## THE JOURNAL OF SYMBOLIC LOGIC IS NOW AVAILABLE IN JSTOR!



JSTOR, a not-for-profit organization, is an important endeavor dedicated to helping the scholarly community take advantage of advances in electronic technologies.

The JSTOR database consists of the complete backfiles of a number of scholarly journals and is available to researchers through participating libraries.

Access to the back volumes of *The Journal of Symbolic Logic* is available to individuals as a priviledge of membership in the Association for Symbolic Logic.

In addition to *The Journal of Symbolic Logic*, mathematics and philosophy journals presently available in JSTOR include:

### MATHEMATICS:

American Mathematical Monthly
Annals of Mathematics
Journal of the American
Mathematical Society
Mathematics of Computation
Proceedings of the
American Mathematical Society
SIAM Journal on Applied Mathematics
SIAM Journal on Numerical Analysis

Transactions of the American Mathematical Society

SIAM Review

### PHILOSOPHY:

Journal of Philosophy

Mind

Nous

Philosophical Perspectives

Philosophical Quarterly

Philosophical Review

Philosophy and

Phenomenological Research

Philosophy and Public Affairs

Information regarding JSTOR is available at http://www.jstor.org.

120 Fifth Avenue, New York, NY 10011

### THE

# **JOURNAL**

**OF** 

# **SYMBOLIC LOGIC**

#### EDITED BY

HOWARD S. BECKER
KEVIN J. COMPTON
ROD DOWNEY

HERBERT B. ENDERTON
JOHN ETCHEMENDY

MATTHEW FOREMAN

Gerhard Jäger

PENELOPE MADDY

DAVID MARKER
WILLIAM J. MITCHEL

MICHAEL RATHJEN

PHILIP SCOWCROFT

Lou van den Dries

MICHIEL VAN LAMBALGEN

Volume 64 1999

PUBLISHED QUARTERLY BY THE ASSOCIATION FOR SYMBOLIC LOGIC, INC.
WITH SUPPORT FROM INSTITUTIONAL AND CORPORATE MEMBERS

The four numbers of Volume 64 were issued at the following dates:

Number 1, pages 1–406, April 20, 1999 Number 2, pages 407–926, June 17, 1999 Number 3, pages 927–1374, October 14, 1999 Number 4, pages 1375–1862, December 15, 1999

Numbers 1–4 of this volume are copyrighted ©1999 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, C. Ward Henson, Department of Mathematics, University of Illinois, 1409 W. Green St., Urbana, IL 61801.

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.

### **CONTENTS OF VOLUME 64**

Andréka, H., Hodkinson, I. and Németi, I. Finite algebras of relations are representable on finite sets	243
ALTINEL, TUNA and CHERLIN, GREGORY. On central extensions of algebraic	
groups	68
Antonelli, G. Aldo. Free set algebras satisfying systems of equations	1656
APTER, ARTHUR W. On measurable limits of compact cardinals	1675
•	10/3
AREF'EV, ROMAN D., BALDWIN, JOHN T. and MAZZUCCO, MARCO. Classifica-	1742
tion of $\delta$ -invariant amalgamation classes	1743
AVIGAD, JEREMY and SOMMER, RICHARD. The model-theoretic ordinal analysis	227
of theories of predicative strength	327
BAGHERI, SEYYED MOHAMMAD. Ordre fondamental d'une théorie 1-basée	1426
BALDWIN, JOHN T., GROSSBERG, RAMI and SHELAH, SAHARON. Transfering	(70
saturation, the finite cover property, and stability	678
BALDWIN, JOHN T. See AREF'EV, ROMAN D.	2.1
Baltag, Alexandru. Interpolation and preservation for pebble logics	846
Bankston, Paul. A hierarchy of maps between compacta	1628
BARWISE, JON and VAN BENTHEM, JOHAN. Interpolation, preservation, and	
pebble games	881
$\label{eq:Beleznay} \textbf{Beleznay}, \textbf{Ferenc}. \ \textbf{The complexity of the collection of countable linear orders}$	
of the form $I + I$	1519
Bell, John L. Frege's theorem in a constructive setting	486
Finite sets and Frege structures	1552
Berardi, Stefano. Intuitionistic completeness for first order classical logic .	304
BLASS, ANDREAS and MILDENBERGER, HEIKE. On the cofinality of ultrapowers	727
Brendle, Jörg and Löwe, Benedikt. Solovay-type characterizations for	
forcing-algebras	1307
Buechler, Steven. Lascar strong types in some simple theories	817
Витz, C. and Моеrdijk, I. An elementary definability theorem for first order	
logic	1028
CANTINI, ANDREA and MINARI, PIERLUIGI. Uniform inseparability in explicit	
mathematics	313
CHERLIN, GREGORY. See ALTINEL, TUNA.	
CHERLIN, GREGORY L. Infinite imprimitive homogeneous 3-edge-colored com-	
plete graphs	159
CHOLAK, PETER, GONCHAROV, SERGEY, KHOUSSAINOV, BAKHADYR and SHORE,	
RICHARD A. Computably categorical structures and expansions by con-	
stants	13
CIESIELSKI, KRZYSZTOF and SHELAH, SAHARON. A model with no magic set	1467
CORAZZA, PAUL. Laver sequences for extendible and super-almost-huge car-	
dinals	963
CUCKER, FELIPE and MEER, KLAUS. Logics which capture complexity classes	
over the reals	363
CZELAKOWSKI, J. and DZIOBIAK, W. Deduction theorems within RM and its	
extensions	279
DELON, FRANÇOISE and SIMONETTA, PATRICK. Un principe d'Ax-Kochen-	001
Ershov pour des structures intermédiaires entre groupes et corps valués	991

