

# Table of Contents

Preface	v
<b>Keynote Papers</b>	
Methodological Aspects of High Performance Scientific Computing J. Linden, A. Schüller, U. Trottenberg	1
Generalized Steady-State, a System Concept in Simulation L. Dekker	11
Problems and Prospects in the Validation of Dynamic Models D.J. Murray-Smith	21
On some Recent Results in the Field of Constrained Dynamical Systems P. Borne, N.E. Radhy	29
Knowledge-based Systems in Simulation - Trends and Applications A. Lehmann	39
Molecular and Quasimolecular Modelling of Solids and Fluids D. Greenspan	43
<b>Methodology and Basic Concepts of Systems Analysis</b>	
Control with Gradient Systems D. Popescu, N. Giurescu, C. Gheorghe	45
Dynamic Programming Approach in Solving Multistage Optimal Control Problems J. Gutenbaum	55
On the Dynamic Programming Method for Systems with Delays A.V. Kim	61
On Problem of Stochastic Bilinear Realization G. Terdik, P. Várlaki, J. Bokor	67
An Efficient Algorithm for Solving Nonlinearly Constrained Optimization Problems V. Sima	73
Transient Phenomena Simulation of Special DC Electrical Drive P. Ostalczyk, J. Kacerka	79

<b>Guaranteed Control Algorithms of the Dynamic Systems under Statistical Uncertainty Conditions</b>	<b>85</b>
V. Shiryayev	
<b>Coprime Factors Model Reduction Method Based on Square-Root Balancing-Free Techniques</b>	<b>91</b>
A. Varga	
<b>Analysis of the Doppler Signal by Frequency Modulation in Ultrasonic Flow Measurement of Fluids</b>	<b>97</b>
V. Matko, D. Donlagić, J. Koprivnikar	
<b>Intelligent Integrated Decision-Making System for FMS Scheduling</b>	<b>105</b>
J.F. O'Kane, D.K. Harrison	
<b>Multi Objective Milling Process Optimisation</b>	<b>111</b>
V.I. Vitanov, D.K. Harrison, J.F. O'Kane, N.H. Minkov, G.R. Sotirov	
<b>Special Theory of Relativity - an Alternative Perspective</b>	<b>117</b>
R.H. Adams	
<b>Synthesis of Optimal Regulator for Stationary Delay Systems</b>	<b>123</b>
V.V. Alsevich	
<b>Numerical Method for the Optimal Estimation of the Initial State of Linear Dynamic Systems</b>	<b>129</b>
V.G. Medvedev	
<b>A Computerized Decision Support System for Systematic Design of Flexible Assembly Systems</b>	<b>135</b>
C. Olofsson, C. Johansson	
<b>On the Solution to the Riccati Differential Matrix Equation</b>	<b>141</b>
C. Boțan	
<b>New Improvement in the Fuel Temperature Calculation</b>	<b>147</b>
C. Beguinet	
<b>A Simulation Study of Task Allocation Algorithms for Distributed Multistage Decision Support Systems</b>	<b>155</b>
L. Borzemski	
<b>Hierachic Control of Conveyor Transport Processes in Technological Systems</b>	<b>161</b>
R. Friedrich, H. Kollasko, P. Metzing	

Guaranteed Exponential Stability in Partly Unknown Large Scale Systems A. Swierniak, K. Simek	167
Identification Method for Certain Processes in Commutation Test Laboratories M. Sasu	173
Semi-Infinite Optimization in Engineering Design G.M. Gramlich	183
Local Assignability of Linear Time-Invariant Systems E. Jezierski	189
Observer Design for Translatory Hydraulic Drives via Parameter Identification of a Bilinear Observer Canonical Form X. Yin, R. Ingenbleek, H. Schwarz	195
On-line Decentralized Control of Uncertain Interconnected Systems L. Bakule	201
Multipoint Approximation Method in Optimization Problems with Expensive Function Values V. V. Toropov	207
Distributed Access Control Schemes for Training Simulators M. Metzger	213
Effects of Sampled and Quantized Control on the Geometry of Reachability Sets of Linear Continuous Systems O. Păstrăvanu, M. Voicu	221
Fault Tolerant Control of Complex Industrial Systems Subjected to Measurement Disturbances I. P. Popchev, S. G. Savov	227
Construction of Mathematical Models of Continuous Systems on the Basis of Discrete Measurement Data A. I. Yastrebov, M. Grzywaczewski	233
The Analysis of Stability and Bifurcation of Carbon Turnover in Soil - Vegetation Systems on the Basis of the Nonlinear Model I. M. Ryzhova	239
The Control of Performing the Complex Work with Application to Diagnostic in Medicine I. Pozniak	245

