

| | |
|-------------------------|---|
| 1. Record Nr. | UNINA9910484346803321 |
| Titolo | Smart modelling for engineering systems . Volume 1 : proceedings of the International Conference on Computational Methods in Continuum Mechanics (CMCM 2021) ; Moscow, Russia, 27-29 October, 2021 // Margarita N. Favorskaya [et al.], editors |
| Pubbl/distr/stampa | Singapore : , : Springer, , [2021] ©2021 |
| ISBN | 981-334-709-0 |
| Descrizione fisica | 1 online resource (303 pages) |
| Collana | Smart innovation, systems, and technologies ; ; Volume 214 |
| Disciplina | 620.00285 |
| Soggetti | Engineering - Data processing Computational intelligence Continuum mechanics Machine learning |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | Intro -- Preface -- Contents -- About the Editors -- 1 Recent Advances in Computational Physics -- 1.1 Introduction -- 1.2 Chapters Included in the Book -- 1.3 Conclusions -- References -- 2 The Scientific and Life Path of Academician Oleg M. Belotserkovskii -- 2.1 Introduction -- 2.2 The Scientific and Life Path -- 2.3 Conclusions -- References -- 3 Numerical Simulation of Spatial Flows in Shear Layers -- 3.1 Introduction -- 3.2 Mathematical Model -- 3.3 Vortex Cascade Numerical Modeling -- 3.4 Vortex Cascade Conditions -- 3.5 Energy Characteristics of the Vortex Flow -- 3.6 Influence of Flow Parameters on Vortex Cascade Structure -- 3.7 Conclusions -- References -- 4 Modeling of Unsteady Flows in Gas Astrophysical Objects on Supercomputers -- 4.1 Introduction -- 4.2 Numerical Technique -- 4.3 Direct Calculation of Gravitational Forces -- 4.4 Parallel Algorithms of Numerical Technique -- 4.5 Simulation of Instability of the Stellar Accretion Disk Area Near Neutron Star Surface -- 4.6 Vortex Structures Simulation in Fast-Rotating Star -- 4.7 Conclusions -- References -- 5 Modeling of the Physical Processes of the Impact of a Powerful Nuclear |

Explosion on an Asteroid -- 5.1 Introduction -- 5.2 Physics of the Impact of a Nuclear Explosion -- 5.3 Research of the Asteroid Fragmentation. Theoretical Analysis -- 5.4 On the Radiophysical Situation in the Field of Explosion and the Possibility of Using Space Rocket Defense in Solving the Problem of Asteroid-Comet Hazard -- 5.5 Conclusions -- References -- 6 A Multidimensional Multitemperature Gas Dynamic and the Neutrino Spectrum in 2D Gravitational Collapse -- 6.1 Introduction -- 6.2 The Multidimensional Multitemperature Gas Dynamic Code with the Approximate Riemann Problem Solver -- 6.3 The Application of the Code to a 2D Gravitational Collapse of a Rotating Core with the Neutrino Spectrum. 6.4 Conclusions -- References -- 7 The Airy Stress Function for Non-Euclidean Model of a Continuous Medium and Description of Residual Stresses -- 7.1 Introduction -- 7.2 Transition from the Classical Model to the Non-Euclidean One -- 7.3 Structure of the Stress Function -- 7.4 Description of Residual Stresses -- 7.5 Conclusions -- References -- 8 Numerical Comparison of Different Approaches for the Fractured Medium Simulation -- 8.1 Introduction -- 8.2 Mathematical Model -- 8.2.1 Implicit Fracturing Model -- 8.2.2 Explicit Fracturing Model -- 8.2.3 Grid-Characteristic Method -- 8.3 Simulation Results -- 8.3.1 Unfilled Fractures -- 8.3.2 Fluid-Filled Fractures -- 8.4 Conclusions -- References -- 9 The Comparison of Two Approaches to Modeling the Seismic Waves Spread in the Heterogeneous 2D Medium with Gas Cavities -- 9.1 Introduction -- 9.2 Numerical Method -- 9.3 Contact Conditions -- 9.4 The Results of Numerical Modeling of the Seismic Waves Spread Through the Heterogeneous Media -- 9.5 The Comparison of the Models Computed by Two Different Methods -- 9.6 Conclusions -- References -- 10 Mathematical Modeling of Spatial Wave Processes in Fractured Seismic Media -- 10.1 Introduction -- 10.2 Mathematical Model -- 10.3 Fracture Models -- 10.3.1 Gas-Saturated (Empty) Fracture -- 10.3.2 Fluid-Filled Fracture -- 10.3.3 Glued Fracture -- 10.3.4 Partially Glued Fracture -- 10.4 Results of Mathematical and Physical Modeling -- 10.4.1 Geological Medium Model -- 10.4.2 Results of Mathematical Modeling -- 10.4.3 Comparison with Results of Physical Modeling -- 10.5 Conclusions -- References -- 11 Investigation of Models with Fluid- and Gas-Filled Fractures with the Help of the Grid-Characteristic Method -- 11.1 Introduction -- 11.2 Numerical Method -- 11.3 Models with Single Fractures in Homogeneous and Heterogeneous Media. 11.4 Models with Clusters of Fractures in Heterogeneous Media -- 11.5 Conclusions -- References -- 12 Modeling Wave Responses from Thawed Permafrost Zones -- 12.1 Introduction -- 12.2 Mathematical Model and Numerical Method -- 12.2.1 Mathematical Model -- 12.2.2 Grid-Characteristic Method -- 12.3 High-Order One-Dimensional Scheme -- 12.4 Simulation Results -- 12.5 Conclusions -- References -- 13 Modeling of Fiber-Metal Laminate Residual Strength After a Low-Velocity Impact with a Grid-Characteristic Numerical Method -- 13.1 Introduction -- 13.2 Material Model and Numerical Method -- 13.3 Numerical Results -- 13.3.1 Problem Statement -- 13.3.2 Wavefronts During Low-Velocity Impacts -- 13.3.3 Wavefronts at Different Layings of Composite Plies -- 13.3.4 Angled Impacts with Different Friction Coefficients -- 13.3.5 Quasi-Static Loading -- 13.4 Conclusions -- References -- 14 Modeling Movement of Train Along Bridge by Grid-Characteristic Method -- 14.1 Introduction -- 14.2 Methods -- 14.2.1 Grid-Characteristic Method -- 14.2.2 Initial and Border Conditions -- 14.3 Results -- 14.3.1 Ballast Railway Track -- 14.3.2 Nonballast Railway Track -- 14.4 Conclusions -- References -- 15 Seismic Evaluation of Two-Storeyed Unreinforced Masonry Building

