## **Table of Contents**

Preface	
Strange Effects of Strong High-Frequency Excitation J.J. Thomsen	3
On General Isospectral Flows for Vibrating Systems S.D. Garvey	11
<b>Modulus Matched Materials for Medical Applications</b> K.E. Tanner	19
Free Damped Nonlinear Vibrations of a Viscoelastic Plate under Two-to-One Internal Resonance	
Y.A. Rossikhin and M.V. Shitikova	29
Frequency Response Functions for Uncertain Nonlinear Systems G. Manson and K. Worden	37
Extending the Method of Multiple Scales to Strongly Nonlinear Vibration Problems R. Khanin	45
Behavioural Analysis of a Nonlinear Mechanical System Using Transient Trajectories H.I. Weber, J.M. Balthazar and D. Belato	51
Orthogonal Function Techniques for the Identification of Nonlinear Mechanical Systems R.P. Pacheco and V. Steffen Jr.	59
Parametric Study on the Frictional Contact Behaviour between Spline Teeth W.S. Sum, S.B. Leen and E.J. Williams	69
A New Specimen Geometry for the Iosipescu Shear Test W. He, O.F.L. Perez, S. Fok and B.J. Marsden	77
Residual Stress Measurement within a European UIC60 Rail Using Integrated Drilling Techniques	
D. Stefanescu, P.A. Browne, C.E. Truman and D.J. Smith	85
A Unified Approach to Digital Photoelasticity Incorporating Image Filtering and Inverse Methods I.A. Jones, P. Wang, A.A. Becker, T.H. Hyde, T.P. Pridmore and A.H. Ghali	93
Dynamic Simulation of Vehicle Suspension Systems for Durability Analysis	93
M.C. Levesley, S.A. Kember, D.C. Barton, P.C. Brooks and O.M. Querin	103
Numerical and Experimental Simulation of Mountain Bike Suspension Systems Subject to Regular Impact Excitation  J.K. Titlestad, A.R. Whittaker, A.C. Fairlie-Clarke, M.C. Davie and S. Grant	111
A Neural Network Sliding Controller for Active Vehicle Suspension S.J. Huang and W.C. Lin	119
Derivation of the Stiffness Terms for a Multi-Cable Spreader Suspension System with Stiff	11,
Elastic Cables D.I.M. Forehand and M.P. Cartmell	127
Simulation of Propagation and Localization of Minute Cracks Near a Mode II Crack Tip under Compressive Stresses	
A. Saimoto, Y. Imai and F. Motomura	137
3D Adaptive Multi Fracture Analysis of Composites S. Mohammadi and S. Forouzan-Sepehr	145
Instability and Disorder of the Front of a Tensile Tunnel-Crack Slightly Perturbed within its Plane E. Favier, V. Lazarus and J. Leblond	153
Short History of Body Force Method and its Application to Various Problems of Stress	155
Analysis H. Nisitani and A. Saimoto	161
Adaptive Numerical Simulation of Machining Process Involving Chip Creation S. Mohammadi, R. Adibi-Asl and M. Vaz	169
Propagation of Elastic Waves in Beams – Including Damping Effects M. Krawczuk, A.J. Żak, W.M. Ostachowicz and M.P. Cartmell	179

