# THE JOURNAL OF SYMBOLIC LOGIC

**Edited by**

Justin Moore, *Coordinating Editor*
Alessandro Berarducci
Erich Grädel
Bradd Hart
Denis Hirschfeldt
Ralf Schindler
Frank Stephan
Alasdair Urquhart
Andreas Weiermann

VOLUME 76 • 2011

*Copyright © 2011 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.

https://doi.org/10.1017/S0022481200001286 Published online by Cambridge University Press

The four numbers of Volume 76 are copyrighted ©2011 by the Association for Symbolic Logic, Inc. Reproduction of copyrighted numbers of the JOURNAL 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 JOURNAL is acid-free and falls within the guidelines established to ensure permanence and durability.

This JOURNAL 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. 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.

https://doi.org/10.1017/S0022481200001286 Published online by Cambridge University Press

# CONTENTS OF VOLUME 76

ANDREWS, URI. A new spectrum of recursive models using an amalgamation construction ..... 883
BAAZ, MATTHIAS and HETZL, STEFAN. On the non-confluence of cut-elimination ..... 313
BAILIN, SIDNEY C. Retraction of: "A normalization theorem for set theory" 1096
BÁRÁNY, VINCE, KAISER, ŁUKASZ, and RABINOVICH, ALEXANDER. Expressing cardinality quantifiers in monadic second-order logic over chains ..... 603
BARMPALIAS, GEORGE, DOWNEY, ROD, and NG, KENG MENG. Jump inversions inside effectively closed sets and applications to randomness ... 491
BERENSTEIN, ALEXANDER, DOLICH, ALF, and ONSHUUS, ALF. The independence property in generalized dense pairs of structures ..... 391
BINNS, STEPHEN. Relative Kolmogorov complexity and geometry ..... 1211
BRATTKA, VASCO and GHERARDI, GUIDO. Weihrauch degrees, omniscience principles and weak computability ..... 143
BRENDLE, JÖRG and FISCHER, VERA. Mad families, splitting families and large continuum ..... 198
BUSS, SAM, CHEN, YIJIA, FLUM, JÖRG, FRIEDMAN, SY-DAVID, and MÜLLER, MORITZ. Strong isomorphism reductions in complexity theory ..... 1381
CAICEDO, ANDRÉS EDUARDO and FRIEDMAN, SY-DAVID. BPFA and projective well-orderings of the reals ..... 1126
CHEN, YIJIA. See BUSS, SAM.
CIFÚ LOPES, VINICIUS. Euler characteristics for strongly minimal groups and the eq-expansions of vector spaces ..... 235
———. See DRIES, LOU VAN DEN.
COX, SEAN. Nonregular ultrafilters on $\omega_2$ ..... 827
CSIMA, BARBARA F., HARIZANOV, VALENTINA S., MILLER, RUSSELL, and MONTALBÁN, ANTONIO. Computability of Fraïssé limits ..... 66
CSIMA, BARBARA F., DOWNEY, ROD, and NG, KENG MENG. Limits on jump inversion for strong reducibilities ..... 1287
DIAMONDSTONE, DAVID and NG, KENG MENG. Strengthening prompt simplicity ..... 946
DOLICH, ALF. See BERENSTEIN, ALEXANDER.
DOWNEY, ROD. See BARMPALIAS, GEORGE.
——— See CSIMA, BARBARA F.
DRIES, LOU VAN DEN and CIFÚ LOPES, VINICIUS. Invariant measures on groups satisfying various chain conditions ..... 209
EGIDI, LAVINIA and FAGLIA, GIOVANNI. Double-exponential inseparability of Robinson subsystem $Q_+$ ..... 94
FAGLIA, GIOVANNI. See EGIDI, LAVINIA.
FARKAS, BARNABÁS. Hechler's Theorem for tall analytic P-ideals ..... 729
FISCHER, VERA. See BRENDLE, JÖRG.
FLENNER, JOSEPH. Relative decidability and definability in henselian valued fields ..... 1240
FLUM, JÖRG. See BUSS, SAM.



https://doi.org/10.1017/S0022481200001286 Published online by Cambridge University Press