The Concept of Computer System with Distributed Data Bases to Experiment Control and Parameter Estimation to Relation Systems L. Koszalka	251
Parameter Identification and Optimization of Nonlinear Dynamic Systems, Exemplified by Mechatronic Systems M. Landwehr, U. Lefarth, E. Waßmuth	257
Sensitivity Analysis of an Energy Demand Model J. Riquelme, M. Toro, S. Valero, J. Aracil	263
Optimal Control of an Energy Demand Model F. Gordillo, M. Toro, S. Valero, J. Aracil	269
Parameter Estimation by Maximum Likelihood in a Model of Tryptophan Renal Excretion A. Bertuzzi, M. Bizarri, A. De Santis, A. Gandolfi	275
Construction of Mathematical Models of Optimization Problems Using Expert Estimates L. F. Guljanitsky, I. V. Sergienko	281
Control Strategy of PWM Transistor Inverter Drive System for Electric Vehicle T. Stefanski	287
Optimization of the Output Matrix for Discrete Time Linear Systems Estimation L. Carotenuto, P. Muraca, P. Pugliese, G. Raiconi	293
<b>Methods and Tools of Simulation</b>	
Massive Parallel Computers and their Application in Simulation S. Burkhardt, K.-D. Drey	299
On the Numerical Computation of Phase-Space-Trajectories M. H. W. Hoffmann	307
The New Expressions for Blocking Probability for Route in Integrated Services Digital Networks A. Grzech, A. Kasprzak, N. Chouigui	313
The Similarity Transformation of the Roesser Model - Minimization of the Dimension K. Gałkowski	319

<b>Cellular Automata Simulation Shell</b> U. Hörkens, R. Hofestädt	325
<b>Neural-Type Continuous Petri Net Concept for System Modeling and Simulation</b> R. Jasinevichius	331
<b>Knowledge Based Qualitative Simulation of Related Signals - an Application in Electrocardiography</b> N. B. Jones, J. T. Wang, A. S. Sehmi, D. P. de Bono	337
<b>The Mathematical Model of the Hysteresis Loop</b> M. Witold, M. Jerzy	343
<b>Approaches to the Analysis of Graphics Elements for Efficient High Level Language Execution</b> H. A. Aboalsamh	351
<b>Performance Evaluation of Computer Networks with Blockings</b> G. Bergholz, K. Richter	357
<b>Process Talk: An Object Oriented Framework for Distributed Automation Software</b> K. Pirklbauer, R. Plösch, R. Weinreich	363
<b>Modelling of a Fuzzy Controller by Using a Parallel Architecture</b> L. Fortuna, A. Gallo, S. Graziani, M. G. Xibilia	369
<b>Analysis of Modified Resequencing Protocol in Network with Data/Voice Integration</b> K. Nowicki, T. Uhl	375
<b>A Simple Way to Parallel Simulation with "PARSIM"</b> R. Schönfeld, V. Müller, A. Schierenbeck	381
<b>The User Interface of Simulation Tools. A Task Oriented Requirement Analysis</b> S. Kämper	387
<b>The Models of External Actions for Mathematical Simulation</b> Y. L. Menshikov, N. V. Polyakov	393
<b>DRE Integration Algorithms for Real-Time Simulation</b> M. Metzger	399

The Simulation of a Container Terminal for Intermodal Traffic by Means of Petri Nets J. Voges	405
Local One-Dimensional Method for Solving Parabolic Equations in Thermal Conductivity Process Modeling and Boundary Condition Identification Problems E. P. Dyban, B. D. Bileka, V. J. Kabkov	411
An Approach to the Simulation of Heterogeneous Systems Th. Mochel, A. Oberweis, V. Sänger	417
SHSER: An Algorithm for Recursive Filters Th. N. Mohammed	423
The Bond Graph Editor and Continuous Model Translator J. Glowacki, K. Grabowiecki, A. Rybicki	433
Software Process Simulation on Arbitrary Levels of Abstraction V. Gruhn	439
Modeling of Objects That May Change their Shapes S. Stifter	445
Petri Nets and AI in Simulation A. Jávor	451
X-Prime. An Interactive Simulation Package J. A. Burton, M. H. H. van Dijk, A. Symons	457
<b>Applications of Modelling and Simulation</b>	
Simulation of Contact Problems in Mechanical Systems H. Ecker	463
Modeling Atmospheric Transport of Heavy Metals in Lagrangian Framework H. Modzelewski, J. Bartnicki	469
Numerical Study of Interactive Biological Units C. Machbub, J. Burger, G. Chauvet	477
Simulation of Robot Dynamics Including Control Systems J. Hödl, F. Pfeiffer	483