Spectral Plate Element for Crack Detection with the Use of Propagating Waves M. Krawczuk, M. Palacz and W.M. Ostachowicz	187
Environmental Effects on Lamb Wave Responses from Piezoceramic Sensors B.C. Lee, G. Manson and W.J. Staszewski	195
A State Space Based Approach to Health Monitoring of Vibrating Structures  I. Trendafilova	203
Damage Detection in CFRP Using Wavelet Scale Correlation C.M. Leavey, M.N. James, J. Summerscales and R. Sutton	211
Measuring Changes of State in Concrete M.G. Wood, J.E.T. Penny, J.A. Purkiss, N.R. Short and O. Owolawi	219
Estimating Rotor Unbalance and Misalignment from a Single Run-Down A.W. Lees, J.K. Sinha and M.I. Friswell	229
<b>Disc Brake Squeal – An Experimental Approach</b> S. James, H.J. Ouyang, D.J. Brookfield and J.E. Mottershead	237
Continuous Scanning Laser Vibrometry for Measurements on Rotating Structures B. Halkon and S. Rothberg	245
Dynamic Modelling of a Twin Clutch Transmission for Controller Design M. Goetz, M.C. Levesley and D.A. Crolla	253
Modal Analysis of a Beam with a Tip Rotor by Using a Fundamental Response J.R. Claeyssen, R.D. Copetti and J.M. Balthazar	261
Car Disc Brake Squeal: Theoretical and Experimental Study Q. Cao, M.I. Friswell, H.J. Ouyang, J.E. Mottershead and S. James	269
Introduction by Session Chairman M.I. Friswell	278
The Phenomenological Behaviour of Particle Dampers G.R. Tomlinson and W. Liu	279
Defective Systems and Pseudospectra M.I. Friswell and A.R. Champneys	287
Shock Vibration and Structural Trauma of a Torpedoed Ship M.G. Wood, D.I. Smith and M.R. Hayns	295
Vibration Analysis of Connecting Rod Big End Bearings M.J. Goodwin, C. Groves, J.L. Nikolajsen and P.J. Ogrodnik	303
The Dynamics of Rotating Machines with Cracks J.E.T. Penny and M.I. Friswell	311
Shape, Position and Orientational Design of Holes for Plates with Optimized Eigenfrequencies N.L. Pedersen and P. Pedersen	321
An Inverse Method to Measure the Flexural Wave Properties of a Beam A.J. Hull and D.A. Hurdis	329
Vibration of Beams Made up of Cellular Material S. Banerjee and A. Bhaskar	337
Static and Dynamic Behaviour of Composite Structures with Shape Memory Alloy Components	
A.J. Żak, M.P. Cartmell and W.M. Ostachowicz  On the Control of a Non-Ideal Engineering System: A Friction-Driven Oscillating System	345
with Limited Power Supply B.R. Pontes, V.A. Oliveira and J.M. Balthazar	355
Complexity and Chaos of Parametrically and Self-Excited System with Non-Ideal Energy Source J. Warminski	363
On Nonlinear Dynamics and Control of a Particular Portal Frame Foundation Model, Excited by a Non-Ideal Motor	200
J.M. Balthazar, J.L.P. Felix and R.M.L.R.d.F. Brasil	371
Free Vibration Analysis of a Basic Structural/Gas/Liquid Interacting System D.G. Gorman, C.K. Lee, J.M. Reese and J. Horáček	381
Study of Ultrasonic Upsetting under Radial and Longitudinal Die Vibration Z.H. Huang, M. Lucas and M.J. Adams	389

Nonlinear and Parametric Vibrations in Ultrasonic Cutting Systems A. Cardoni, M. Lucas, M.P. Cartmell and F.C.N. Lim	397
Vibration Analysis of a Cracked Plate Subjected to Tension Using a Hybrid Method of FEM	
and BFM T. Fujimoto, K. Wakata, F.Y. Cao and H. Nisitani	407
Pseudo Tests on Axisymmetric Structures H. Shahverdi, C. Mares and J.E. Mottershead	415
Modelling and Simulation of Bolted Joints under Harmonic Excitation M. Oldfield, H.J. Ouyang, J.E. Mottershead and A. Kyprianou	421
The Use of Wavelets to Facilitate Finite Element Post-Processing A.J. McMillan and G. Watson	429
Creep Testing and Finite Element Modelling of TIG Butt-Welded Inco718 Sheets at 620°C Y. Song, A.A. Becker, T.H. Hyde and W. Sun	439
Failure Analysis of Shrink-Fitted Shafts C.E. Truman and J.D. Booker	447
Finite Element Torsional Buckling Analysis and Prediction for Plain Shafts W.S. Robotham, T.H. Hyde and E.J. Williams	455
The Influence of Heat Affected Zone Characteristics on the Creep Failure of P91 Welds – An Initial Sensitivity Study Using Steady State Creep T.H. Hyde, J.A. Williams, A.A. Becker and W. Sun	465
A Nonlinear Dynamic Stiffness Model of a Vibration Isolator at Finite Deformations L. Kari	475
On the Mechanical Stability of Circular Discs in High Specific Load Capacity Magnetic	
<b>Bearings</b> S.D. Garvey, I.A. Jones, W.K.S. Khoo and I.C.D. Care	481
The Modelling and Prediction of the Influence of Building Vibration on the Dynamic Response of Elevator Ropes	
S. Kaczmarczyk, J.P. Andrew and J.P. Adams	489
Modelling, Simulation and Analysis Techniques in the Prediction of Non-Stationary Vibration Response of Hoist Ropes in Lift Systems Y. Terumichi, S. Kaczmarczyk, S. Turner, M. Yoshizawa and W.M. Ostachowicz	497
Effect of Metallic Vapour Pressure on the Vibration of Electrical Contacts in Vacuum S.N. Kharin, H. Nouri and T. Davies	505
Nonlinear Dynamics of Vibro-Impact Systems: Theory and Experiments M. Wiercigroch and E. Pavlovskaia	513
Vibrations Analysis of Two-Dimensional Model of Metal Turning Process R. Rusinek, K. Szabelski and J. Warminski	521