Contents

Part I Abduction, Problem Solving, and Practical Reasoning

Animal Abduction
From Mindless Organisms to Artifactual Mediators
Lorenzo Magnani .......................................................... 3

Communicative Gestures Facilitate Problem Solving
for Both Communicators and Recipients
Sandra C. Lozano, Barbara Tversky .............................. 39

The Concept of Fallacy is Empty
A Resource-Bound Approach to Error
John Woods ................................................................. 69

Abductive Reasoning, Information, and Mechanical Systems
Maria Eunice Quilici Gonzalez, Mariana Claudia Broens
and Fabricio Loffredo D’Ottaviano ................................. 91

Automated Abduction in Scientific Discovery
Oliver Ray ................................................................. 103

Abduction, Medical Semeiotics and Semioethics
Individual and Social Symptomatology from a Semiotic Perspective
Susan Petrilli ............................................................. 117

Abduction and Modeling in Biosemiotics and Sociosemiotics
Augusto Ponzio .......................................................... 131

Reason out Emergence from Cellular Automata Modeling
Leilei Qi, Huaxia Zhang ............................................. 147

Belief Ascription and De Re Communication
Yuan Ren ................................................................. 161
Multiagent-Based Simulation in Biology
A Critical Analysis
Francesco Amigoni, Viola Schiaffonati ........................................ 179

Mathematics through Diagrams: Microscopes in Non-Standard and Smooth Analysis
Riccardo Dossena, Lorenzo Magnani ....................................... 193

Part II Models, Mental Models, Representations, and Medical Reasoning

Cognition, Environment and the Collapse of Civilizations
Michael E. Gorman ................................................................. 217

Cognitive Aspects of Tacit Knowledge and Cultural Diversity
Riccardo Viale, Andrea Pozzali ................................................ 229

The Functional-Analogical Explanation in Chinese Science and Technology
A Case Study of the Theory of Yin-Yang and Five Elements
Huazia Zhang, Zhilin Zhang ...................................................... 245

Model-Based Reasoning and Diagnosis in Traditional Chinese Medicine (TCM)
Zhikang Wang ........................................................................ 261

Model-Based Reasoning in Cognitive Science
Yi-dong Wei ............................................................................. 273

An Examination of Model-Based Reasoning in Science and Medicine in India
Sundari Krishnamurthy ............................................................... 293

Ontology, Artefacts, and Models of Reasoning
Pasi Pohjola ............................................................................. 315

The Wondering Angels of the Fractal Art
Viorel Guliciuc ........................................................................ 333

Part III Logical and Computational Aspects of Model-Based Reasoning

Polynomizing: Logic Inference in Polynomial Format and the Legacy of Boole
Walter Carnielli ....................................................................... 349
Abductive Inference and Iterated Conditionals
Claudio Pizzi ................................................................. 365

Peircean Pragmatic Truth and da Costa’s Quasi-Truth
Itala M. Loffredo D’Ottaviano, Carlos Hifune .................. 383

Sliding Mode Motion Control Strategies
for Rigid Robot Manipulators
Antonella Ferrara, Lorenza Magnani .............................. 399

Model-Based Chemical Compound Formulation
Stefania Bandini, Alessandro Mosca and Matteo Palmonari .... 413

Model-Based Reasoning for Self-Repair
of Autonomous Mobile Robots
Michael Hofbaur, Johannes Kób, Gerald Steinbauer
and Franz Wotawa .......................................................... 431

Application of Bayesian Inference
to Automatic Semantic Annotation of Videos
Fangshi Wang, De Xu, Hongli Xu, Wei Lu and Weixin Wu .... 447

An Algebraic Approach to Model-Based Diagnosis
Shangmin Luan, Lorenzo Magnani and Guozhong Dai ......... 467

CYBERNARD: A Computational Reconstruction
of Claude Bernard’s Scientific Discoveries
Jean-Gabriel Ganascia, Claude Debru ............................. 497

Do Computational Models of Reading Need
a Bit of Semantics?
Remo Job, Claudio Mulatti .............................................. 511