

# Contents

## Invited Talks

Mining the Archive of Formal Proofs . . . . .	3
<i>Jasmin Christian Blanchette, Maximilian Haslbeck, Daniel Matichuk, and Tobias Nipkow</i>	
Math Search for the Masses: Multimodal Search Interfaces and Appearance-Based Retrieval . . . . .	18
<i>Richard Zanibbi and Awelemdy Orakwue</i>	

## Calculus

Towards Formal Fault Tree Analysis Using Theorem Proving. . . . .	39
<i>Waqar Ahmad and Osman Hasan</i>	
Optimizing a Certified Proof Checker for a Large-Scale Computer-Generated Proof . . . . .	55
<i>Luis Cruz-Filipe and Peter Schneider-Kamp</i>	
A First Class Boolean Sort in First-Order Theorem Proving and TPTP . . . . .	71
<i>Evgenii Kotelnikov, Laura Kovács, and Andrei Voronkov</i>	
Type Inference for ZFH . . . . .	87
<i>Steven Obua, Jacques Fleuriot, Phil Scott, and David Aspinall</i>	
Generic Literals . . . . .	102
<i>Florian Rabe</i>	
Ranking/Unranking of Lambda Terms with Compressed de Bruijn Indices . . .	118
<i>Paul Tarau</i>	

## Digital Mathematics Libraries

A Flexiformal Model of Knowledge Dissemination and Aggregation in Mathematics . . . . .	137
<i>Mihnea Iancu and Michael Kohlhase</i>	

## Mathematical Knowledge Management

Structure Formation in Large Theories . . . . .	155
<i>Serge Autexier and Dieter Hutter</i>	

Formal Logic Definitions for Interchange Languages . . . . .	171
<i>Fulya Horozal and Florian Rabe</i>	
Math Literate Knowledge Management via Induced Material . . . . .	187
<i>Mihnea Iancu and Michael Kohlhase</i>	
Strategies for Parallel Markup. . . . .	203
<i>Bruce R. Miller</i>	
Readable Formalization of Euler’s Partition Theorem in Mizar . . . . .	211
<i>Karol Pąk</i>	
Automating Change of Representation for Proofs in Discrete Mathematics . . .	227
<i>Daniel Raggi, Alan Bundy, Gudmund Grov, and Alison Pease</i>	
Performance Evaluation and Optimization of Math-Similarity Search. . . . .	243
<i>Qun Zhang and Abdou Youssef</i>	
<b>Projects and Surveys</b>	
Mizar: State-of-the-Art and Beyond. . . . .	261
<i>Grzegorz Bancerek, Czesław Byliński, Adam Grabowski, Artur Kornilowicz, Roman Matuszewski, Adam Naumowicz, Karol Pąk, and Josef Urban</i>	
Growing the Digital Repository of Mathematical Formulae with Generic $\text{\LaTeX}$ Sources . . . . .	280
<i>Howard S. Cohl, Moritz Schubotz, Marjorie A. McClain, Bonita V. Saunders, Cherry Y. Zou, Azeem S. Mohammed, and Alex A. Danoff</i>	
Formalizing Physics: Automation, Presentation and Foundation Issues . . . . .	288
<i>Cezary Kaliszyk, Josef Urban, Umair Siddique, Sanaz Khan-Afshar, Cvetan Dunchev, and Sofiène Tahar</i>	
A Survey on Retrieval of Mathematical Knowledge. . . . .	296
<i>Ferruccio Guidi and Claudio Sacerdoti Coen</i>	
Towards the Formalization of Fractional Calculus in Higher-Order Logic. . . .	316
<i>Umair Siddique, Osman Hasan, and Sofiène Tahar</i>	
LeoPARD — A Generic Platform for the Implementation of Higher-Order Reasoners. . . . .	325
<i>Max Wisniewski, Alexander Steen, and Christoph Benzmüller</i>	

**Systems and Data**

TIP: Tons of Inductive Problems. . . . . 333  
*Koen Claessen, Moa Johansson, Dan Rosén, and Nicholas Smallbone*

Semantic Enrichment of Mathematics via ‘tooltips’ . . . . . 338  
*Ross Moore*

Documentation Generator Focusing on Symbols for the HTML-ized Mizar  
Library . . . . . 343  
*Kazuhisa Nakasho and Yasunari Shidama*

Tools for MML Environment Analysis . . . . . 348  
*Adam Naumowicz*

Enabling Symbolic and Numerical Computations in HOL Light . . . . . 353  
*Ons Seddiki, Cvetan Dunchev, Sanaz Khan-Afshar, and Sofiène Tahar*

Erratum to: Towards Formal Fault Tree Analysis Using Theorem Proving . . . E1  
*Waqar Ahmad and Osman Hasan*

**Author Index** . . . . . 359



<http://www.springer.com/978-3-319-20614-1>

Intelligent Computer Mathematics  
International Conference, CICM 2015, Washington, DC,  
USA, July 13-17, 2015, Proceedings.  
Kerber, M.; Carette, J.; Kaliszyk, C.; Rabe, F.; Sorge, V.  
(Eds.)  
2015, XXI, 359 p. 84 illus., Softcover  
ISBN: 978-3-319-20614-1