## SHOCK AND VIBRATION Subject Index • Volume 3 • 1996

Abbreviated injury severity, 337 Acceleration methods, 287 Acceleration outputs, multiaxial shaker testing, 393 Acoustics measurement, 27 reverberant, structure subjected to, peak deformation prediction, 461 plane waves, transient interaction with spherical elastic shell, 85 Acoustic-vibratory system, identification, 27 Added virtual mass approach, 159 Aircraft fuselage, 2-D scanning laser Doppler vibrometry, 135 panel flutter, 361 Angular vibration, scanning laser Doppler vibrometry, 141 Articulated Total Body Model, 435 Artificial spring technique, 193 Axial deformation, 169 Backpropagation algorithm, 201 Base isolated structure, hysteretic energy dissipation, 353 Basis vector, 259 Beamlike structures, dynamic force identification, 183 Beam-on-foundation, 169 Beams deflections, 293 power flow, 325 radially rotating, motion analysis, 293 Bifurcations analysis, 313 local, 11 Camera, high-speed, 293 Car collisions, lateral, thorax injury severity, 337 Cavity, analysis, 193 CCD camera, 117 Cesàro summation, 85 Chebychev polynomial approximation, 127 Chest injuries proposed potential corridor, 435 thorax injury severity, 337 Cholesky factorization, 237 Coefficient matrix, 27 Coherence functions, matrix methods for estimating, 237 Collisions, lateral, thorax injury severity, 337 Complex shock, 451 Composite laminates, stress waves, transverse plane shock wave excitation, 419 Constrained eigenstructure assignment method, 247 Corridor, prescribed, impact testing, 435 Counteracting control forces, 269 Coupling stiffness ratio, 1 Coupling strength, 1

Crash dummies, 39 Cross-spectral density matrix, estimates, 237 Cubic nonlinearities, modified Lindstedt-Poincaré method, 279 Cylindrical shells circular, fluid-filled, with lumped masses attached, 159 closed, model, 193 plastic deformation, 169 spatially filtered vibration control, 269 Damping, effect on shock spectrum values, 472 Data compression, space-frequency method, 127 DDAM, 462 Deceleration based corridor, sensitivity, 435 Design process, structures under impact loading, 69 Discrete Fourier series approximation, two-dimensional, 127 Discrete Fourier transform-inverse discrete Fourier transform, 135 Disorder direction, 1 Disorder location, 1 Double-pulse holographic interferometry, digital, 117 DYNA 3D predictions, plastic deformation of cylindrical shells, 169 Dynamic design analysis method, 462 Dynamic force identification, beamlike structures, 183 Dynamic loading, cylindrical shells, 169 Dynamic stiffness method, 183 Dynamic system identification, learning method, 201 Earthquake resistance, 353 Eddy-current electromagnet exciter, 107 Eigenstructure assignment technique, modified, 247 Elastic shock waves, 419 Elbows, pressurized, strain ratcheting, parametric nonlinear finite element analysis, 373 El-Centro 1940 earthquake excitation, 353 Electronic holography system, 107 Electronic speckle pattern interferometry, double-pulse, 117 Element aerodynamic matrices, 361 Element dynamic stiffness matrix, 183 Element load vector, 361 Element mass matrix, 361 Element stiffness matrix, 361 Element transfer matrix, 183 Envelope, spectra, 211 Equation of motion composite-type tall building, 99 one-story building mounted on elastomeric bearing, 353 Equivalent functions, 169 Equivalent modal damping ratios, composite-type tall building, 99 Error expanding ratio, 27

Shock and Vibration, Vol. 3 (1996)

## 482 Subject Index

Exciters, calibrated noncontact, 107 Exclusive OR problem, 201 Experimental modal analysis, 127 Experimental spatial power-flow method, 325 Finite element analysis mechanical impedance methods, 223 nonlinear structural dynamic, 259 parametric nonlinear, strain ratcheting, 373 Finite element model combined with lower level measured responses, 461 updating, modified eigenstructure assignment technique, 247 Fluids loading, 193 structures immersed in, vibroacoustic modeling, 193 Fluid-structure interaction, 159 Flutter characteristics, environmental effects, 361 Foundation, flexible, effect on isolator wave effects, 61 Fourier transform techniques, 419 windowed, 17 Frequency shaping, multiaxial shaker inputs, 393 Fresnel hologram, digital, 117 Gaussian enveloped oscillating wavelet, 17 Gearbox diagnosis, 22 Gibb's phenomenon, 85 Glass-fiber reinforced plastic, stress waves, 419 Global dynamic stiffness matrix, 183 Governing equations, asymptotic solution, 403 Grazing orbits, 11 Group theory, 303 Hardening spring characteristic equation, 279 Harmonic excitation frequency, ratio to base isolation frequency, 353 Harrison's model, 61 Holographic interferometry, digital double-pulse, 117 Hysteretic energy, dissipation in base isolated structure, 353 Ill-conditioning reduction, 27 Image plane hologram, 117 Impact loading, optimal design of structures, 69 Impact testing, occupant response sensitivity, 435 Impedance methods, mechanical, 223 Impulsive loading, 169 In-plane membrane control forces, 269 Isolation systems, flexible vibration, 61 Isolator, wave effects, 61 Laminated composite panels, flutter characteristics, 361 Laminate-water interaction system model, 419 Laplace transform, inverse series, 85 Laser Doppler vibrometer scanning, see Scanning laser Doppler vibrometer spatially dense measurements, 127 Learning method, neural networks, 201 Lindstedt-Poincaré method, modified, 279 Local bifurcations, 11 Localization, parameter study, 1