FOKINA, E., KNIGHT, J. F., MELNIKOV, A., QUINN, S. M., and SAFRANSKI, C. Classes of Ulm type and coding rank-homogeneous trees in other structures ..... 846
FRIEDMAN, SY-DAVID. See BUSS, SAM.
———. See CAICEDO, ANDRÉS EDUARDO.
FRIEDMAN, SY-DAVID and HALILOVIĆ, AJDIN. The tree property at $\aleph_{\omega+2}$ ..... 477
FRIEDMAN, SY-DAVID, HYTTINEN, TAPANI, and WALCZAK-TYPKE, AGATHA. Potential isomorphism of elementary substructures of a strictly stable homogeneous model ..... 987
FRIEDMAN, SY-DAVID and MOTTO ROS, LUCA. Analytic equivalence relations and bi-embeddability ..... 243
FRIEDMAN, SY-DAVID and WELCH, P. D. Hypermachines ..... 620
FUJIMOTO, KENTARO. Autonomous progression and transfinite iteration of self-applicable truth ..... 914
FULK, MARK. Robust separations in inductive inference ..... 368
GABBAY, MICHAEL. A proof-theoretic treatment of $\lambda$-reduction with cut-elimination: $\lambda$-calculus as a logic programming language ..... 673
GHERARDI, GUIDO. See BRATTKA, VASCO.
GITMAN, VICTORIA. Ramsey-like cardinals ..... 519
GITMAN, VICTORIA and WELCH, P. D. Ramsey-like cardinals II ..... 541
GIVEN-WILSON, THOMAS. See JAY, BARRY.
GREENBERG, NOAM. A random set which only computes strongly jump-traceable c.e. sets ..... 700
GREENBERG, NOAM and NIES, ANDRÉ. Benign cost functions and lowness properties ..... 289
GÜNAYDIN, AYHAN and HIERONYMI, PHILIPP. Dependent pairs ..... 377
HALILOVIĆ, AJDIN. See FRIEDMAN, SY-DAVID.
HARDIN, CHRISTOPHER S. On transitive subrelations of binary relations ..... 1429
HARIZANOV, VALENTINA S. See CSIMA, BARBARA F.
HARRIS, CHARLES M. On the jump classes of noncuppable enumeration degrees ..... 177
HAVERKAMP, NICK. Cardinal characteristics on graphs ..... 1
HETZL, STEFAN. See BAAZ, MATTHIAS.
HIERONYMI, PHILIPP. See GÜNAYDIN, AYHAN.
HIRSCH, ROBIN, HODKINSON, IAN, and MADDUX, ROGER D. Weak representations of relation algebras and relational bases ..... 870
HJORTH, GREG and NIES, ANDRÉ. Borel structures and Borel theories ..... 461
HODKINSON, IAN See HIRSCH, ROBIN
HYTTINEN, TAPANI. See FRIEDMAN, SY-DAVID.
HYTTINEN, TAPANI and KESÄLÄ, MEERI. Categoricity transfer in simple finitary abstract elementary classes ..... 759
IRRGANG, BERNHARD. Forcings constructed along morasses ..... 1097
JAY, BARRY and GIVEN-WILSON, THOMAS. A combinatory account of internal structure ..... 807
JONES, GARETH and SERVI, TAMARA. On the decidability of the real field with a generic power function ..... 1418
KAISER, ŁUKASZ. See BÁRÁNY, VINCE.



https://doi.org/10.1017/S0022481200001286 Published online by Cambridge University Press

