

2010 40th IEEE International Symposium on Multiple-Valued Logic

(ISMVL 2010)

**Barcelona, Spain
26-28 May 2010**



IEEE Catalog Number: CFP10034-PRT
ISBN: 978-1-4244-6752-5

40th IEEE International Symposium on Multiple-Valued Logic

ISMVL 2010

Table of Contents

Preface	ix
Organizing Committee	xi
Program Committee	xii
Additional Reviewers	xiii
Keynote Address Abstract	xiv

Technical Papers

Spectral Techniques: The First Decade of the XXI Century (Invited Paper)	3
<i>Claudio Moraga</i>	
Minimal Unsatisfiability: Models, Algorithms and Applications (Invited Paper)	9
<i>Joao Marques-Silva</i>	
MDGs Reduction Technique Based on the HOL Theorem Prover	15
<i>Sa'ed Abed and Otmane Ait Mohamed</i>	
The Automorphism Group of Finite Godel Algebras	21
<i>Stefano Aguzzoli, Brunella Gerla, and Vincenzo Marra</i>	
Schauder Hats for the Two-Variable Fragment of BL	27
<i>Stefano Aguzzoli and Simone Bova</i>	
Learning of the Non-threshold Functions of Multiple-Valued Logic by a Single	
Multi-valued Neuron with a Periodic Activation Function	33
<i>Igor Aizenberg</i>	
Synthesis of Reversible Circuits with No Ancilla Bits for Large Reversible Functions	
Specified with Bit Equations	39
<i>Nouardin Alhagi, Maher Hawash, and Marek Perkowski</i>	
New Insights into Encodings from MaxCSP into Partial MaxSAT	46
<i>Josep Argelich, Alba Cabiscol, Inès Lynce, and Felip Manyà</i>	
Non-deterministic Multi-valued Logics--A Tutorial	53
<i>Arnon Avron and Anna Zamansky</i>	
Logics of Reasonable Information Sources	61
<i>Arnon Avron, Jonathan Ben-Naim, and Beata Konikowska</i>	

Design of Tamper-Resistant Registers for Multiple-Valued Cryptographic Processors	67
<i>Yuichi Baba, Naofumi Homma, Atsushi Miyamoto, and Takaaki Aoki</i>	
On a Graded Notion of t-Norm and Dominance	73
<i>Libor Behounek, Petr Cintula, Ulrich Bodenhofer, Susanne Saminger-Platz, and Peter Sarkoci</i>	
Low Voltage Semi Floating-Gate Binary to Multiple-Value and Multiple-Value to Binary Converters	79
<i>Y. Berg</i>	
Infinite-Valued Łukasiewicz Logic Based on Principal Lattice Filters	83
<i>Félix Bou</i>	
Completions in Subvarieties of BL-Algebras	89
<i>Manuela Busaniche and Leonardo Manuel Cabrer</i>	
Two Many Values: An Algorithmic Outlook on Suszko's Thesis	93
<i>Carlos Caleiro and João Marcos</i>	
Truth-Functionality, Rough Sets and Three-Valued Logics	98
<i>Davide Ciucci and Didier Dubois</i>	
Co-stone Residuated Lattices	104
<i>Claudia Muresan</i>	
The Euler Characteristic of a Formula in Gödel Logic	108
<i>Pietro Codara, Ottavio M. D'Antona, and Vincenzo Marra</i>	
The Arity Gap of Polynomial Functions over Bounded Distributive Lattices	113
<i>Miguel Couceiro and Erkko Lehtonen</i>	
Classes of Operations Closed under Permutation, Cylindrification and Composition	117
<i>Miguel Couceiro and Erkko Lehtonen</i>	
Finitely Generated Maximal Partial Clones and Their Intersections	122
<i>Miguel Couceiro and Lucien Haddad</i>	
Quaternary Voltage-Mode Logic Cells and Fixed-Point Multiplication Circuits	128
<i>Satyendra R.P. Raju Datla and Mitchell A. Thornton</i>	
Revisiting Ultraproducts in Fuzzy Predicate Logics	134
<i>Pilar Dellunde</i>	
Generating the Variety of SMV-Algebras	140
<i>Antonio Di Nola and Tommaso Flaminio</i>	
Finding Attractors in Synchronous Multiple-Valued Networks Using SAT-Based Bounded Model Checking	144
<i>Elena Dubrova, Maxim Teslenko, and Liu Ming</i>	
An Evolutionary Algorithm for Optimization of Pseudo Kronecker Expressions	150
<i>Alexander Finder and Rolf Drechsler</i>	
Efficient Simulation-Based Debugging of Reversible Logic	156
<i>Stefan Frehse, Robert Wille, and Rolf Drechsler</i>	
Representing Fuzzy Structures in Quantum Computation with Mixed States	162
<i>Hector Freytes, Roberto Giuntini, Giuseppe Sergioli, and Antonio Aricò</i>	
Switching Activity in Stochastic Decoders	167
<i>Vincent C. Gaudet and Warren J. Gross</i>	