Lower level measured responses, combined with finite element modeling, 461 Lyapunov exponents, largest, 313 Mass, modal effective, 466 Mass matrix, 303 Mass-spring problem, linear single degree of freedom, 201 Mechanical fault diagnosis, 17 Mechanical impedance methods, 223 Mechanically coupled structures, vibroacoustic modeling, 193 Modal damping ratios, composite tube-type tall building to dynamic wind loading, 99 Modal strain energy method, 403 Motion analysis, radially rotating beams, 293 Multiaxis shaker testing, 393 NAC film motion analyzer, 293 Natural eigenvalue problem, 303 Near-field effects, 325 Neoclassical solution, 85 Neural networks, learning method, 201 Nonlinear oscillations, modified Lindstedt-Poincaré method, 279 Nonlinear systems, stochastic, largest Lyapunov exponents and bifurcations, 313 Occupant response, sensitivity, 435 Optical modal analysis, 107 Oscillator, with continuous and piecewise-linear restoring force, 11 Overtest problem, 223 Padé approximants method, 403 Peak deformation, prediction, structure subjected to reverberant acoustics, 461 Pendulum tests, 39 Periodic pattern, disorder, 1 Permanent magnet and coil exciter, 107 Piezoelectric shells, spatially filtered vibration control, 269 Plastic deformation, cylindrical shells, 169 Poincaré mapping, 11 Post- to preyielding stiffness ratio, 353 Power-flow vector field, spatially continuous model, 325 Prediction limit, 211 Pseudoinverse technique, learning method based on, 201 Pulselike shock, 451 Quadratic nonlinearities, modified Lindstedt-Poincaré method, 279 Rayleigh damping, 99 Receptance method, 159 Reflection symmetry, 303 Response function method, 247 Response points, unbiased selection, 211 Reverberant acoustics, structure subjected to, peak deformation prediction, 461 Rigid-plastic approximations, plastic deformation of cylindrical shells, 169 Ritz vector, 259 Rotation symmetry, 303

Sandwich shells, viscoelastically damped, vibration analysis, 403 Scanning laser Doppler vibrometer, 127 experimental and analytical power flow in beams, 325 nonsquare and unevenly spaced data, 135 translational and angular vibration, 141 Sensitivity analysis, 183 transient response, 69 Shock excitation, 451 Shock response spectrum, 462 Shock waves, transverse plane, stress waves in composite laminates, 419 Single mounting system, 61 Singular value decomposition, 237 Sinusoidal excitation, 353 Skew boundary conditions, 361 Sled tests frontal, 39 lateral collisions, 337 occupant response sensitivity, 435 side impact, 39 Snowdon's model, 61 Softening spring characteristic equation, 279 Space-frequency data compression method, 127 Space-frequency regression, 127 Spatial DFT-IDFT techniques, 135 Spatial shaping, multiaxial shaker inputs, 393 Speckle interference, 141 Spherical elastic shell, transient interaction of plane acoustic waves with, 85 Steepest descent method, 201 Stiffness imperfection ratio, 1 Stiffness matrix, 303 analysis by transfer matrix method, 99 transcendental, 287 Stiffness properties, random distribution, 1 Stochastic error expanding ratio, 27 Stochastic nonlinear systems, largest Lyapunov exponents and bifurcations, 313 Strain-displacement relations, 169 Strain ratcheting, in pressurized elbows, parametric nonlinear finite element analysis, 373

Stress stiffness matrix, 361 Stress waves, composite laminates excited by transverse plane shock waves, 419 String-on-foundation, 169 Structural optimization, 69 Structural responses, maximum, computational procedures, 211 Substructure mobility analysis, 61 Substructure transfer matrix, 183 Symmetry, rotation and reflection, 303 Thoracic mass, effective, determination, 39 Thoracic trauma index, 337 Time-frequency distribution, 17 Time period, superstructure, 353 Time-scale distribution, 17 Tolerance limits, 211 Transcendental stiffness matrix eigenproblems, 287 Transfer matrix method, 99 Translational vibration, scanning laser Doppler vibrometry, 141 Tube-type tall building, modal damping ratios, 99 Underwater explosion shocks, 419 van der Pol oscillator, bifurcation points, 313 Velocity shock, 451 Vibration analysis structures with rotation and reflection symmetry, 303 viscoelastically damped sandwich shells, 403 Vibration control, spatially filtered, cylindrical shells, 269 Vibration isolation, 451 Vibration simulation, mechanical impedance methods, 223 Vibroacoustic modeling, mechanically coupled structures, 193 Viscous criterion, 337 Wave effects, isolator, 61 Wave equation, 27 Wave field, in frequency domain, 419 Wavelet transform, 17 Wind loading, dynamic, modal damping ratios, 99 Yielding, effect on shock design values, 472

Zones, 211