Interface Crack in Bonded Semi-Infinite Planes K. Oda, N. Noda and S. Arita	375
Dynamic Ductile Fracture Toughness Test and Numerical Simulation for Ultra-High Pressure Gas Pipelines X.C. You, Z. Zhuang, T. Tang, Y.R. Feng, C.Y. Huo and C.J. Zhuang	381
FEM Analysis of a Crack in a Bimaterial Plate Based on the Crack Tip Stress Method H. Nisitani and T. Teranishi	387
Fracture Mechanics Parameters Governing Delaminated Interfaces in IC Packages Subjected to Unsteady Thermal Stress K. Machida, M. Gheni and H. Okamura	393
Experimental Observation of Final Void Volume Fraction at Fracture in Constrained Metal Matrix Composites M. Gheni, S. Anarbek and N. Himit	399
The Void Size Effect in Metallic Materials K.C. Hwang, B.C. Liu, X. Qiu and Y. Huang	405
Damage Identification Based Simulations for a Class of Nonlinear Structures G.M. Atanasiu	411
Tension-Dependent Internal Damping of a Cable Model G. Zheng, Y.Q. Ni, J.M. Ko and X. Xu	415
Experimental and Micromechanical Study of Size Effects in the Constrained Deformation of Metallic Foams C. Chen, N.A. Fleck and Y.P. Shen	421
Continuous Modeling of the Transient and Steady Cyclic Hardening /Softening Behavior of Metallic Materials under Amplitude Change Loading S.X. Zhao, Z.D. Zhou and Z.B. Kuang	427

Application of Numerical Simulation to SHPB Test to Investigate the Dynamic Compressive Behavior of Material with Failure J.F. Lu, Z. Zhuang, K. Shimamura and T. Shibue	433
Study of the Viscoplastic Deformation Behavior of SUS316L Stainless Steel and Effects of Dynamic Aging, Cyclic Loading and Temperature K. Kaneko, T. Oyamada and D. Shimizu	439
The Plastic Flow Behavior and Model of B.C.C. Polycrystalline Metals with Application to Pure Ta, Mo, Nb and V W.G. Guo, Y.L. Li and S. Nemat-Nasser	445
Bending of Magnetostrictive Laminated Plates X. Liu and X. Zheng	451
SH Waves in Functional Gradient Piezoelectric Material Layer J.K. Du, Y.P. Shen and X.G. Tian	457
Elastic Property Analysis of 3-D Braided Composites B. Wang, G.Q. Jiao, L. Tao and W.G. Pan	463
Application of Macro-Polarization Curve Method to Corrosion Analysis of Heat Exchanger S. Aoki, K. Amaya and H. Miyuki	469
Structural Remodeling of Blood Vessels Due to Change in Pressure P. Tong and S.M. Wang	475
Numerical Simulation of Temperature Field Evolution of Metallic Alloy Surface due to Pulsed Laser Treatment Y.S. Hong, Z.S. An and H.C. Wang	481
Constitutive Relationship and Applications of Shape-Memory Alloys Z.F. Yue and J.S. Wan	487
Two Analysis Methods for the Crustal Deformation of Japanese Islands M. Hori and K. Oguni	493
Influencing Factors of Temperature Action and Joint Distance of Reinforced Concrete Frame and Bent Structures L. Song, H.J. Liao, H. Xu and S.X. Wu	499
Study of a Two-Dimensional Thermal Shock Problem X.G. Tian, Y.P. Shen and T. He	505
A Micromechanical Analysis of Rubber Modified Epoxy Resin H. Okada, Y. Fukui and N. Kumazawa	511
The Stress Characteristics near to the Grain Boundaries of Bicrystal and Tricrystal Specimens J.S. Wan and Z.F. Yue	517
An Experimental and Numerical Study of the Mechanical Properties of 3-D Braided Structural Textile Composites X.T. Zheng, W. Guo and T. Ye	523
Numerical Analysis of the Deformation Behavior of Filament Wound Composite Shell Subjected to Internal Pressure Z.S. Shao and T.J. Wang	529
Stability Analysis of Delaminated Cylindrical Shells G. Zheng, J.F. Zhu, Y.Q. Ni and J.M. Ko	535
Local Buckling Analysis of a Cracked Plate Subjected to Tension Using a Hybrid Method of FEM and BFM F.Y. Cao, T. Fujimoto and H. Nisitani	541
The Spectral Analysis of Polynomial Nonlinear Vibration System with Multi-Degree of Freedom X.N. Zhang, S.L. Xie and C.-. He	547
Numerical Simulation of the Levitation Force of High-T_c Superconductors X. Zheng, X. Gou and Y.H. Zhou	553
Analyses of the Magneto-Elastic-Plastic Behavior of a Nonlinear Ferromagnetic Beam-Plate with Unmoved Simple Supports Y.H. Zhou, Y. Gao and X. Zheng	559
Numerical Simulation of Sand Erosion Phenomena in a Particle Separator J. Kuki, K. Toda and M. Yamamoto	565
Creeping Motions of Particles in Solids and Fluids H.Y. Yu	571

Scattering and Attenuation of Electromagnetic Waves by Charged Sands in Sandstorms Q.S. He, X. Zheng and Y.H. Zhou	577
Research on the Theoretical Prediction of the Electric Field Generated by Wind-Blown Sand X. Guo, X. Zheng and Y.H. Zhou	583
Theoretical Simulation of Developing Process of Wind-Blown Sand Movement N. Huang and X. Zheng	589
The Application of the Infinite Element Method to Endodontic Endosseous Implant Stress Analysis H. Xin, X. Ma, Y.L. Li and L. Ying	595
iBone: A Reaction Diffusion Based Shape Optimization Method K. Tezuka, Y. Wada and M. Kikuchi	601
A Numerical Simulation of Fluid Flowing Through a Windbreak Z. Wang and X. Zheng	607
A Theoretical Study of the Distribution of the Initial Velocity of Saltating Sand Particles by Collision L. Xie, X. Zheng and Y.H. Zhou	613
Study of the Dynamic Shear Strength of Cohesive Soils B. Han, H.J. Liao, J. Wu and T. Akiro	619