

Contents

Part I. Modeling

What Is a Hybrid System?	3
<i>Jan Lunze</i>	
Description of Hybrid Systems by Modified Petri Nets	15
<i>Rainer Drath</i>	
Model Based Development of Hybrid Systems: Specification, Simulation, Test Case Generation	37
<i>Klaus Bender, Manfred Broy, István Péter, Alexander Pretschner, Thomas Stauner</i>	
Hybrid Modeling of Complex Process Control Function Blocks	53
<i>Ansgar Münnemann, Udo Enste, Ulrich Epple</i>	
Discrete Models for Hybrid Systems	67
<i>Jan Lunze, Jörg Raisch</i>	

Part II. Simulation

An Environment for the Integrated Modelling of Systems with Complex Continuous and Discrete Dynamics	83
<i>Manuel A. Pereira Remelhe, Sebastian Engell, Martin Otter, André Deparade, Pieter J. Mosterman</i>	
A DEVS-Based Approach for Modeling and Simulation of Hybrid Variable Structure Systems	107
<i>Thorsten Pawletta, Bernhard Lampe, Sven Pawletta, Wolfgang Drewelow</i>	
Object-Oriented Development of Simulation Models for Complex Hybrid Systems	131
<i>André Nordwig</i>	

Part III. Analysis and Verification

Introduction to the Analysis and Verification of Hybrid Systems	153
<i>Stefan Kowalewski</i>	

Reachability Analysis and Control of a Special Class of Hybrid Systems . .	173
<i>Gero Nenninger, Goran Frehse, Volker Krebs</i>	

Performance Models for a Hybrid Reactor System	193
<i>Katinka Wolter, Andrea Zisowsky, Günter Hommel</i>	

Using Parameterized Timestamp Petri Nets in Automatic Control	211
<i>Carlo Simon, Kurt Lautenbach, Hans-Michael Hanisch, Jan Thieme</i>	

Compositional Verification of Continuous-Discrete Systems	225
<i>Ralf Huuck, Ben Lukoschus, Goran Frehse, Sebastian Engell</i>	

Part IV. Controller Synthesis

Abstraction Based Supervisory Controller Synthesis for High Order Monotone Continuous Systems	247
<i>Thomas Moor, Jörg Raisch</i>	

Hybrid Reconfigurable Control	267
<i>Jan Lunze, Thomas Steffen</i>	

Automatic Design of Controllers for Hybrid Systems Using Genetic Algorithms	285
<i>Stefan Wegele, Eckehard Schnieder, Mourad Chouikha</i>	

Synthesis of a Discrete Control for Hybrid Systems by Means of a Petri-Net-State-Model	295
<i>Christian Müller, Philipp Orth, Dirk Abel, Heinrich Rake</i>	

Nonlinear Hybrid Dynamical Systems: Modeling, Optimal Control, and Applications	311
<i>Martin Buss, Markus Glocker, Michael Hardt, Oskar von Stryk, Roland Bulirsch, Günther Schmidt</i>	

Generation of Optimal Control Policies for Systems with Switched Hybrid Dynamics	337
<i>Olaf Stursberg, Sebastian Panek, Jochen Till, Sebastian Engell</i>	

Part V. Applications

Definition of a Type of Continuous-Discrete High-Level Petri Nets and Its Application to the Performance Analysis of Train Protection Systems	355
<i>Gebhard Decknatel, Roman Slovák, Eckehard Schnieder</i>	

Simulation for Analysis of Aircraft Elevator Feedback and Redundancy Control 369
Pieter J. Mosterman, Manuel A. Pereira Remelhe, Sebastian Engell, Martin Otter

Development of Hybrid Component Models for Online Monitoring of Complex Dynamic Systems 391
Susanne Manz, Peter Göhner

Modelling and Simulation of Controlled Road Traffic 419
Olaf Czogalla, Robert Hoyer, Ulrich Jumar

Hybrid Control of Multi-fingered Dextrous Robotic Hands 437
Thomas Schlegl, Martin Buss, Günther Schmidt

References 467

Index 501

Modelling, Analysis and Design of Hybrid Systems

Engell, S.; Frehse, G.; Schnieder, E. (Eds.)

2002, XV, 504 p., Softcover

ISBN: 978-3-540-43812-0