Došen, Kosta and Petrić, Zoran. Cartesian isomorphisms are symmetric monoidal: A justification of linear logic	227
Downey, Rod, Laforte, Geoffrey and Lempp, Steffen. A $\Delta_2^0$ set with barely	
$\Sigma^0_2$ degree	1700
DOWNEY, ROD and JOCKUSCH, CARL G. JR. Effective presentability of Boolean algebras of Cantor-Bendixson rank 1	45
DŽAMONJA, MIRNA and SHELAH, SAHARON. Similar but not the same: various	
versions of 🌲 do not coincide	180
DZIOBIAK, W. See CZELAKOWSKI, J.	
ELGUETA, RAIMON. Freeness in classes without equality	1159
FELGNER, U. and TRUSS, J. K. The independence of the Prime Ideal Theorem from the Order-Extension Principle	199
FENG, QI. Rado's conjecture and presaturation of the nonstationary ideal on	
$\omega_1$	38
FLUM, JÖRG and ZIEGLER, MARTIN. Pseudo-finite homogeneity and saturation	
GHILARDI, SILVIO. Unification in intuitionistic logic	859
GITIK, MOTI. On closed unbounded sets consisting of former regulars	1505
and Shelah, Saharon. Cardinal preserving ideals	
GIVANT, STEVEN. Universal classes of simple relation algebras	575
GRÄDEL, ERICH. On the restraining power of guards	1719
GROSSBERG, RAMI. See BALDWIN, JOHN T.	
Hammond, Todd. Friedberg splittings in $\Sigma^0_3$ quotient lattices of ${\mathscr E}$	1403
HART, BRADD, SOKOLOVIĆ, ŽELJKO and TANOVIĆ, PREDRAG. A note on a-prime models	1555
	1601
	590
and Woodin, W. Hugh. $\Pi_3^1$ sets and $\Pi_3^1$ singletons	
HEATON, A.J. A jump operator for subrecursion theories	460
HELLA, LAURI, LIBKIN, LEONID and NURMONEN, JUHA. Notions of locality and their logical characterizations over finite models	1751
Hirst, Jeffry L. Ordinal inequalities, transfinite induction, and reverse math-	1/31
ematics	769
HODKINSON, I. See ANDRÉKA, H.	702
HOLLAND, KITTY L. Model completeness of the new strongly minimal sets	946
HRUSHOVSKI, EHUD and SCANLON, THOMAS. Lascar and Morley ranks differ	1280
Hummel, Tamara and Jockusch, Carl G. Jr. Generalized cohesiveness	489
Humphreys, A. James and Simpson, Stephen G. Separation and Weak König's	102
Lemma	268
HYTTINEN, TAPANI and SHELAH, SAHARON. Constructing strongly equivalent	634
nonisomorphic models for unsuperstable theories, Part C	1595
IVANOV, A. A. Generic expansions of $\omega$ -categorical structures and semantics	1393
of generalized quantifiers	775
JABER, KHALED. Équations génériques dans un groupe stable nilpotent	761
	, 01

