

# Table of Contents

## Preface

### Transports in Porous Media

P. Adler 3

### Magnetically Ordered Liquids: Experimental Approbation of Various Models

E. Blums 5

### Classical and Quantum Dynamics for a Class of Damped Nonlinear Systems

J.A. Holyst and L.A. Turski 15

### Non-Equilibrium Thermodynamics of Materials with Continuous Internal Parameters

G. Kluge 25

### Lagrangian for Thermoelectricity

R. Kotowski 31

### Effective Medium Theory of Diffusion and Chemical Reaction in the Presence of Stationary Sinks

J. Krüger 39

### Irreversible Thermodynamics of Deformable High-Temperature Superconductors

G.A. Maugin 49

### Mesoscopic Orientation Balances and Macroscopic Constitutive Equations of Liquid Crystals

S. Blenk, H. Ehrentraut, W. Muschik and C. Papenfuss 59

### On the Concept of Temperature for Systems not Infinitesimally near to Equilibrium

Z. Banach and S. Piekarski 69

### Kinetic Theory and Correlational Thermodynamics for Gases with Charged Particles

P. Konopka, J. Schröter and R. Wegener 79

### Transport Phenomena in Geologic Media

V. Cvetkovic 89

### On Constitutive Theories of Shape Memory Alloys Undergoing a Structural Phase Transformation

F. Falk 91

### Global Behavior Related with Interface Movement; The Case of Transformation Induced Plasticity

J.M. Diani, M. Berveiller and H. Sabar 101

### Time- and Frequency-Dependent Transport Coefficients of Colloidal Suspensions

B. Cichocki 111

### Three-Dimensional Landau Theory Describing the Martensitic Phase Transformation of Shape-Memory Alloys

P. Konopka and F. Falk 113

### Coherency Energy and Pseudoelastic Hysteresis

I. Müller 123

### The Liquid-Vapor Interface in Three Dimensions: Solvable Models and Rigorous Results

H.J. Wagner 125

### Effective Transport Properties of Suspensions of Spheres

B.U. Felderhof 135

### The Mechanical State Map of Amorphous Solids

A.S. Bakai 145

### Homogeneous Configurations of Uniform Elastic Bodies

M. Elzanowski and S. Prishchepionok 155

### Interrelation of Microscopic, Mesoscopic and Macroscopic Theory

V. Kafka 165

### Moving Frames in Continuous and Discrete Systems: A Group Theoretical Approach

I. Kunin, F. Hussain, X. Zhou and S. Prishchepionok 175

### Variational Principles in Heterogeneous Non-Linear Elasticity

P. Mazilu 185

### Non-Local Hardenings in Metals

D. Muller, M. Berveiller and J. Kratochvíl 195

<b>Magnetoelastic Fluctuations in a Ferromagnetic Anisotropic Slab Containing a Lattice Defect</b> A. Radowicz	205
<b>Reverse Plastic Yield in Unloading of Highly Anisotropic Elastic-Plastic Cantilevers</b> A.H. England, T.G. Rogers and P.W. Gregory	215
<b>Hodge Theory and the Characterization of Symmetries in a Non-Local Description of Continuum Mechanics</b> G. Schwarz	225
<b>Exact Theory of Heterogeneous Anisotropic Elastic Plates</b> A.J.M. Spencer, P. Watson and T.G. Rogers	235
<b>On the Behaviour of Inhomogeneous Elastic Media: Variational Approach and Morphological Analysis</b> C. Stolz, E. Hervé and A. Zaoui	245
<b>Mechanical Modelling of Multi-Domain Polycrystalline Ferromagnets – Application to Acoustoelasticity</b> S. Motogi	257
<b>Measurement and Representation of the Statistical Properties of Microstructure of Polycrystalline Materials</b> B.L. Adams	267
<b>Long Waves in Random Composites</b> B. Gambin	279
<b>Continuum Approach to Textured Materials</b> W. Gambin	287
<b>Physical Properties of Multiphase Alloys</b> G. Grimvall	297
<b>Phase Morphology and Plastic Behaviour of Two-Phase Material</b> L. Allais, T. Bretheau and H. Hervé	305
<b>Bounds on the Effective Absorption Coefficient of Random Media</b> M.K. Kolev and K.Z. Markov	315
<b>Analytical Treatment of Composite Structures by Means of Integral Equations</b> W. Meiners and K.P. Herrmann	321
<b>Thermoplastic Behaviour and Fracture of Fibre-Reinforced Composites</b> K.P. Herrmann and I.M. Mihovsky	331
<b>Scale-Dependent Plasticity of Metal Matrix Composites with Continuous Fibres</b> O.B. Pedersen	341
<b>The Effective Behavior of Nonlinear Composites: A Comparison between Two Methods</b> P. Ponte Castañeda and J.R. Willis	351
<b>Textures in Polycrystalline Metal Alloys - Structural Plasticity</b> K. Wilanski	361
<b>Bounds for the Overall Properties of Nonlinear Composites</b> D.R.S. Talbot	371
<b>Geometry and Evolution of Biological Tissues</b> N. Rivier	383
<b>Inner Ear Neuromechanics and Principles of Acoustic Pattern Recognition</b> M. Euler	393
<b>Dynamics of Soliton Pairs in Quasi-One-Dimensional Magnets</b> J.A. Holyst and H. Benner	405
<b>Completely Integrable Continuous Non-Heisenberg Chains</b> A.E. Borovick	415
<b>Lattice Approach of Shear Horizontal Solitons in Cubic Crystal Plates</b> B. Collet	417
<b>The Long Road from Uniformity to Defects</b> M. Epstein	427
<b>Numerics of Surface Solitons on Solids</b> H. Hadouaj and G.A. Maugin	435
<b>Solitons in a Nonlinear Elastic Medium</b> Y.S. Kivshar	445

