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Part 1. Abstract Formulation.-Optimization-Based Modeling with Applications to Transport: Part 2. The Optimization Algorithm.-Optimization-Based Modeling with Applications to Transport: Part 3. Computational Studies.-Part IV: Control and Uncertain Systems Newton' s Method and Secant Method for Set-Valued Mappings.-Optimal Control of Multibody Systems in Resistive Media.-Classical and Relaxed Progressively Refining Discretization- Optimization Methods for Optimal Control Problems Defined by Ordinary Differential Equations.-On the Asymptotic Stabilization of an Uncertain Bioprocess Model.-Reachable Sets of Impulsive Control System with Cone Constraint on the Control and Their Estimates.-Optimal Mass Transportation-Based Models for Neuronal Fibers.-Optimal Controls in Models of Economic Growth and the Environment .-On the Minimum Time Problem for Dodgem Car–Like Bang–Singular Extremals.-Perturbation Bounds for the Nonlinear Matrix Equation X + AHX1A + BHX1B = I.-Part V: Applications of Metaheuristics to Large-ScaleProblems Sensitivity Analysis for the Purposes of Parameter Identification of a S. cerevisiae Fed-Batch Cultivation.-A Matheuristic Algorithm for a Large-Scale Energy Management Problem.-On a Game-Method for Modelling with Intuitionistic Fuzzy Estimations: Part 1.-A Generalized Net with an ACO-Algorithm Optimization Component.-Time Series Prediction by Artificial Neural Networks and Differential Evolution in Distributed Environment.-Differential Evolution Applied to Large Scale Parametric Interval Linear Systems.-User-Centric Optimization with Evolutionary and Memetic Systems.-Intuitionistic Fuzzy Estimation of the Ant Colony Optimization Starting Points.-Variable Neighborhood Search for Robust Optimization and Applications to Aerodynamics .-Processor Array Design with the Use of Genetic Algorithm.-A Hybrid Genetic Algorithm for Parameter Identification of Bioprocess Models.-A General Frame for Building Optimal Multiple SVM Kernels.-Part VI: Environmental Modeling Modeling of Toxic Substances in the Atmosphere – Risk Analysis and Emergency Forecast .-Some Aspects of Impact in the Potential Climate Change on Ozone Pollution Levels over Bulgaria from High Resolution Simulations.-New Parallel Implementation of an Air Pollution Computer Model –Performance Study on an IBM Blue Gene/P Computer -- Simulation of the 2009 Harmanli Fire (Bulgaria).-A Computational Approach for Remediation Procedures in Horizontal Subsurface Flow Constructed Wetlands.-Parallel Computation of Sensitivity Analysis Data for the Danish Eulerian Model.-Implementation of Two Different Shadow Models into EULAG Model: Madrid Case Study.-Model Simulation of Air Pollution Due to April 2010 Iceland Volcano Eruption.-Automatic Data Quality Control of Environmental Data.-Part VII: Large-Scale Computing on Many-Core Architectures Computing Boundary Element Method's Matrices on GPU.-A Parallel Algorithm with Improved Performance of Finite Volume Method (SIMPLE-TS).-Towards Distributed Heterogenous High-Performance Computing with ViennaCL.-High-Throughput-Screening of Medical Image Data on Heterogeneous Clusters.-Part VIII: Multiscale Industrial, Enviromental and Biomedical Problems Preconditioning of Linear Systems Arising in Finite Element Discretizations of the Brinkman Equation.-Part IX: Efficient Algorithms of Computational -- Geometry Blending Functions for Hermite Interpolation by Beta-Function B-Splines on Triangulations.-Index Mapping between Tensor-Product Wavelet Bases of Different Number of Variables, and Computing Multivariate Orthogonal Discrete Wavelet Transforms on Graphics Processing Units.-Interpolation of Curvature and Torsion Using Expo-Rational B-Splines.-Hermite Interpolation Using ERBS with Trigonometric Polynomial Local Functions.-Triangular Beta-Function B-Spline Finite Elements:

Evaluation and Graphical Comparisons.-Part X: High-Performance Monte Carlo Simulations.-Sensitivity Study of Heston Stochastic Volatility Model Using GPGPU.-A Monte Carlo Simulator for Non-contact Mode Atomic Forc.-Microscopy.-Numerical Integration Using Sequences Generating Permutations.-XII Table of Contents.-Optimization of Intermolecular Interaction Potential Energy Parameters for Monte-Carlo and Molecular Dynamics Simulations.-Phonon-Induced Decoherence in Electron Evolution.-Study of Human Influenza's Spreading Phenomenon .-Part XI: Voxel-Based Computations.-Multilevel Solvers with Aggregations for Voxel Based Analysis of Geomaterials.-A Highly Scalable Matrix-Free Multigrid Solver for FE Analysis.-Based on a Pointer-Less Octree.-Aliasing Properties of Voxels in Three-Dimensional Sampling Lattices .-Analysis of a Fast Fourier Transform Based Method for Modeling of Heterogeneous Materials .-Part XII: Contributed Papers Properties and Estimates of an Integral Type Nonconforming Finite Element.-Quadratic Finite Element Approximation of a Contact Eigenvalue Problem.-Optimization Methods for Calibration of Heat Conduction Models.-Block-Preconditioners for Conforming and Non-conforming FEM Discretizations of the Cahn-Hilliard Equation.-Comparison of Two Numerical Methods for Computation of American Type of the Floating Strike Asian Option.-A Kernel-Based Algorithm for Numerical Solution of Nonlinear PDEs in Finance.-Improving the Efficiency of Parallel FEM Simulations on Voxel Domains .-On the Robustness of Two-Level Preconditioners for Quadratic FE Orthotropic Elliptic Problems.-A Computational Approach for the Earthquake Response of Cable-Braced Reinforced Concrete Structures under Environmental Actions.-An Inverse Problem for the Stationary Kirchhoff Equation.-An Improved Sparse Matrix-Vector Multiply Based on Recursive Sparse Blocks Layout.-On the Differences of the Discrete Weak and Strong Maximum Principles for Elliptic Operators .-Adaptive FEM Package with Decentralized Parallel Adaptation of Tetrahedral Meshes.-Efficient Simulations of the Transport Properties of Spin Field-Effect Transistors Built on Silicon Fins.-Large-Scale Simulation of Uniform Load Traffic for Modeling of Throughput on a Crossbar Switch Node.-Two-Phase Porous Media Flow Simulation on a Hybrid Cluster .-Petrov-Galerkin Analysis for a Degenerate Parabolic Equation in Zero-Coupon Bond Pricing.-Agents in Grid System — Design and Implementation.-Using Blue Gene/P and GPUs to Accelerate Computations in the EULAG Model.-.

Sommario/riassunto

This book constitutes the thoroughly refereed post-conference proceedings of the 8th International Conference on Large-Scale Scientific Computations, LSSC 2011, held in Sozopol, Bulgaria, in June 2011. The 74 revised full papers presented together with 3 plenary and invited papers were carefully reviewed and selected from numerous submissions. The papers are organized in topical sections on robust multigrid, multilevel and multiscale, deterministic and stochastic methods for modeling highly heterogeneous media, advanced methods for transport, control and uncertain systems, applications of metaheuristics to large-scale problems, environmental modelling, large scale computing on many-core architectures, multiscale industrial, enviromental and biomedical problems, efficient algorithms of computational geometry, high performance Monte Carlo simulations, voxel based computations and contributed papers.