KELLNER, JAKOB and SHELAH, SAHARON. Saccharinity ..... 1153
KESÄLÄ, MEERI. See HYTTINEN, TAPANI.
KESTNER, CHARLOTTE and PILLAY, ANAND. Remarks on unimodularity ..... 1453
KNIGHT, J. F. See FOKINA, E.
KOERWIEN, MARTIN. A complicated $\omega$-stable depth 2 theory ..... 47
KOWALSKI, TOMASZ, PAOLI, FRANCESCO, and SPINKS, MATTHEW. Quasi-subtractive varieties ..... 1261
KRUEGER, JOHN. Weak compactness and no partial squares ..... 1035
KRUPIŃSKI, KRZYSZTOF. On relationships between algebraic properties of groups and rings in some model-theoretic contexts ..... 1403
KUSKE, DIETRICH and LOHREY, MARKUS. Automatic structures of bounded degree revisited ..... 1352
LINDSTRÖM, PER. A theorem on partial conservativity in arithmetic ..... 341
LIU, JIANG and WU, GUOHUA. An almost-universal cupping degree ..... 1137
LOHREY, MARKUS. See KUSKE, DIETRICH.
MADDUX, ROGER D. See HIRSCH, ROBIN.
MALICKI, MACIEJ. On Polish groups admitting a compatible complete left-invariant metric ..... 437
MAMINO, MARCELLO. Splitting definably compact groups in o-minimal structures ..... 973
MARCONE, ALBERTO and MONTALBÁN, ANTONIO. The Veblen functions for computability theorists ..... 575
MATET, PIERRE. The Magidor function and diamond ..... 405
MELNIKOV, A. See FOKINA, E.
MILDENBERGER, HEIKE. The club principle and the distributivity number ... 34
MILDENBERGER, HEIKE and SHELAH, SAHARON. The minimal cofinality of an ultrapower of $\omega$ and the cofinality of the symmetric group can be larger than $\mathfrak{b}^+$ ..... 1322
MILLER, RUSSELL. $\mathrm{Low}_5$ Boolean subalgebras and computable copies ..... 1061
———. See CSIMA, BARBARA F.
MILLIET, CÉDRIC. On enveloping type-definable structures ..... 1023
———. Stable division rings ..... 348
MONTALBÁN, ANTONIO. See CSIMA, BARBARA F.
———. See MARCONE, ALBERTO.
MORENO, JAVIER. Iterative differential Galois theory in positive characteristic: A model theoretic approach ..... 125
MOTTO ROS, LUCA. See FRIEDMAN, SY-DAVID.
MÜLLER, MORITZ. See BUSS, SAM.
NEEMAN, ITAY. Necessary use of $\Sigma^1_1$ induction in a reversal ..... 561
NG, KENG MENG. See BARMPALIAS, GEORGE.
———. See CSIMA, BARBARA F.
———. See DIAMONDSTONE, DAVID.
NIES, ANDRÉ. See GREENBERG, NOAM.
———. See HJORTH, GREG.
ONSHUUS, ALF. See BERENSTEIN, ALEXANDER.
ONSHUUS, ALF and USVYATSOV, ALEXANDER. On dp-minimality, strong dependence and weight ..... 737



https://doi.org/10.1017/S0022481200001286 Published online by Cambridge University Press

PAOLI, FRANCESCO. See KOWALSKI, TOMASZ.
PILLAY, ANAND. Stable embeddedness and *NIP* ..... 665
———. See KESTNER, CHARLOTTE.
QUINN, S. M. See FOKINA, E.
RABINOVICH, ALEXANDER. See BÁRÁNY, VINCE.
ROSENDAL, CHRISTIAN. Completely metrisable groups acting on trees ..... 1005
———. Finitely approximable groups and actions Part I: The Ribes–Zalesskiĭ property ..... 1297
———. Finitely approximable groups and actions Part II: Generic representations ..... 1307
SABOK, MARCIN and ZAPLETAL, JINDŘICH. Forcing properties of ideals of closed sets ..... 1075
SAFRANSKI, C. See FOKINA, E.
SANDERS, SAM. ERNA and Friedman's Reverse Mathematics ..... 637
SERVI, TAMARA. See JONES, GARETH.
SHAFER, PAUL. Coding true arithmetic in the Medvedev and Muchnik degrees ..... 267
SHELAH, SAHARON. See KELLNER, JAKOB.
———. See MILDENBERGER, HEIKE.
SIMON, PIERRE. On dp-minimal ordered structures ..... 448
SKLINOS, RIZOS. On the generic type of the free group ..... 227
SPINKS, MATTHEW. See KOWALSKI, TOMASZ.
STRULLU, REMI. *MRP*, tree properties and square principles ..... 1441
TOWSNER, HENRY. Hindman's theorem: an ultrafilter argument in second order arithmetic ..... 353
TSANKOV, TODOR. The additive group of the rationals does not have an automatic presentation ..... 1341
USVYATSOV, ALEXANDER. See ONSHUUS, ALF.
WAGNER, FRANK. Propriétés résiduelles dans les groupes supersimples ..... 361
WALCZAK-TYPKE, AGATHA. See FRIEDMAN, SY-DAVID.
WANG, WEI. Relative enumerability and 1-genericity ..... 897
WEBER, REBECCA. Degree invariance in the $\Pi^0_1$ classes ..... 1184
WELCH, P. D. Determinacy in strong cardinal models ..... 719
———. Weak systems of determinacy and arithmetical quasi-inductive definitions ..... 418
———. See FRIEDMAN, SY-DAVID.
———. See GITMAN, VICTORIA.
WU, GUOHUA. See LIU, JIANG.
ZAPLETAL, JINDŘICH. See SABOK, MARCIN.



https://doi.org/10.1017/S0022481200001286 Published online by Cambridge University Press

The JOURNAL invites submission of original scholarly work in mathematical logic and its applications.