JÄGER, GERHARD, KAHLE, REINHARD, SETZER, ANTON and STRAHM, THOMAS.
The proof-theoretic analysis of transfinitely iterated fixed point theories 53
JAHN, MICHAEL A. Implicit measurements of dynamic complexity properties and splittings of speedable sets
JECH, THOMAS. Some results on combinators in the system TRC
JEONG, JOOHEE. A decidable variety that is finitely undecidable
Jockusch, Carl G. Jr. See Downey, Rod
Jockusch, Carl G. Jr. See Hummel, Tamara.
Kahle, Reinhard. See Jäger, Gerhard.
KANEKO, MAMORU. Common knowledge logic and game logic 685
KANOVEI, VLADIMIR. On non-wellfounded iterations of the perfect set forcing 551
KHOUSSAINOV, BAKHADYR. See CHOLAK, PETER.
KOHLENBACH, ULRICH. On the no-counterexample interpretation 1491
Комјатн, Péter. Some remarks on the partition calculus of ordinals 436
Kracht, Marcus and Wolter, Frank. Normal monomodal logics can sim-
ulate all others
Kučera, Antonín and Terwijn, Sebastiaan A. Lowness for the class of random sets
random sets
LAFLAMME, CLAUDE and SCHEEPERS, MARION. Combinatorial properties of
filters and open covers for sets of real numbers
LAFORTE, GEOFFREY See DOWNEY, ROD.
LARSON, PAUL. An S <sub>max</sub> variation for one Souslin tree
LASCAR, DANIEL and PILLAY, ANAND. Forking and fundamental order in
simple theories
Lempp, Steffen. See Downey, Rod.
LESHEM, AMIR and MAGIDOR, MENACHEM. The independence of $\delta_n^1$
LIBKIN, LEONID See HELLA, LAURI.
Löwe, Benedikt. See Brendle, Jörg.
LURIE, JACOB. Anti-admissible sets
Magidor, Menachem. See Leshem, Amir.
MARX, MAARTEN and MIKULÁS, SZABOLCS. Decidability of cylindric set algebras of dimension two and first and a large with two variables.
bras of dimension two and first-order logic with two variables
MAZZUCCO, MARCO. See AREF'EV, ROMAN D.
MEER, KLAUS. See CUCKER, FELIPE.
MIKULÁS, SZABOLCS and MARX, MAARTEN. Undecidable relativizations of
algebras of relations
MIKULÁS, SZABOLCS. See MARX, MAARTEN.
MILDENBERGER, HEIKE. See BLASS, ANDREAS.
MINARI, PIERLUIGI. See CANTINI, ANDREA.
MINTS, G. Cut-elimination for simple type theory with an axiom of choice 479
MITCHELL, W. J. Jónsson cardinals, Erdős cardinals, and the core model 1065
Moerdijk, I. See Butz, С.
MURAKAMI, MASAHIKO. Standardization principle of nonstandard universes 1645

Muraki, Hisato. Non-distributive upper semilattice of Kleene degrees  Nurmonen, Juha. See Hella, Lauri.	147
NEEMAN, ITAY and STEEL, JOHN. A weak Dodd-Jensen lemma	1285
Néметі, I. See Andréka, H.	
Newelski, Ludomir. Flat Morley sequences	
Geometry of *-finite types	1375
NORMANN, DAG, PALMGREN, ERIK and STOLTENBERG-HANSEN, VIGGO. Hyperfinite type structures	1216
OKADA, MITSUHIRO and TERUI, KAZUSHIGE. The finite model property for	
various fragments of intuitionistic linear logic	790
•	
Petrić, Zoran. See Došen, Kosta.	
PILLAY, ANAND. See LASCAR, DANIEL.	
POIZAT, BRUNO. Le carre de l'egalite	
PORTIER, NATACHA. Stabilité polynômiale des corps différentiels	803
Prest, Mike. Tensor product and theories of modules	617
Puninski, Gennadi. Cantor-Bendixson rank of the Ziegler spectrum over a	1512
	1512 1439
RATHJEN, MICHAEL. Explicit mathematics with the monotone fixed point	1737
principle. II: Models	517
RUDOMINER, MITCH. The largest countable inductive set is a mouse set	443
SARACINO, DAN. Prime e.c. commutative rings in characteristic $n \ge 2 \dots$	629
Scanlon, Thomas. See Hrushovski, Ehud.	
, 1	1295
. See Laflamme, Claude.	400=
, , , , , , , , , , , , , , , , , , , ,	1087
SCHINDLER, RALF-DIETER. Successive weakly compact or singular cardinals SCHOUTENS, HANS. Existentially closed models of the theory of artinian local	139
rings	825
Setzer, Anton. See Jäger, Gerhard.	
SHELAH, SAHARON. See BALDWIN, JOHN T.	
See Ciesielski, Krzysztof.	
. See Džamonja, Mirna.	
See Gitik, Moti.	
See Hyttinen, Tapani.	
SHORE, RICHARD A. See CHOLAK, PETER.	
Simonetta, Patrick. See Delon, Françoise.	
Simpson, Stephen G. See Humphreys, A. James.	
Sokolović, Željko. See Hart, Bradd.	
SOLECKI, SLAWOMIR and SPINAS, OTMAR. Dominating and unbounded free sets	75
SOMMER, RICHARD. See AVIGAD, JEREMY.	13
Spinas, Otmar. Countable filters on $\omega$	469
See Solecki Stawowip	.07

