THE BULLETIN OF SYMBOLIC LOGIC



Edited by

John Baldwin, Managing Editor

Ilijas Farah Michael Rathjen Volker Halbach Erich Reck André Nies Katrin Tent

Martin Otto

Reviews Editors

Steve Awodey, Managing Editor for Reviews

John Baldwin

John Burgess

Ernest Schimmerling

Mark Colyvan

Carsten Schürmann

Anni David Rayları

Anuj Dawar Kai Wehmeier Marcelo Fiore Matthias Wille

Noam Greenberg

VOLUME 16 • NUMBER 3 • SEPTEMBER 2010 • ISSN 1079-8986

Copyright © 2010 by the Association for Symbolic Logic. All rights reserved.

Reproduction by photostat, photo-print, microfilm, or like process by permission only.

https://doi.org/10.1017/S1079898600009288 Published online by Cambridge University Press

TABLE OF CONTENTS

ARTICLES

THE BULLETIN OF SYMBOLIC LOGIC (ISSN print: 1079-8986, ISSN online: 1943-5894) is published quarterly, in the months of March, June, September, and December, by the Association for Symbolic Logic, Inc., 124 Raymond Avenue, Poughkeepsie, NY 12604-0001, USA. Periodicals postage is paid at Poughkeepsie NY and at additional mailing offices. The BULLETIN is distributed with THE JOURNAL OF SYMBOLIC LOGIC. The 2010 annual subscription price for the two journals, in either print or electronic form, is US\$590; visit http://www.aslonline.org/Journals-subscription.html for more information. Postmaster: Send address changes to The Bulletin of Symbolic Logic, c/o American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294, USA. Business correspondence should be sent to the Secretary-Treasurer of the Association, Charles Steinhorn (address on inside back cover).

The BULLETIN, the JOURNAL, and the REVIEW OF SYMBOLIC LOGIC are the official organs of the Association for Symbolic Logic, an international organization for furthering research in all aspects of symbolic logic. The BULLETIN encourages submission of Articles and Communications in all areas of logic, including mathematical or philosophical logic, logic in computer science or linguistics, the history or philosophy of logic, and applications of logic to other fields. The BULLETIN also publishes reviews of publications in logic.

Articles should be of broad interest and accessible to a wide audience of logicians. They may be purely expository, survey, or historical articles, or they may contain, in addition, new ideas or results or new approaches to old ones.

Communications should be announcements of important new results and ideas in any aspect of logic; they may be short papers in their final form or preliminary announcements (extended abstracts, position papers) of longer, full papers that will be published elsewhere. In any case, they should include, in addition to a description of the new results or ideas, enough history, background, and explanation to make the significance of the work apparent to a wide audience. Communications will be quickly refereed and published within six months of the submission of final versions.

Continued on inside back cover

10 9 8 7 6 5 4 3 2 1 15 14 13 12 11 10

A. Doxiadis, C. Papadimitriou, A. Papadatos, and A. di Donna, <i>Logicomix</i> .	
Reviewed by Paolo Mancosu	419
The search for diamonds. Reviewed by Assaf Rinot	420
Five papers on axiomatic theories of truth. Reviewed by Graham E. Leigh	424
M. Schirn, On translating Frege's Die Grundlagen der Arithmetik. Reviewed by	
Matthias Wille	428
2009–2010 Winter Meeting of The Association for Symbolic Logic, Moscone Center	
West, San Francisco, CA, January 15–16, 2010	430
2010 Winter Meeting of the Association for Symbolic Logic, The Palmer House	
Hilton Hotel, Chicago, Illinois, February 18–20, 2010	438
The 2009 Annual Conference of the Australasian Association for Logic, University of	
Melbourne, Australia, July 11–12, 2009	445
Notices	450
Erratum	456

