



# THEORY AND APPLICATIONS OF CATEGORIES

Volume 30, 2015

On strong homotopy for quasi-schemoids Katsuhiko Kuribayashi	1
Model categories with simple homotopy categories Jean-Marie Droz and Inna Zakharevich	15
Weak braided monoidal categories and their homotopy colimits Mirjam Solberg	40
Un théorème A de Quillen pour les 2-foncteurs lax Jonathan Chiche	49
Algebraic Kan extensions in double categories Seerp Roald Koudenburg	86
Bicategorical homotopy pullbacks A.M. Cegarra, B.A. Heredia, J.Remedios	147
Characteristic subobjects in semi-abelian categories Alan S. Cigoli and Andrea Montoli	206
Limit closures of classes of commutative rings Michael Barr, John F. Kennison, R. Raphael	229
Partial-sup lattices Toby Kenney	305
Lax formal theory of monads, monoidal approach to bicategorical structures and generalized operads Dimitri Chikladze	332
A cocategorical obstruction to tensor products of Gray-categories John Bourke and Nick Gurski	387

Normalizers, centralizers and action accessibility J. R. A. Gray	410
Operadic definitions of weak $n$ -category: coherence and comparisons Thomas Cottrell	433
Slicing sites and semireplete factorization systems Thorsten Palm	489
Notes on commutation of limits and colimits Marie Bjerrum, Peter Johnstone, Tom Leinster, William F. Sawin	527
Polynomials in categories with pullbacks Mark Weber	533
Extensive categories and the size of an orbit Ernie Manes	599
Cartesian differential storage categories R. Blute, J.R.B. Cockett, and R.A.G. Seely	620
The accessibility rank of weak equivalences G. Raptis and J. Rosicky	687
A model structure on internal categories in simplicial sets Geoffroy Horel	704
Categories enriched over a quantaloid: Algebras Qiang Pu and Dexue Zhang	751
An algebraic definition of $(\infty, n)$ -categories Camell Kachour	775
Reflexivity and dualizability in categorified linear algebra Martin Brandenburg, Alexandru Chirvasitu, and Theo Johnson-Freyd	808
Categories in control John C. Baez and Jason Erbele	836
Actions in modified categories of interest with application to crossed modules Y. Boyaci, J. M. Casas, T. Datuashvili and E. O. Uslu	882
Internal choice holds in the discrete part of any cohesive topos satisfying stable connected codiscreteness F. W. Lawvere and M. Menni	909
On the second cohomology categorical group and a Hochschild-Serre 2-exact sequence A.R. Garzon and E.M. Vitale	933

<i>Theory and Applications of Categories</i> , Vol. 30	iii
Skew-monoidal reflection and lifting theorems Stephen Lack and Ross Street	985
Deligne groupoid revisited Paul Bressler, Alexander Gorokhovsky, Ryszard Nest and Boris Tsygan	1001
Finite categories with pushouts D. Tambara	1017
Reduced smooth stacks? Giorgio Trentinaglia	1032
Cyclic homology arising from adjunctions Niels Kowalzig, Ulrich Krähmer, and Paul Slevin	1067
Decorated cospans Brendan Fong	1096
A note on transport of algebraic structures Henrik Holm	1121
Generalized covering space theories Jeremy Brazas	1132
Building a Model Category out of cofibrations and fibrations Seunghun Lee	1163
A C-system defined by a universe category Vladimir Voevodsky	1181
Intercategories Marco Grandis and Robert Paré	1215
Stacks of Ann-Categories and their morphisms Ettore Aldrovandin	1256
Segal group actions Matan Prasma	1287
On reflective subcategories of locally presentable categories J. Adamek and J. Rosicky	1287
Gauge invariant surface holonomy and monopoles Arthur J. Parzygnat	1319
Transformation double categories associated to 2-group actions Jeffrey C. Morton and Roger Picken	1429
Proximity biframes and compactifications of completely regular ordered spaces Guram Bezhanishvili and Patrick J. Morandi	1469

$A_\infty$ -morphisms with several entries Volodymyr Lyubashenko	1501
Homotopy unital $A_\infty$ -morphisms with several entries Volodymyr Lyubashenko	1552
The waves of a total category R.J. Wood	1624
Limits of abstract elementary classes M. Lieberman, J. Rosicky	1647
Operads as polynomial 2-monads Mark Weber	1659
Internal algebra classifiers as codescent objects of crossed internal categories Mark Weber	1713
Algebras of open dynamical systems on the operad of wiring diagrams Dmitry Vagner, David I. Spivak, and Eugene Lerman	1793
Mutation pairs and triangulated quotients Zengqiang Lin and Minxiong Wang	1823
Profinite topological spaces G. Bezhanishvili, D. Gabelaia, M. Jibladze, P. J. Morandi	1841
Algebraically coherent categories Alan S. Cigoli, James R. A. Gray and Tim Van der Linden	1864
Groupoids in categories with pretopology Ralf Meyer and Chenchang Zhu	1906
On the 3-representations of groups and the 2-categorical traces Wei Wang	1999

THEORY AND APPLICATIONS OF CATEGORIES (ISSN 1201-561X) will disseminate articles that significantly advance the study of categorical algebra or methods, or that make significant new contributions to mathematical science using categorical methods. The scope of the journal includes: all areas of pure category theory, including higher dimensional categories; applications of category theory to algebra, geometry and topology and other areas of mathematics; applications of category theory to computer science, physics and other mathematical sciences; contributions to scientific knowledge that make use of categorical methods.