### **VOLUME 62**

Page 1502, column 1, line 5. For  $\langle flow \rangle \rangle$ , read  $\langle form \rangle \rangle$ .

### **VOLUME 63**

Page 477. Reference [12] should be changed to read as follows: «[12] J. ZASHEV, Categorial generalization of algebraic recursion theory, Journal of Pure and Applied Algebra, vol. 101 (1995), pp. 91–128.»

The complexity of decision procedures in relevance logic II, by ALASDAIR	
URQUHART	1774
Adjoining cofinitary permutations, by Y1 ZHANG	1803
Some results on combinators in the system TRC, by THOMAS JECH	1811
Reviews	1820
Index of Reviews	1854

The BULLETIN and the JOURNAL are the official organs of the Association for Symbolic Logic, an international organization for furthering research in symbolic logic and the exchange of ideas among mathematicians, philosophers, computer scientists, linguists, and others interested in this field.

The JOURNAL invites submission of (1) original technical papers in the field of symbolic logic, (2) expository papers in this field, (3) papers whose main point is philosophical and which either bear upon logic or make use of its methods, and (4) studies in the history of logic in which modern technical developments are taken into account.

Articles being submitted for publication in the JOURNAL should be sent in duplicate to one (and only one) of the following editors: Howard S. Becker, Department of Mathematics, University of South Carolina, Columbia, SC 29208, USA (becker@math.sc.edu); or Kevin J. Compton, Department of EECS, University of Michigan, Ann Arbor, MI 48109, USA (kjc@umich.edu); or Rod Downey, Department of Mathematics, Victoria University of Wellington, Box 600, Wellington, New Zealand (rod.downey@vuw.ac.nz); or John Etchemendy, Department of Philosophy, Stanford University, Stanford, CA 94305, USA (jetch@csli.stanford.edu); or David Marker, Department of Mathematics, m/c 249, University of Illinois at Chicago, 851 S. Morgan Street, Chicago, IL 60607, USA (marker@math.uic.edu); or William J. Mitchell, Department of Mathematics, University of Florida, Gainesville, FL 32611, USA (mitchell@math.ufl.edu); or Michael Rathjen, School of Mathematics, University of Leeds, Leeds LS2 9JT, England (rathjen@msta.leeds.ac.uk); or Lou van den Dries, Department of Mathematics, University of Illinois, 1409 W. Green Street, Urbana, IL 61801, USA (vddries@math.uiuc.edu); or Michiel van Lambalgen, Department of Mathematics and Computer Science, University of Amsterdam, Plantage Muidergracht 24, 1018 TV Amsterdam, The Netherlands (michiell@fwi.uva.nl).

Each manuscript should be typewritten with wide margins and with double spacing between the lines. Footnotes should be numbered consecutively and should also be typed with wide margins and double spacing, preferably on a separate sheet. Two copies of the manuscript should be sent to the editor, and the author should also keep a complete copy. After the paper is accepted in its final form, an electronic copy in LaTeX or (preferably) AMS-LATEX format will be appreciated, and will advance considerably the final publication date of the paper. Fifty offprints of each article are supplied at no charge, and additional offprints may be purchased if desired.

Books for review in the JOURNAL should be sent to Herbert Enderton, The Journal of Symbolic Logic, UCLA, Los Angeles, CA 90095-1555, USA. The other editors of reviews are Matthew Foreman Gorhard.