Articles being submitted for publication in the JOURNAL should be sent to one (and only one) of the following editors: ***Alessandro Berarducci, Dipartimento di Matematica, Universita' di Pisa, Largo Bruno Pontecorvo 5, 56127 Pisa, Italy*** (berardu@dm.unipi.it); or ***Erich Grädel, Mathematische Grundlagen der Informatik, RWTH Aachen, D-52056 Aachen, Germany*** (graedel@logic.rwth-aachen.de); or ***Bradd Hart, Dept. of Math. & Stat., McMaster University, 1280 Main Street W., Hamilton, Ontario, L8S 4K1, Canada*** (hartb@mcmaster.ca); or ***Denis Hirschfeldt, Dept. of Math., University of Chicago, 5734 S. University Ave., Chicago, IL 60637, USA*** (drh@math.uchicago.edu); or ***Justin Moore, Department of Mathematics, 310 Malott Hall, Cornell University, Ithaca, NY 14853-4201, USA*** (justin@math.cornell.edu); or ***Ralf Schindler, Institut für Mathematische Logik und Grundlagenforschung, Universität Münster, Einsteinstr. 62, D-48149 Münster, Germany*** (rds@math.uni-muenster.de); or ***Frank Stephan, Department of Mathematics, National University of Singapore, 2 Science Drive 2, Singapore 117543, Republic of Singapore*** (fstephan@comp.nus.edu.sg); or ***Alasdair Urquhart, Department of Philosophy, University of Toronto, 215 Huron Street, Toronto, Ontario, M5S 1A1, Canada*** (urquhart@cs.toronto.edu); or ***Andreas Weiermann, Vakgroep Wiskunde, Ghent University, Krijgslaan 281 - Gebouw S22, B9000 Gent, Belgium*** (Andreas.Weiermann@ugent.be).

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.

Volumes 1 through 71 of the JOURNAL are available online in the JSTOR database.

Reviews of articles and books in logic which in the past were published in the JOURNAL have been moved to the BULLETIN OF SYMBOLIC LOGIC, beginning with the March 2000 issues.

Individual membership in the Association is open to anyone interested in its work. Annual dues for members are US$82 (US$41 for students). Dues include subscriptions to the current volumes of the JOURNAL, the BULLETIN, and the REVIEW. Institutional membership in the Association is available to any academic institution or department. Annual basic institutional membership dues are US$625 and full institutional membership dues are US$1075 for 2011. Membership privileges include choices of current subscriptions, back volumes, and student memberships. A detailed description of institutional and corporate memberships is available from the Secretary-Treasurer.

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 JOURNAL and on submitting papers for publication.

Notices of change of address, dues payments, and subscription orders to the JOURNAL and BULLETIN should be sent to: ***Association for Symbolic Logic, c/o American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294, USA***. All orders must be accompanied by payment in US dollars; Visa, MasterCard, Discover and American Express charges are accepted. To receive a replacement copy of the JOURNAL, please report damaged, defective, or missing issues within nine months of the date of publication.

For subscriptions to the REVIEW, contact Cambridge Journals Customer Services at journals@cambridge.org.

All back volumes of the JOURNAL are available. Volume 26 is an index for Volumes 1–26 and Number 4 of Volume 45 is an index for Volumes 27–45. Number 4 of Volume 55 is a cumulative index for Volumes 27–55 (it includes the index published in Volume 45, Number 4, except for listings of reviews by subject, which has been discontinued). A revised edition of ***A Bibliography of Symbolic Logic*** by Alonzo Church may be purchased separately. Members of the Association may purchase back volumes for their personal use at a 50% discount. This discount also applies to institutional members. Orders should be sent to the Secretary-Treasurer, from whom the current price list is available.

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

This JOURNAL 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 US 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.

https://doi.org/10.1017/S0022481200001286 Published online by Cambridge University Press

https://doi.org/10.1017/S0022481200001286 Published online by Cambridge University Press