Articles and Communications being submitted for publication in the BULLETIN should be sent to one (and only one) of the following editors: John Baldwin (Managing Editor), Dept. of Math., Stat., and Comp. Sci. (M/C 249), Univ. of Ill. at Chicago, 851 S. Morgan St, Chicago, IL 60607, USA (jbaldwinQuic.edu); or Ilijas Farah, Department of Mathematics and Statistics, York University, 4700 Keele Street, Toronto, ON M3J1P3, Canada (ifarah@mathstat.yorku. ca); or Volker Halbach, New College, Oxford, OX1 3BN, UK (volker.halbach@philosophy. ox.ac.uk); or André Nies, Department of Computer Science, University of Auckland, Private Bag 92019, Auckland, New Zealand (andre@cs.auckland.ac.nz); or Martin Otto, Department of Mathematics, Technische Universität Darmstadt, Schlossgartenstr. 7, 64289 Darmstadt, Germany (otto@mathematik.tu-darmstadt.de); or Michael Rathjen, School of Mathematics, University of Leeds, Leeds LS2 9JT, UK (rathjen@maths.leeds.ac.uk); or Erich Reck, Department of Philosophy, University of California Riverside, HMNSS Building Room 1604, 900 University Avenue, Riverside, CA 92521, USA (erich.reck@ucr.edu); or Katrin Tent, Fakultät für Mathematik, Universität Bielefeld, Postfach 100131, D-33501 Bielefeld, Germany (ktent@ math.uni-bielefeld.de). Submissions that are not readily categorized as either Articles or Communications should be sent to the managing editor.

Books for review in the BULLETIN should be sent to ASL, Box 742, Vassar College, 124 Raymond Avenue, Poughkeepsie, NY 12604, USA. The Managing Editor for Reviews is Steve Awodey, Department of Philosophy, Carnegie Mellon University, 135 Baker Hall, Pittsburgh, PA 15213, USA (awodey@cmu.edu). The other editors of reviews are John Baldwin (jbaldwin@math.uic.edu), John Burgess (jburgess@princeton.edu), Mark Colyvan (mcolyvan@usyd.edu.au), Anuj Dawar (Anuj.Dawar@cl.cam.ac.uk), Marcelo Fiore (mpf23@cl.cam.ac.uk), Noam Greenberg (Noam.Greenberg@mcs.vuw.ac.nz), Hannes Leitgeb@ bristol.ac.uk), Ernest Schimmerling (eschimme@andrew.cmu.edu), Carsten Schürmann (carsten@itu.dk), Kai Wehmeier (wehmeier@uci.edu), and Matthias Wille (matthias.wille@iel.uni-koeln.de).

The editors prefer electronic submissions. The preferred formats for electronic submissions are PDF or postscript, but other formats, such as Word documents, will be accommodated as best as possible. The author should keep a complete copy of the submitted manuscript and the electronic files from which it was created. After the paper is accepted in its final form, an electronic copy will be appreciated and will advance the final publication date of the paper. It is preferred that papers be prepared in LaTeX or other variant of TeX, especially for manuscripts that include extensive symbolic or mathematical notation. The ASL LaTeX style files are available at http://www.aslonline.org, but their use is optional. Fifty offprints of each article are supplied at no charge; additional offprints may be purchased if desired.

Postscript files of articles published in the BULLETIN may be downloaded using a Web browser from http://www.math.ucla.edu/~asl/bsltoc.htm. All volumes of the BULLETIN also are available online in the JSTOR database.

Requests for information, applications for membership, orders for back volumes, business correspondence, and notices and announcements for publication in the BULLETIN should be sent to the Secretary-Treasurer of the Association, Charles Steinhorn, ASL, Box 742, Vassar College, 124 Raymond Avenue, Poughkeepsie, NY 12604, USA. The electronic mail address of the Association's business office is asl@vassar.edu. The ASL Website is located at http://www.aslonline.org. Links from that site provide further information on the BULLETIN and on

THE BULLETIN OF SYMBOLIC LOGIC



Edited by

John Baldwin, Managing Editor

Ilijas Farah Michael Rathjen Volker Halbach Erich Reck André Nies Katrin Tent

Martin Otto

Reviews Editors

Steve Awodey, Managing Editor for Reviews

John Baldwin Hannes Leitgeb
John Burgess Ernest Schimmerling
Mark Colyvan Carsten Schürmann

Anuj Dawar Kai Wehmeier Marcelo Fiore Matthias Wille

Noam Greenberg

VOLUME 16 • 2010

Copyright © 2010 by the Association for Symbolic Logic. All rights reserved. Reproduction by photostat, photo-print, microfilm, or like process by permission only.



PUBLISHED QUARTERLY BY THE ASSOCIATION FOR SYMBOLIC LOGIC WITH SUPPORT FROM INSTITUTIONAL MEMBERS.

The four numbers of Volume 16 are copyrighted ©2010 by the Association for Symbolic Logic, Inc. Reproduction of copyrighted numbers of the BULLETIN by photostat, photoprint, microfilm, or like process is forbidden, except by written permission, to be obtained from the Secretary of the Association, Charles Steinhorn, ASL, Box 742, Vassar College, 124 Raymond Avenue, Poughkeepsie, NY 12604, USA.