Toffoli Gate Implementation Using the Billiard Ball Model	173
<i>Hadi Hosseini and Gerhard W. Dueck</i>	
Low-Power Multiple-Valued Reconfigurable VLSI Based on Superposition of Bit-Serial Data and Current-Source Control Signals	179
<i>Akitaka Ishikawa, Nobuaki Okada, and Michitaka Kameyama</i>	
Note on Construction of Probabilities on Many-Valued Events via Schauder Bases and Inverse Limits	185
<i>Tomáš Kroupa</i>	
A Classification of Partial Boolean Clones	189
<i>Dietlinde Lau and Karsten Schölzel</i>	
Endoprimal Monoids and Witness Lemma in Clone Theory	195
<i>Hajime Machida and Ivo G. Rosenberg</i>	
Galois Connection for Hyperclones	201
<i>Hajime Machida, Jovanka Pantovic, and Ivo G. Rosenberg</i>	
Interpolation Properties for Uninorm Based Logics	205
<i>Enrico Marchioni and George Metcalfe</i>	
One-Color Two-Phase Asynchronous Communication Links Based on Multiple-Valued Simultaneous Control	211
<i>Atsushi Matsumoto, Naoya Onizawa, and Takahiro Hanyu</i>	
Reducing Reversible Circuit Cost by Adding Lines	217
<i>D. Michael Miller, Robert Wille, and Rolf Drechsler</i>	
Floating-Point Numeric Function Generators Based on Piecewise-Split EVMDDs	223
<i>Shinobu Nagayama, Tsutomu Sasao, and Jon T. Butler</i>	
A Comparison of Architectures for Various Decision Diagram Machines	229
<i>Hiroki Nakahara, Tsutomu Sasao, and Munehiro Matsuura</i>	
Low-Energy Pipelined Multiple-Valued Current-Mode Circuit with 8-Level Static Current-Source Control	235
<i>Masanori Natsui, Takashi Arimitsu, and Takahiro Hanyu</i>	
Reconstruction of Additive Generators from Partial Derivatives of Continuous Archimedean t-Norms	241
<i>Mirko Navara, Milan Petrik, and Peter Sarkoci</i>	
Synthesis of Small Reversible and Pseudo-Reversible Circuits Using Y-Gates and Inverse Y-Gates	245
<i>Marek Perkowski, Nouraddin Alhagi, Martin Lukac, Neha Saxena, and Scott Blakely</i>	
A Graded Inference Approach Based on Infinite-Valued Łukasiewicz Semantics	252
<i>David Picado Muñoz</i>	
Multiple-Valued Logic Interpretations of Analogical, Reverse Analogical, and Paralogical Proportions	258
<i>Henri Prade and Gilles Richard</i>	
Secure Design Flow for Asynchronous Multi-valued Logic Circuits	264
<i>Ashur Rafiev, Julian P. Murphy, and Alex Yakovlev</i>	
Mapping Binary Functions to a Practical Adiabatic Quantum Computer	270
<i>David Rosenbaum and Marek Perkowski</i>	

ESOP-Based Toffoli Network Generation with Transformations	276
<i>Yasaman Sanaee and Gerhard W. Dueck</i>	
On the Number of Products to Represent Interval Functions by SOPs with Four-Valued Variables	282
<i>Tsutomu Sasao</i>	
Number of Maximal Partial Clones	288
<i>Karsten Schölzel</i>	
Information-Theoretical Mining of Determining Sets for Partially Defined Functions	294
<i>Dan A. Simovici, Dan Pletea, and Rosanne Vetro</i>	
Queries with Multivalued Logic-Based Semantics for Imperfect Information Fusion	300
<i>Daniel Stamate</i>	
Heterogeneous Decision Diagrams for Applications in Harmonic Analysis on Finite Non-Abelian Groups	307
<i>Stanislav Stankovic, Jaakko Astola, D. Michael Miller, and Radomir S. Stankovic</i>	
Remarks on Applicability of Spectral Representations on Finite Non-Abelian Groups in the Design for Regularity	313
<i>Radomir S. Stankovic, Jaakko T. Astola, and Claudio Moraga</i>	
An Ontology Mediated Multimedia Information Retrieval System	319
<i>Umberto Straccia</i>	
A Low-Power Successive Approximation Analog-to-Digital Converter Based on 2-Bit/Step Comparison	325
<i>Naoki Sugiyama, Hiroshi Noto, Yoshito Nishigami, Ryosuke Oda, and Takao Waho</i>	
A Ternary Partial-Response Signaling Scheme for Capacitively Coupled Interface	331
<i>Yasushi Yuminaka and Kyohei Kawano</i>	
Author Index	337