Articles appearing in the journal have been carefully and critically refereed under the responsibility of members of the Editorial Board. Only papers judged to be both significant and excellent are accepted for publication.

Full text of the journal is freely available in .dvi, Postscript and PDF from the journal's server at <http://www.tac.mta.ca/tac/> and by ftp. It is archived electronically and in printed paper format.

**SUBSCRIPTION INFORMATION.** Individual subscribers receive by e-mail abstracts of articles by e-mail as they are published. To subscribe, send e-mail to [tac@mta.ca](mailto:tac@mta.ca) including a full name and postal address. For institutional subscription, send enquiries to the Managing Editor.

**INFORMATION FOR AUTHORS.** The typesetting language of the journal is **TEX**, and **LATEX 2E** is strongly encouraged. Articles should be submitted by e-mail directly to a Transmitting Editor. Please obtain detailed information on submission format and style files from <http://www.tac.mta.ca/tac/>.

Managing editor. Robert Rosebrugh, Mount Allison University: [rrosebrugh@mta.ca](mailto:rrosebrugh@mta.ca)

**TEX**nical editor. Michael Barr, McGill University: [barr@math.mcgill.ca](mailto:barr@math.mcgill.ca)

Assistant **TEX** editor. Gavin Seal, Ecole Polytechnique Fédérale de Lausanne:  
[gavin\\_seal@fastmail.fm](mailto:gavin_seal@fastmail.fm)

Transmitting editors.

Clemens Berger, Université de Nice-Sophia Antipolis: [cberger@math.unice.fr](mailto:cberger@math.unice.fr)

Richard Blute, Université d' Ottawa: [rblute@uottawa.ca](mailto:rblute@uottawa.ca)

Lawrence Breen, Université de Paris 13: [breen@math.univ-paris13.fr](mailto:breen@math.univ-paris13.fr)

Ronald Brown, University of North Wales: [ronnie.profbrown\(at\)btinternet.com](mailto:ronnie.profbrown(at)btinternet.com)

Valeria de Paiva: Nuance Communications Inc: [valeria.depaiva@gmail.com](mailto:valeria.depaiva@gmail.com)

Ezra Getzler, Northwestern University: [getzler\(at\)northwestern\(dot\)edu](mailto:getzler(at)northwestern(dot)edu)

Kathryn Hess, Ecole Polytechnique Fédérale de Lausanne: [kathryn.hess@epfl.ch](mailto:kathryn.hess@epfl.ch)

Martin Hyland, University of Cambridge: [M.Hyland@dpmms.cam.ac.uk](mailto:M.Hyland@dpmms.cam.ac.uk)

Anders Kock, University of Aarhus: [kock@imf.au.dk](mailto:kock@imf.au.dk)

Stephen Lack, Macquarie University: [steve.lack@mq.edu.au](mailto:steve.lack@mq.edu.au)

F. William Lawvere, State University of New York at Buffalo: [wlawvere@buffalo.edu](mailto:wlawvere@buffalo.edu)

Tom Leinster, University of Edinburgh: [Tom.Leinster@ed.ac.uk](mailto:Tom.Leinster@ed.ac.uk)

Ieke Moerdijk, Radboud University Nijmegen: [i.moerdijk@math.ru.nl](mailto:i.moerdijk@math.ru.nl)

Susan Niefield, Union College: [niefiels@union.edu](mailto:niefiels@union.edu)

Robert Paré, Dalhousie University: [pare@mathstat.dal.ca](mailto:pare@mathstat.dal.ca)

Jiri Rosicky, Masaryk University: [rosicky@math.muni.cz](mailto:rosicky@math.muni.cz)

Giuseppe Rosolini, Università di Genova: [rosolini@disi.unige.it](mailto:rosolini@disi.unige.it)

Alex Simpson, University of Ljubljana: [Alex.Simpson@fmf.uni-lj.si](mailto:Alex.Simpson@fmf.uni-lj.si)

James Stasheff, University of North Carolina: [jds@math.upenn.edu](mailto:jds@math.upenn.edu)

Ross Street, Macquarie University: [street@math.mq.edu.au](mailto:street@math.mq.edu.au)

Walter Tholen, York University: [tholen@mathstat.yorku.ca](mailto:tholen@mathstat.yorku.ca)

Myles Tierney, Université du Québec à Montréal : [tierney.myles4@gmail.com](mailto:tierney.myles4@gmail.com)

R. J. Wood, Dalhousie University: [rjwood@mathstat.dal.ca](mailto:rjwood@mathstat.dal.ca)