with Rigid Diaphragm Using Nonlinear Static Analysis -- 15.1
Introduction -- 15.2 Description of Sample Existing Building -- 15.3
Linear Static Analysis -- 15.3.1 As Per IS 1893:2002 -- 15.3.2 As Per
FEMA-356 (2000) -- 15.4 Nonlinear Static (Pushover) Analysis --
15.4.1 Modeling of Masonry Building -- 15.4.2 Nonlinear Static
Analysis of URM Building Without Bond Beams -- 15.4.3 Nonlinear
Static Analysis with Bond Beams -- 15.5 Results and Conclusions --
References -- 16 Numerical Study of Thin Composite Structures
Vibrations for Material Parameters Identification -- 16.1 Introduction.
16.2 Mathematical Model and Numerical Method -- 16.3 Numerical
Results -- 16.4 Conclusions -- References -- 17 The Study
of the Physical Processes that Cause the Destruction and Fragmentation
of Meteoroids in the Atmosphere -- 17.1 Introduction -- 17.2
Dynamics of a Meteoroid Prior to Fragmentation -- 17.3 Fragmentation
of Meteoroid -- 17.4 The Results of the Calculation -- 17.4.1 The
Tunguska Bolide -- 17.4.2 The Vitim Bolide -- 17.4.3 The Chelyabinsk
Bolide -- 17.5 Conclusions -- References -- 18 Personalized
Geometric Modeling of a Human Knee: Data, Algorithms, Outcomes --
18.1 Introduction -- 18.2 Personalized Geometric Model of a Human
Knee -- 18.2.1 Knee Bones -- 18.2.2 Knee Ligaments -- 18.3
Biomechanical Model of a Human Knee -- 18.4 Example
of Personalized Simulation -- 18.5 Conclusions -- References -- 19
Personalization of Mathematical Models of Human Atrial Action
Potential -- 19.1 Introduction -- 19.2 Methods -- 19.2.1 Experimental
Data Acquisition -- 19.2.2 Computer Simulations -- 19.3 Results --
19.3.1 Experimental AP Waveforms -- 19.3.2 Genetic Algorithm Runs
-- 19.4 Discussion -- 19.5 Conclusions -- References -- 20
Computational Study of the Effect of Blood Viscosity to the Coronary
Blood Flow by 1D Haemodynamics Approach -- 20.1 Introduction --
20.2 Methodology of Modeling Blood Viscosity in Reduced Order
Models -- 20.3 Blood Viscosity in 1D Model -- 20.3.1 1D Model
of Haemodynamics with Application to Coronary Circulation -- 20.3.2
Blood Viscosity and Friction -- 20.4 Results of Computational
Simulations -- 20.5 Conclusions -- References -- 21 Simulation
of the Human Head Ultrasound Study by Grid-Characteristic Method
on Analytically Generated Curved Meshes -- 21.1 Introduction -- 21.2
The Solved Boundary-Value Problem of Elastic and Acoustic Wave
Equations -- 21.3 Analytical Expressions of Human Head Tissues
Shape.
21.4 Covering the Integration Domain by the System of Conformal
Structured Curved Meshes -- 21.5 Generation of Structured Curved
Mesh by Analytical Approach -- 21.6 Numerical Examples -- 21.7
Conclusions -- References -- 22 Reaction-Diffusion Model
of Coexistence of Viruses in the Space of Genotypes -- 22.1
Introduction -- 22.2 Analytical Solution of Virus Coexistence -- 22.3
Numerical Simulations of Virus Coexistence -- 22.4 Generalization
of the Virus Mortality Functions -- 22.5 Conclusions -- References --
23 Numerical Simulation of the Denture Prosthesis Integrity Under
Typical Chewing Loads -- 23.1 Introduction -- 23.2 Mathematical
Modeling of Laminar Dentures of the Upper and Lower Jaws -- 23.3
Boundary Conditions and Chewing Loads -- 23.4 Results
and Discussion -- 23.5 Conclusions -- References -- 24 Numerical
Modeling of Elastic Wave Propagation in a Human Craniocerebral Area
with Discontinuous Galerkin Method -- 24.1 Introduction -- 24.2
Numerical Method -- 24.3 Numerical Results -- 24.3.1 Problem
Statement -- 24.3.2 Temple Strike -- 24.3.3 Nape Strike -- 24.3.4
Vertex Strike -- 24.3.5 Forehead Strike -- 24.4 Conclusions --
References -- Author Index.