<b>Configurational and Material Forces in the Theory of Defects in Ordered Structures</b> E. Kröner	447
<b>Disclinations in Elastic Dielectrics</b> J.P. Nowacki, S. Minagawa, M. Epstein and Z. Pretczynski	455
<b>On the Formation and Motion of Defects in Nematic Liquid Crystals</b> J. Rubinstein	463
<b>Diffusion of Point Defects in Continuously Dislocated Crystalline Solids</b> A. Trzesowski	473
<b>Nonlinear Waves in Structured (Dipolar) Media</b> H. Zorski and E. Infeld	481
<b>Mechanics of Ductile Shear Failure of Amorphous Alloy Ribbons</b> V.Z. Bengus, E.D. Tabachnikova, S.E. Shumilin, Y.I. Golovin, M.V. Makarov, A.A. Shibkov, K. Csach, P. Diko, V. Hajko, J. Miškuf and V. Ocelík	485
<b>Computer Simulation of Crack Growth</b> F. Ferber	495
<b>Morphological Models for Fracture Statistics</b> D. Jeulin	505
<b>Effective Properties of Cracked Cross-Ply Laminates</b> T. Lewinski and J.J. Telega	515
<b>Interaction of Dislocations and Dislocation Dipoles with Cracks and Anticracks</b> X. Markenscoff	525
<b>Dynamic Extension of Curvilinear Interface Cracks in Self-Stressed Two-Phase Composite Structures</b> A. Noe and K.P. Herrmann	531
<b>Inhomogeneities in Elastic Bodies and Applications to Fracture</b> C. Trimarco and G.A. Maugin	541
<b>Higher Order Gradients and Self-Organization at Nano, Micro, and Macro Scales</b> E.C. Aifantis	553
<b>Dislocation Dynamics, Plasticity, Thermodynamics: A Unification by Means of Lagrange Formalism</b> K. Anthony	567
<b>Gauge Theory of Dislocations</b> B.K.D. Gairola	579
<b>A Geometrical Method for the Separation of Compatible and Incompatible Elastic Strain</b> H. Günther	591
<b>Effects of Dislocations on the Dynamics of Elastic Semiconductors</b> B. Maruszewski	599
<b>Normality Rule from Plastic Work Extremals?</b> M.V. Micunovic	609
<b>Dislocation-Disclination Kinetics and Instabilities</b> A.E. Romanov	617
<b>Nonlinear Elasticity Theory of the Interaction between Two Parallel Screw Dislocations in an Isotropic Medium</b> Z. Wesolowski, E. Kröner and A. Seeger	627
<b>Microplasticity and Macroplasticity</b> B.Y. Xu and Q.L. Jin	639
<b>Microstructural Modelling of Crystal Plasticity</b> C. Teodosiu	649
<b>Stochastic Modelling of Cyclic Deformation Processes in Metals</b> E.A. Steck	651
<b>Ordered Defect Structures in Metals under Irradiation</b> W. Jäger and H. Trinkaus	661
<b>Dislocation Dynamics and Inelastic Properties of Solids</b> J. Kratochvíl	673
<b>On the Generalization of the Duru-Kleinert-Propagator Transformations</b> A. Pelster and A. Wunderlin	685
<b>Radiation-Induced Self-Organization of Defect Structures in Metals</b> M. Zaiser, P. Hähner, C. Tölg and W. Frank	687