The paper used in this BULLETIN is acid-free and falls within the guidelines established to ensure permanence and durability.

This BULLETIN has been registered with the Copyright Clearance Center, Inc. The appearance of a code at the bottom of the first page of an article indicates the copyright owner's consent for copying beyond that permitted by Sections 107 or 108 of the U. S. Copyright Law, provided that the per-copy fee stated in the code is paid directly to Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, USA. This consent does not extend to copying for general distribution, for advertising or promotion purposes, for creating new collective works, or for resale. Specific written permission for such copying must be obtained from the Association.

CONTENTS OF VOLUME 16

ARTICLES

ABDULLA, PAROSH AZIZ. Well (and better) quasi-ordered transition systems Coskey, Samuel and Kossak, Roman. The complexity of classification problems for	457
models of arithmetic	345
FUJIMOTO, KENTARO. Relative truth definability of axiomatic truth theories	305
KLEMENT, KEVIN C. The senses of functions in the Logic of Sense and Denotation	153
McLarty, Colin. What does it take to prove Fermat's Last Theorem? Grothendieck	
and the logic of number theory	359
MEDVEDEV, ALICE and TAKLOO-BIGHASH, RAMIN. An invitation to model-theoretic	
Galois theory	261
Moschovakis, Yiannis N. Kleene's amazing Second Recursion Theorem	189
RAGHAVAN, DILIP. Almost disjoint families and diagonalizations of length continuum	240
SHORE, RICHARD A. Reverse mathematics: the playground of logic	378
URQUHART, ALASDAIR. Von Neumann, Gödel and complexity theory	516
Communications	
CORAZZA. PAUL. The Axiom of Infinity and transformations $j: V \to V$	37
KOELLNER, PETER. Strong logics of first and second order	1
Reviews	
A. Nies, Computability and randomness. Reviewed by Anthony Morphett L. Kreiser, Logik und Logiker in der DDR. Eine Wissenschaft im Aufbruch. Reviewed	85
by Matthias Wille	87
E. Menzler-Trott, Logic's lost genius: The life of Gerhard Gentzen. Reviewed by	07
W. W. Tait	270
N. B. Cocchiarella and M. A. Freund, Modal logic. An introduction to its syntax and	
semantics. Reviewed by Heinrich Wansing	275
K. Bimbó and J. M. Dunn Relational semantics of nonclassical logical calculi. Re-	277
viewed by Alasdair Urquhart	277
J. Zapletal, Forcing idealized. Reviewed by Mirna Džamonja	278
J. Harrison, Handbook of practical logic and automated reasoning. Reviewed by	279
Alwen Tiu	
Dobrinen	281
Hildebrandt	282
Jc Beall, Spandrels of truth. Reviewed by Zach Weber	284
G. Gabriel. K. Huelser, and S. Schlotter, Zur Miete bei Frege—Rudolf Hirzel und die	204
Rezeption der stoischen Logik und Semantik in Jena. Reviewed by Matthias Wille	286

