

1. Record Nr.	UNINA9910555257403321
Titolo	Modern trends in structural and solid mechanics . 1 Statics and stability // edited by Noel Challamel, Julius Kaplunov, Izuru Takewaki
Pubbl/distr/stampa	London, England ; ; Hoboken, New Jersey : , : ISTE : , : Wiley, , [2021] ©2021
ISBN	1-5231-4360-6 1-119-83188-1 1-119-83189-X 1-119-83187-3
Descrizione fisica	1 online resource (305 pages)
Collana	Mechanical Engineering and Solid Mechanics Series
Disciplina	624.171
Soggetti	Structural analysis (Engineering) Statics Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Cover -- Half-Title Page -- Title Page -- Copyright Page -- Contents -- Preface: Short Bibliographical Presentation of Prof. Isaac Elishakoff -- Books by Elishakoff -- Books edited or co-edited by Elishakoff -- 1 Static Deformations of Fiber-Reinforced Composite Laminates by the Least-Squares Method -- 1.1. Introduction -- 1.2. Formulation of the problem -- 1.3. Results and discussion -- 1.3.1. Verification of the numerical algorithm -- 1.3.2. Simply supported sandwich plate -- 1.3.3. Laminate with arbitrary boundary conditions -- 1.4. Remarks -- 1.5. Conclusion -- 1.6. Acknowledgments -- 1.7. References -- 2 Stability of Laterally Compressed Elastic Chains -- 2.1. Introduction -- 2.2. Compression of stacked elastic sheets -- 2.3. Stability of an elastically coupled cyclic chain -- 2.4. Elastic stability of two coupled rods with disorder -- 2.5. Spatial localization of lateral buckling in a disordered chain of elastically coupled rigid rods -- 2.6. Conclusion -- 2.7. References -- 3 Analysis of a Beck's Column over Fractional-Order Restrains via Extended Routh-Hurwitz Theorem -- 3.1. Introduction -- 3.2. Material hereditariness -- 3.2.1. Linear hereditariness: fractional-

order models -- 3.3. Dynamic equilibrium of an elastic cantilever over a fractional-order foundation -- 3.4. Stability analysis of Beck's column over fractional-order hereditary foundation -- 3.4.1. The characteristic polynomial -- 3.4.2. State-space representation of the dynamic equilibrium equation -- 3.4.3. Stability analysis of fractional-order Beck's column via the extended Routh-Hurwitz criterion -- 3.5. Numerical application -- 3.6. Conclusion -- 3.7. References -- 4 Localization in the Static Response of Higher-Order Lattices with Long-Range Interactions -- 4.1. Introduction -- 4.2. Two-neighbor interaction - general formulation - homogeneous solution. 4.3. Two-neighbor interaction - localization in a weakened problem -- 4.4. Conclusion -- 4.5. References -- 5 New Analytic Solutions for Elastic Buckling of Isotropic Plates -- 5.1. Introduction -- 5.2. Equilibrium equation -- 5.3. Solution -- 5.4. Boundary condition -- 5.5. Numerical results -- 5.6. Conclusion -- 5.7. Appendix A: Deflection, slopes, bending moments and shears -- 5.8. Appendix B: Function transformation -- 5.9. References -- 6 Buckling and Post-Buckling of Parabolic Arches with Local Damage -- 6.1. Introduction -- 6.2. A one-dimensional model for arches -- 6.2.1. Finite kinematics and balance, linear elastic law -- 6.2.2. Non-trivial fundamental equilibrium path -- 6.2.3. Bifurcated path -- 6.2.4. Special benchmark examples -- 6.3. Parabolic arches -- 6.4. Crack models for one-dimensional elements -- 6.5. An application -- 6.5.1. A comparison -- 6.6. Final remarks -- 6.7. Acknowledgments -- 6.8. References -- 7 Inelastic Microbuckling of Composites by Wave-Buckling Analogy -- 7.1. Introduction -- 7.2. Buckling-wave propagation analogy -- 7.3. Microbuckling in elastic orthotropic composites -- 7.4. Inelastic microbuckling -- 7.5. Results and discussion -- 7.6. References -- 8 Quasi-Bifurcation of Discrete Systems with Unstable Post-Critical Behavior under Impulsive Loads -- 8.1. Introduction -- 8.2. Case study of a two DOF system with unstable static behavior -- 8.3. Exploring the static and dynamic behavior of the two DOF system -- 8.4. The dynamic stability criterion due to Lee -- 8.5. New stability bounds following Lee's approach -- 8.6. Conclusion -- 8.7. Acknowledgments -- 8.8. References -- 9 Singularly Perturbed Problems of Drill String Buckling in Deep Curvilinear Borehole Channels -- 9.1. Introduction -- 9.2. Singular perturbation theory: elements and history. 9.3. Posing the problem of a drill string buckling in the curvilinear borehole -- 9.4. Modeling the drill string buckling in lowering operation -- 9.5. References -- 10 Shape-optimized Cantilevered Columns under a Rocket-based Follower Force -- 10.1. Background -- 10.2. Aims -- 10.3. Numerical analysis -- 10.3.1. Stability analysis -- 10.3.2. Optimum design -- 10.4. Experiment -- 10.4.1. General description -- 10.4.2. Rocket motor -- 10.4.3. Columns -- 10.4.4. Free vibration test -- 10.5. Flutter test -- 10.6. Concluding remarks -- 10.7. Acknowledgments -- 10.8. Appendix -- 10.9. References -- 11 Hencky Bar-Chain Model for Buckling Analysis and Optimal Design of Trapezoidal Arches -- 11.1. Introduction -- 11.2. Buckling analysis of trapezoidal arches based on the HBM -- 11.2.1. Description of the HBM -- 11.2.2. HBM stiffness matrix formulation -- 11.2.3. Governing equation considering compatibility conditions -- 11.2.4. Verification of the HBM -- 11.3. Optimal design of symmetric trapezoidal arches -- 11.3.1. Problem definition -- 11.3.2. Optimization procedure -- 11.3.3. Optimal solutions -- 11.3.4. Sensitivity analysis of optimal solutions -- 11.3.5. Comparison with the buckling load of optimal fully stressed trapezoidal arches -- 11.4. Concluding remarks -- 11.5. References -- List of Authors -- Index -- Summary of Volume 2 -- Summary of Volume 3 -- Other titles from iSTE in Mechanical

