

ISSN 0030-1566

MATHEMATICAL JOURNAL
OF
OKAYAMA UNIVERSITY

VOL. 55 2013

PUBLISHED BY

DEPARTMENT OF MATHEMATICS
FACULTY OF SCIENCE
OKAYAMA UNIVERSITY
OKAYAMA, JAPAN

MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY

FOUNDED BY M. MORIYA, T. INAGAKI, M. OSIMA, T. OTSUKI

EDITED BY

Masao HIROKAWA

Kazuyoshi KIYOHARA

Kazuhisa SHIMAKAWA

Hiro-Fumi YAMADA

Tomoyuki KAKEHI

Hiroaki NAKAMURA*

Hideo TAMURA

Yuji YOSHINO

(* : Managing Editor)

Each volume consists of two numbers, and each number which contains about 100 pages will appear semi-annually.

According to circumstances, there are some cases where one volume containing about 200 pages appears annually.

All communications relating to this publication should be addressed to

Mathematical Journal of Okayama University

Department of Mathematics

Faculty of Science

Okayama University

Okayama 700-8530, Japan

E-mail: journal@math.okayama-u.ac.jp

Information for authors is to be found on the inside back cover.

Visit our web site

<http://www.math.okayama-u.ac.jp/mjou/>

Copyright©2013 by the Editorial Board of Mathematical Journal of Okayama University

Information for authors

Submission of Manuscripts

- (1) Articles on pure and applied mathematics intended for publication in *Mathematical Journal of Okayama University* should be written in English.
- (2) Only original papers not yet published and not simultaneously submitted for publication elsewhere will be accepted.
- (3) Electronically prepared manuscripts in printable files (dvi or pdf) can be sent via e-mail to:

`journal@math.okayama-u.ac.jp`

- (4) Electronic submission in LaTeX style is preferred. If you are unable to submit your manuscript electronically, you should send two hard copies to the Editorial Office of Mathematical Journal of Okayama University, Department of Mathematics, Okayama University, Okayama 700-8530, Japan.
- (5) After acceptance for publication, authors will be requested to send a LaTeX file coded with the style file “jokayama.cls” which (together with all necessary additional information on how to use the style sheet) is available at our homepage:

<http://www.math.okayama-u.ac.jp/mjou/>.

Proofs

Authors will receive page proofs, preferably by e-mail in PDF format. Corrections should be confined to typographical errors. Authors will be charged for excessive corrections. Please correct your galley proofs and return them within 14 days together with the signed copyright agreement.

Reprints

The corresponding author will receive 50 hardcopy reprints free of charge, this number to be shared between joint authors.

Edit and Publishing:

Department of Mathematics,
Faculty of Science, Okayama University
Okayama, JAPAN

Design and Printing Office:

... Co. Ltd.

CONTENTS

	Page
ADEMOLA, A. T. AND ARAWOMO, P. O. Uniform Stability and Boundedness of Solutions of Nonlinear Delay Differential Equations of The Third Order	157
AKAHORI, J., AMABA, T. AND URAGUCHI, S. An Algebraic Approach to the Cameron-Martin-Maruyama-Girsanov Formula	167
HARAN, D., JARDEN, M. AND POP, F. The block approximation theorem	53
KANESAKA, N. AND NAKAMURA, H. On hyperbolic area of moduli of θ -acute triangles	191
KESKIN TÜTÜNCÜ, D. AND KURATOMI, Y. On mono-injective modules and mono-jective modules	117
LINTON, S. A. AND MPONO, Z. E. Multiplicity-free permutation characters of covering groups of sporadic simple groups	145
MIYAHARA, H. Purity and Gorenstein filtered rings	131
SOUDÈRES, I. Explicit associator relations for multiple zeta values	1
TANAKA, K. A model structure on the category of small categories for coverings	95
TEZUKA, M. AND YAGITA, N. Note on the cohomological invariant of Pfister forms	87

JANUARY 2013

Vol. 55

CONTENTS

	Page
SOUNDÈRES, I. Explicit associator relations for multiple zeta values	1
HARAN, D., JARDEN, M. AND POP, F. The block approximation theorem	53
TEZUKA, M. AND YAGITA, N. Note on the cohomological invariant of Pfister forms	87
TANAKA, K. A model structure on the category of small categories for coverings	95
KESKIN TÛTÛNCÛ, D. AND KURATOMI, Y. On mono-injective modules and mono-objective modules	117
MIYAHARA, H. Purity and Gorenstein filtered rings	131
LINTON, S. A. AND MPOÑO, Z. E. Multiplicity-free permutation characters of covering groups of sporadic simple groups	145
ADEMOLA, A. T. AND ARAWOMO, P. O. Uniform Stability and Boundedness of Solutions of Nonlinear Delay Differential Equations of The Third Order	157
AKAHORI, J., AMABA, T. AND URAGUCHI, S. An Algebraic Approach to the Cameron-Martin-Maruyama-Girsanov Formula	167
KANESAKA, N. AND NAKAMURA, H. On hyperbolic area of moduli of θ -acute triangles	191

**EXPLICIT ASSOCIATOR RELATIONS
FOR MULTIPLE ZETA VALUES**

ISMAËL SOUDÈRES

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY
Vol. 55, 2013

THE BLOCK APPROXIMATION THEOREM

DAN HARAN, MOSHE JARDEN AND FLORIAN POP

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY
Vol. 55, 2013

**NOTE ON THE COHOMOLOGICAL INVARIANT
OF PFISTER FORMS**

MICHISHIGE TEZUKA AND NOBUAKI YAGITA

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY
Vol. 55, 2013

**A MODEL STRUCTURE ON THE CATEGORY
OF SMALL CATEGORIES FOR COVERINGS**

KOHEI TANAKA

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY
Vol. 55, 2013

**ON MONO-INJECTIVE MODULES
AND
MONO-OJECTIVE MODULES**

DERYA KESKIN TÜTÜNCÜ AND YOSUKE KURATOMI

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY
Vol. 55, 2013

PURITY AND GORENSTEIN FILTERED RINGS

HIROKI MIYAHARA

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY
Vol. 55, 2013

**MULTIPLICITY-FREE PERMUTATION CHARACTERS OF
COVERING GROUPS OF SPORADIC SIMPLE GROUPS**

S. A. LINTON AND Z. E. MPONO

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY
Vol. 55, 2013

**UNIFORM STABILITY AND BOUNDEDNESS
OF SOLUTIONS OF NONLINEAR DELAY
DIFFERENTIAL EQUATIONS OF THE THIRD ORDER**

A. T. ADEMOLA AND P. O. ARAWOMO

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY
Vol. 55, 2013

**AN ALGEBRAIC APPROACH TO THE
CAMERON-MARTIN-MARUYAMA-GIRSANOV FORMULA**

JIRÔ AKAHORI, TAKAFUMI AMABA AND SACHIYO URAGUCHI

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY
Vol. 55, 2013

**ON HYPERBOLIC AREA OF MODULI
OF θ -ACUTE TRIANGLES**

NAOMI KANESAKA AND HIROAKI NAKAMURA

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY
Vol. 55, 2013