Two publications of G. Hjorth. Reviewed by Howard Becker E. Grädel, P. Kolaitis, L. Libkin, M. Marx, J. Spencer, M. Vardi, Y. Venema, and S. Weinstein <i>Finite model theory and its applications</i> . Reviewed by Stephan Kreutzer J. van Oosten, <i>Realizability: an introduction to its categorical side</i> . Reviewed by	406
Peter T. Johnstone C. Benzmüller, C. Brown, J. Siekmann, and R. Statman (eds.), <i>Reasoning in simple</i>	407
type theory. Reviewed by Florian Rabe	409
J. Burgess, <i>Philosophical logic</i> . Reviewed by Lloyd Humberstone	411 413
M. Peterson, An introduction to decision theory. Reviewed by Steven Robertson G. Metcalfe, N. Olivetti and D. Gabbay, Proof theory for fuzzy logics. Reviewed by	415
Bartosz Więckowski	419
The search for diamonds. Reviewed by Assaf Rinot	420
Five papers on axiomatic theories of truth. Reviewed by Graham E. Leigh M. Schirn, On translating Frege's Die Grundlagen der Arithmetik. Reviewed by	424
Matthias Wille	428
D. Hyde, Vagueness, logic and ontology. Reviewed by Nicholas J. J. Smith	531
N. J. J. Smith, Vagueness and degrees of truth. Reviewed by Dominic Hyde	533
W. Kienzler Begriff und Gegenstand. Reviewed by Matthias Wille	535
twentieth century. Reviewed by Matthias Wille	537
MEETINGS OF THE ASSOCIATION FOR SYMBOLIC LOGIC	
2009 European Summer Meeting of the Association for Symbolic Logic, Logic Colloquium '09, Sofia, Bulgaria, July 31–August 5, 2009	90
loquium '09, Sofia, Bulgaria, July 31–August 5, 2009	90 430
loquium '09, Sofia, Bulgaria, July 31-August 5, 2009	
loquium '09, Sofia, Bulgaria, July 31-August 5, 2009	430
loquium '09, Sofia, Bulgaria, July 31-August 5, 2009	430
loquium '09, Sofia, Bulgaria, July 31-August 5, 2009	430 438
loquium '09, Sofia, Bulgaria, July 31-August 5, 2009	430 438 143
loquium '09, Sofia, Bulgaria, July 31-August 5, 2009 2009-2010 Winter Meeting of The Association for Symbolic Logic, Moscone Center West, San Francisco, CA, January 15-16, 2010 2010 Winter Meeting of the Association for Symbolic Logic, The Palmer House Hilton Hotel, Chicago, Illinois, February 18-20, 2010 MEETINGS SPONSORED BY THE ASSOCIATION FOR SYMBOLIC LOGIC 16th Workshop on Logic, Language, Information and Computation (WoLLIC 2009), Tokyo, Japan, July 21-24, 2009 11th Asian Logic Conference, National University of Singapore, Singapore, June 22-27, 2009 The 2009 Annual Conference of the Australasian Association for Logic, University of Melbourne, Australia, July 11-12, 2009	430 438 143 288 445 151
loquium '09, Sofia, Bulgaria, July 31-August 5, 2009 2009-2010 Winter Meeting of The Association for Symbolic Logic, Moscone Center West, San Francisco, CA, January 15-16, 2010 2010 Winter Meeting of the Association for Symbolic Logic, The Palmer House Hilton Hotel, Chicago, Illinois, February 18-20, 2010 MEETINGS SPONSORED BY THE ASSOCIATION FOR SYMBOLIC LOGIC 16th Workshop on Logic, Language, Information and Computation (Wollic 2009), Tokyo, Japan, July 21-24, 2009 11th Asian Logic Conference, National University of Singapore, Singapore, June 22-27, 2009 The 2009 Annual Conference of the Australasian Association for Logic, University of Melbourne, Australia, July 11-12, 2009	430 438 143 288 445
loquium '09, Sofia, Bulgaria, July 31-August 5, 2009 2009-2010 Winter Meeting of The Association for Symbolic Logic, Moscone Center West, San Francisco, CA, January 15-16, 2010 2010 Winter Meeting of the Association for Symbolic Logic, The Palmer House Hilton Hotel, Chicago, Illinois, February 18-20, 2010 MEETINGS SPONSORED BY THE ASSOCIATION FOR SYMBOLIC LOGIC 16th Workshop on Logic, Language, Information and Computation (Wollic 2009), Tokyo, Japan, July 21-24, 2009 11th Asian Logic Conference, National University of Singapore, Singapore, June 22-27, 2009 The 2009 Annual Conference of the Australasian Association for Logic, University of Melbourne, Australia, July 11-12, 2009 Corrigendum Erratum. Notices 145, 299, 450,	430 438 143 288 445 151 456
loquium '09, Sofia, Bulgaria, July 31–August 5, 2009 2009–2010 Winter Meeting of The Association for Symbolic Logic, Moscone Center West, San Francisco, CA, January 15–16, 2010 2010 Winter Meeting of the Association for Symbolic Logic, The Palmer House Hilton Hotel, Chicago, Illinois, February 18–20, 2010 MEETINGS SPONSORED BY THE ASSOCIATION FOR SYMBOLIC LOGIC 16th Workshop on Logic, Language, Information and Computation (Wollic 2009), Tokyo, Japan, July 21–24, 2009 11th Asian Logic Conference, National University of Singapore, Singapore, June 22–27, 2009 The 2009 Annual Conference of the Australasian Association for Logic, University of Melbourne, Australia, July 11–12, 2009 Corrigendum Erratum	430 438 143 288 445 151 456