

Contents

Part I Fundamentals and Elasticity

Time Derivatives in Material and Spatial Description—What Are the Differences and Why Do They Concern Us?	3
Elena A. Ivanova, Elena N. Vilchevskaya and Wolfgang H. Müller	
The Cosserats' Memoir of 1896 on Elasticity	29
Gérard A. Maugin	
On Equivalent Inhomogeneities for Particles with Multiple-Component Interphases	49
Lidiia Nazarenko and Henryk Stolarski	
The Influence of Distributed Dislocations on Large Deformations of an Elastic Sphere	61
Evgeniya V. Zhdanova and Leonid M. Zubov	

Part II Visco-Elastic Media and Coupled Phenomena

A Closed-Form Solution for a Linear Viscoelastic Self-gravitating Sphere	79
Wolfgang H. Müller and Elena N. Vilchevskaya	
Constitutive Modelling of the Glass Transition and Related Phenomena: Relaxation of Shear Stress Under Pressure	103
Alexander Lion, Michael Jöhlich and Christoph Mittermeier	
A Material Model for Electroactive Polymers.	119
Kerstin Weinberg and Anna Pandolfi	

Part III Thermo-Elasto-Plasticity

Finite Elastoplasticity with Thermal Effects—Some Unexpected Phenomena.	135
Otto T. Bruhns	

Crystal-Plasticity Simulation of Micromachining of Single-Crystal Metal: Methodology and Analysis	165
Qiang Liu, Srihari Dodla, Anish Roy and Vadim V. Silberschmidt	
Warpage Variation Analysis of Si/Solder/Cu Layered Plates Subjected to Cyclic Thermal Loading	185
Nobutada Ohno, Satoshi Mizushima, Dai Okumura and Hisashi Tanie	
A Note on Plasticity with Additional Internal Variables	205
Michael Wolff and Michael Böhm	
Finite Inelastic Deformations of Compressible Soft Solids with the Mullins Effect	223
Heng Xiao, Hao Li, Zhao-Ling Wang and Zheng-Nan Yin	
Effect of Geometric Dimension on the Dissipative Property of the Structures Consisting of NiTi Shape Memory Alloy Wires	243
Chao Yu, Guozheng Kang and Qianhua Kan	
Part IV Continuum Damage and Phase Fields	
A Discussion on Gradient Damage and Phase-Field Models for Brittle Fracture	263
René de Borst and Clemens V. Verhoosel	
Experiments on Damage and Failure Mechanisms in Ductile Metals at Different Loading Conditions	279
Michael Brüinig, Steffen Gerke and Marco Schmidt	
Modeling of Damage Deactivation in Concrete Under Cyclic Compression	295
Artur Ganczarski and Marcin Cegielski	
Phase-Field Modelling of Damage and Fracture—Convergence and Local Mesh Refinement	307
Markus Kästner, Paul Hennig, Thomas Linse and Volker Ulbricht	
Part V Fracture Mechanics and Failure Criteria	
Prestressed Orthotropic Material Containing an Elliptical Hole	327
Eduard-Marius Craciun	
Generalized Limit Surfaces—With an Example of Hard Foams	337
Nina-Carolin Fahlbusch, Vladimir A. Kolupaev and Wilfried Becker	
On the Problem of Cracking in 2-Phase Ceramic Matrix Composite Materials	367
Tomasz Sadowski, Liviu Marsavina and Eduard-Marius Craciun	

On Failure Theories for Composite Materials. 379
Ramesh Talreja

Part VI Rods, Plates and Shells

**On the Dislocation Density Tensor in the Cosserat
Theory of Elastic Shells.** 391
Mircea Bîrsan and Patrizio Neff

Direct Approach Versus Consistent Approximation 415
Reinhold Kienzler and Patrick Schneider

**Modelling of a Rotating Active Thin-Walled Composite
Beam System Subjected to High Electric Fields** 435
Jarosław Latański

**On a Description of Deformable Junction in the Resultant
Nonlinear Shell Theory** 457
Wojciech Pietraszkiewicz

**Analytical and Numerical Modelling of a Sub- and Supersonic
Moving Load Front Along a Rod's Skin** 469
Wolfgang E. Weber, Yannick F. Fangye, Daniel Balzani
and Bernd W. Zastrau

Part VII Generalized Continua, Multi-Scales and Meta-Materials

**Application of Multi-scale Approaches to the Investigation
of Sealing Surface Deformation for the Improvement of Leak
Tightness in Pressure Relief Valves** 493
Ali A. Anwar, Yevgen Gorash and William Dempster

**Against the Fragmentation of Knowledge: The Power
of Multidisciplinary Research for the Design of Metamaterials** 523
Francesco dell'Isola, Sara Bucci and Antonio Battista

**On Equilibrium of a Second-Gradient Fluid Near Edges
and Corner Points** 547
Victor A. Eremeyev

Author Index 557