<b>Selection Procedures and their Application in Economy and Ecology</b> A. G. Ivachnenko, J. -A. Müller	489
<b>Modeling and Simulation of the Waste-Water Purification Process</b> M. Köhne, St. Zoll, K. Hoen	495
<b>A Modelling Procedure of the Simple Mechanical Dynamic Systems with Using a Nonlinear Model</b> M. Kulisiewicz, St. Piesak	501
<b>Simulation of Magnetic Devices by a State Model with IDAS</b> Th. Kleineberg	507
<b>Artificial Vision Used to Produce Wire Diagrams of Omniprojectable Objects</b> R. M. Carnaghan, T. C. Spamer, E. W. Reed	513
<b>The Model of a Conference</b> R. Starkermann	517
<b>The Simulation of Genetic Processes</b> R. Hofestädt, H. P. Müller	523
<b>Model Based Interpretation of Environmental Data</b> F. Schmidt	529
<b>A Graphical Monitor for the Validation of Discrete Event Simulation Models</b> V. Guttenberg, B. Page	535
<b>The Correction of Color Distortions in Computer Vision System of Robototechnical Complexes</b> S. M. Ibatullin, J. M. Titov	543
<b>Simulation of Discrete Systems in Real-Time LOTOS</b> Z. Huzar	549
<b>Tools for Analysis and Design of Computer Integrated Manufacturing Systems</b> B. Scholz-Reiter	555
<b>CASE Tools for Modeling and Maintenance of a Unified Information/Data Model for Decision Support Systems in Manufacturing</b> B. Scholz-Reiter	561

Model Simulation of the Dynamic Behaviour of a Multi-Zone Tubular Furnace H. Sauermann, P. Deus, P. Metzing, H. Krause	567
Parallel Simulation of Atmospheric Dispersion in Radiation Protection S. Gottwald, U. Nielsen, M. V. Rekowski, G. Wiesner	575
BiCMOS Timing Level in a Time Warp Parallel Multilevel Logic Simulator N. Simic	581
Simulation of Monthly Values of Nitrate Concentrations and Prediction of their Development in the Ondava Basin O. Mendel, P. Pekárová	587
Dynamic Repartitioning in a Parallel Logic Simulator H. Ortner, R. Keil, R. Schenk	593
An Object Oriented Programming Tool for Developing Simulation and PLC Control Modules for FMS Applications S. Wilkinson, G. Smith	599
Computer Aided Modelling and Simulation of Air Conditioning Plants H. Hoffmeister, H. Rake	605
Simulation of Discrete Systems with an Object Oriented Concept Th. Mochel	611
Computer Calculation of Charge Heating in an Electric Bell-Furnace K. T. Januszkiewicz	617
Mathematical Modeling of Measles Epidemics and the Optimisation of Corresponding Antiepidemic Programmes A. Cristea, C. N. Zaharia, I. Deutsch, E. Bunescu, M. G. Blujdescu	623
Simulational Investigation of the Cycloconverter Fed Synchromotor Drive on a Transputer Net M. Zajac, Z. R. Kich, H. Krawiec	629
Direct and Inverse Modelling for Continuous Casting Processes J. R. Boehmer, F. N. Fett	635

Hierarchical Modelling of Production Systems K. Mertins, M. Rabe, M. Bergmann	641
Application of Expert Systems for Differential Diagnostics of Cardio-Vascular Diseases V. Shusterman, O. Trofimov	647
Modelling of Complex Catalytic Reactions G. S. Yablonskii, S. I. Spivak, M. Z. Lazman	651
The Dynamical Model of a Centrifugal Pump K. N. Proskuriakov, A. K. Ustinov	657
Feed System of the Direct-Current Electric Traction Modelling in Transient States K. Wincencik, W. Marcinek	665
A Simulation Model to Forecast the Dynamics of Manpower Structure M. Ovsenik	671
A Method of Gearbox Ratios Determination for Energy Saving or Environment Protection H. Kormanski, K. Rudzinska	677
<b>Workshop</b>	
Array-Based Logic O.I. Franksen	683
<b>Late Keynote Paper</b>	
Complex Systems Analysis for Managerial Decision Support in a Competitive Business Environment M.G. Singh	687
<b>Index</b>	697