

# THE JOURNAL OF SYMBOLIC LOGIC

## **Edited by**

Steve Awodey, *Coordinating Editor*

Sylvy Anscombe

Jeremy Avigad

Lev Beklemishev

Alex Berenstein

Ricardo Camerlo

Damir Dzhafarov

Vera Fischer

Itay Kaplan

Elvira Mayordomo

Hiroshi Sakai

Anton Setzer

VOLUME 89 • NUMBER 3 • SEPTEMBER 2024 • ISSN 0022-4812

Copyright © 2024 by the Association for Symbolic Logic. All rights reserved.  
Reproduction by photostat, photo-print, microfilm, or like process by permission only.



PUBLISHED BY CAMBRIDGE UNIVERSITY 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.

### Editors

Steve Awodey (Coordinating Editor)

Departments of Philosophy and Mathematics, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, USA

(awodey@cmu.edu) ;

Sylvy Anscombe

Université de Paris, France

(sylvy.anscombe@imj-prg.fr) ;

Jeremy Avigad

Departments of Philosophy and Mathematics, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, USA

(avigad@cmu.edu) ;

Lev Beklemishev

Steklov Mathematical Institute of RAS, Gubkina str. 8, 119991 Moscow, Russia

(lbekl@yandex.ru) ;

Alex Berenstein

Departamento de Matemáticas, Universidad de los Andes, Cra 1 N° 18A-12, Edificio H, 111711 Bogotá, Colombia

(aberenst@uniandes.edu.co) ;

Ricardo Camerlo

Dipartimento di Matematica, Università di Genova, Via Dodecaneso, 35 16146 Genova, Italy

(camerlo@dima.unige.it) ;

Damir Dzhafarov

Department of Mathematics, University of Connecticut, 341 Mansfield Road U1009, Storrs, CT 06269-1009, USA

(damir@math.uconn.edu) ;

Vera Fischer

University of Vienna, Kolingasse 14-16, 1090 Vienna, Austria

(vera.fischer@univie.ac.at) ;

Itay Kaplan

Einstein Institute of Mathematics, Office Ross 78B, Hebrew University (The Edmond J. Safra Campus – Giv'at Ram), Jerusalem 91904, Israel

(kaplan@math.huji.ac.il) ;

Elvira Mayordomo

Departamento de Informática, Universidad de Zaragoza, María de Luna 1, 50018 Zaragoza, Spain

(elvira@unizar.es) ;

Hiroshi Sakai

Graduate School of System Informatics, Kobe University, 1-1 Rokkodai-cho, Nada-ku, Kobe, 657-8501, Japan

(hsakai@people.kobe-u.ac.jp) ;

Anton Setzer

Department of Computer Science, Swansea University Bay Campus, Fabian Way, Swansea, SA1 8EN, UK

(a.g.setzer@swansea.ac.uk) .

Manuscripts should be submitted using EditFlow at [https://ef.msp.org/submit/asl\\_jsl](https://ef.msp.org/submit/asl_jsl), where instructions directed specifically at using the system can also be found.

Authors should keep a complete copy of their submission and all electronic files from which it was created. They should also consult the more general guidelines for the submission of manuscripts at <https://aslonline.org/journals/the-journal-of-symbolic-logic/submission-guidelines/>. These instructions include the Association's standards about previous publication and plagiarism as well as information about copyrights and electronic copies of published papers.

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

A new perspective on semi-retractions and the Ramsey property DANA BARTOŠOVÁ and LYNN SCOW .....	945
Weak indestructibility and reflection JAMES HOLLAND .....	980
Reflection in second-order set theory with abundant urelements bi-interprets a supercompact cardinal JOEL DAVID HAMKINS and BOKAI YAO .....	1007
Self-embeddings of models of arithmetic; fixed points, small submodels, and extendability SAEIDEH BAHRAMI .....	1044
The permutations with $n$ non-fixed points and the sequences with length $n$ of a set JUKKRID NUNTASRI and PIMPEN VEJAJIVA .....	1067
On robust theorems due to Bolzano, Weierstrass, Jordan, and Cantor DAG NORMANN and SAM SANDERS .....	1077
Fractal dimensions of $k$ -automatic sets ALEXI BLOCK GORMAN and CHRIS SCHULZ .....	1128
Orthogonal decomposition of definable groups ALESSANDRO BERARDUCCI, PANTELIS E. ELEFThERIOU, and MARCELLO MAMINO .....	1158
Strong compactness, square, GCH, and Woodin cardinals ARTHUR W. APTER .....	1180
The reverse mathematics of CAC for trees JULIEN CERVELLE, WILLIAM GAUDELIER, and LUDOVIC PATEY .....	1189
Separating many localisation cardinals on the generalised Baire space TRISTAN VAN DER VLUGT .....	1212
Comparing computability in two topologies DJAMEL EDDINE AMIR and MATHIEU HOYRUP .....	1232
The strong and super tree properties at successors of singular cardinals WILLIAM ADKISSON .....	1251
Extensions and limits of the Specker–Blatter theorem ELDAR FISCHER and JOHANN A. MAKOWSKY .....	1284
Computable presentations of $C^*$ -algebras ALEC FOX .....	1313
Remarks on convergence of Morley sequences KARIM KHANAKI .....	1339
On cupping and Ahmad pairs ISKANDER SH. KALIMULLIN, STEFFEN LEMPP, KENG NG, and MARS M. YAMALEEV .....	1358
On the c.e. degrees realizable in $\Pi_1^0$ classes BARBARA F. CSIMA, ROD DOWNEY, and KENG MENG NG .....	1370