THE JOURNAL OF SYMBOLIC LOGIC

Edited by

Noam Greenberg, *Coordinating Editor* Bradd Hart Jan Krajíček Stephan Kreutzer Ya'acov Peterzil Alasdair Urquhart Boban Velickovic Andreas Weiermann Philip Welch

VOLUME 79 • NUMBER 2 • JUNE 2014 • ISSN 0022-4812

Copyright © 2014 by the Association for Symbolic Logic. All rights reserved. Reproduction by photostat, photo-print, microfilm, or like process by permission only.

DL PUBLISHED BY CAMBRIDGE UNVERSITY PRESS FOR AND ON BEHALF OF THE ASSOCIATION FOR SYMBOLIC LOGIC. 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 logic and the exchange of ideas among mathematicians, computer scientists, linguists, and others interested in this field.

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:

Noam Greenberg (Coordinating Editor) School of Mathematics, Statistics and Operations Research, Victoria University of Wellington, PO Box 600, Wellington 6140 New Zealand (greenberg@msor.vuw.ac.nz);

Bradd Hart Department of Mathematics & Statistics, McMaster University, 1280 Main Street W., Hamilton, Ontario, Canada L8S 4K1 (hartb@mcmaster.ca);

Jan Krajiček Department of Algebra, Faculty of Mathematics and Physics, Sokolovska 83, Prague, CZ-186 75, The Czech Republic (krajicek@karlin.mff.cuni.cz);

Stephan Kreutzer Technische Universität Berlin, Institut für Softwaretechnik und Theoretische Informatik, Lehrstuhl für Logik und Semantik, Sekr TEL 7-3, Ernst-Reuter-Platz 7, 10587 Berlin, Germany (stephan.kreutzer@tu-berlin.de);

Ya'acov Peterzil Department of Mathematics, University of Haifa, Mount Carmel, Haifa, 31905, Israel (kobi@math.haifa.ac.il);

Alasdair Urquhart Department of Computer Science, Sandford Fleming Building, 10 King's College Rd., University of Toronto, Toronto, Ontario M5S 3G4, Canada (urquhart@cs.toronto.edu);

Boban Velickovic Équipe de Logique Mathématique, Université Paris Diderot – Paris 7, UFR de Mathématiques (case 7012), 2 place Jussieu 75251 Paris, France (boban@math.univ-paris-diderot.fr);

Andreas Weiermann Vakgroep Wiskunde, Ghent University, Krijgslaan 281 – Gebouw S22, B9000 Gent, Belgium (Andreas.Weiermann@UGent.be);

Philip Welch School of Mathematics, University of Bristol, Clifton, Bristol, BS8 1TW, UK (P.Welch@bristol.ac.uk).

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 its final publication date.

It is recommended that papers be prepared in IAT_EX using the ASL's class file, especially for manuscripts having extensive symbolic or mathematical notation. This style file is available from the ASL's website at http://www.aslonline.org; links from that site provide further information about the JOURNAL and about submitting papers for publication.

No print offprints will be supplied but authors will receive a link to a freely accessible electronic pdf of their published article. Print offprints may be purchased if required.

TABLE OF CONTENTS

Lifting proof theory to the countable ordinals: Zermelo-Fraenkel	
set theory, by Toshiyasu Arai	325
O-minimalism, by HANS SCHOUTENS	355
The free pseudospace is <i>N</i> -ample, but not $(N + 1)$ -ample,	
by Katrin Tent	410
The tree property up to $\aleph_{\omega+1}$, by Itay Neeman	429
Almost indiscernible sequences and convergence of canonical bases,	
by Itaï Ben Yaacov, Alexander Berenstein, and C. Ward Henson	460
Glivenko and Kuroda for simple type theory, by CHAD E. BROWN	
and Christine Rizkallah	485
Fragments of approximate counting, by SAMUEL R. BUSS,	
Leszek Aleksander Kołodziejczyk, and Neil Thapen	496
Characterizing lowness for Demuth randomness, by LAURENT BIENVENU,	
ROD DOWNEY, NOAM GREENBERG, ANDRÉ NIES, and DAN TURETSKY	526
Automorphism groups of saturated models of Peano Arithmetic,	
by Ermek S. Nurkhaidarov and James H. Schmerl	561
Examples in dependent theories, by ITAY KAPLAN and SAHARON SHELAH	585
Complexity of complexity and strings with maximal plain and prefix	
Kolmogorov complexity, by B. BAUWENS and A. SHEN	620
A note on initial segments of the enumeration degrees,	
by Theodore A. Slaman and Andrea Sorbi	633
F_{σ} equivalence relations and Laver forcing, by MICHAL DOUCHA	644