

ISSN 0030-1566

MATHEMATICAL JOURNAL  
OF  
OKAYAMA UNIVERSITY

---

VOL. 64 2022

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 ISHIKAWA\*  
Kei KONDO  
Yoshihito OSHITA  
Takeshi TORII

Masao JINZENJI  
Masaharu TANIGUCHI  
Naoki TERAII

(\* : 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: [mjou@okayama-u.ac.jp](mailto:mjou@okayama-u.ac.jp), [journal@math.okayama-u.ac.jp](mailto: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©2022 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:

`mjou@okayama-u.ac.jp`, `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
AOKAGE, K., TABATA, S. AND YAMADA, H.-F. Quantum Sylvester-Franke Theorem .....	143
HOSHI, Y. A Note on Torsion Points on Ample Divisors on Abelian Varieties .....	1
HYODO, F. A note on a Hecke ring associated with the Heisenberg Lie algebra .....	215
NAGAMACHI, I. Criteria for good reduction of hyperbolic polycurves .....	75
NISHIYAMA, Y. Bijective proofs of the identities on the values of inner products of the Macdonald polynomials .....	153
PUTHENPURAKAL, T. Symbolic powers of monomial ideals .....	187
SEITA, K. The $d$ -Smith sets of Cartesian products of the alternating groups and finite elementary abelian 2-groups .....	13
SUZUKI, T. AND TOYOSAWA, Y. On Hook Formulas for Cylindric Skew Diagrams .....	191
TASAKA, K. Note on totally odd multiple zeta values .....	63
WANG, Q. $\tau$ -tilting finiteness of two-point algebras I .....	117
YAGITA, N. Notes on the filtration of the $K$ -theory for abelian $p$ -groups .....	109
YAMAGISHI, H. The best constant of the discrete Sobolev inequalities on the complete bipartite graph .....	31
YAMANAKA, S. On Weakly Separable Polynomials in skew polynomial rings .....	47

**JANUARY 2022**

**Vol. 64**

**CONTENTS**

---

	Page
HOSHI, Y. A Note on Torsion Points on Ample Divisors on Abelian Varieties .....	1
SEITA, K. The $d$ -Smith sets of Cartesian products of the alternating groups and finite elementary abelian 2-groups .....	13
YAMAGISHI, H. The best constant of the discrete Sobolev inequalities on the complete bipartite graph .....	31
YAMANAKA, S. On Weakly Separable Polynomials in skew polynomial rings .....	47
TASAKA, K. Note on totally odd multiple zeta values .....	63
NAGAMACHI, I. Criteria for good reduction of hyperbolic polycurves .....	75
YAGITA, N. Notes on the filtration of the $K$ -theory for abelian $p$ -groups .....	109
WANG, Q. $\tau$ -tilting finiteness of two-point algebras I .....	117
AOKAGE, K., TABATA, S. AND YAMADA, H.-F. Quantum Sylvester-Franke Theorem .....	143
NISHIYAMA, Y. Bijective proofs of the identities on the values of inner products of the Macdonald polynomials .....	153
PUTHENPURAKAL, T. Symbolic powers of monomial ideals .....	187
SUZUKI, T. AND TOYOSAWA, Y. On Hook Formulas for Cylindric Skew Diagrams .....	191
HYODO, F. A note on a Hecke ring associated with the Heisenberg Lie algebra .....	215

**A NOTE ON TORSION POINTS ON AMPLE DIVISORS  
ON ABELIAN VARIETIES**

YUICHIRO HOSHI

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022

**THE  $d$ -SMITH SETS OF CARTESIAN PRODUCTS OF  
THE ALTERNATING GROUPS AND  
FINITE ELEMENTARY ABELIAN 2-GROUPS**

KOHEI SEITA

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022

**THE BEST CONSTANT OF  
THE DISCRETE SOBOLEV INEQUALITIES ON  
THE COMPLETE BIPARTITE GRAPH**

HIROYUKI YAMAGISHI

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022



**ON WEAKLY SEPARABLE POLYNOMIALS IN SKEW  
POLYNOMIAL RINGS**

SATOSHI YAMANAKA

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022

**NOTE ON TOTALLY ODD MULTIPLE ZETA VALUES**

KOJI TASAKA

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022

**CRITERIA FOR GOOD REDUCTION OF HYPERBOLIC  
POLYCURVES**

IPPEI NAGAMACHI

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022

NOTES ON THE FILTRATION OF THE  $K$ -THEORY FOR  
ABELIAN  $p$ -GROUPS

NOBUAKI YAGITA

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022

$\tau$ -TILTING FINITENESS OF TWO-POINT ALGEBRAS I

QI WANG

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022

# QUANTUM SYLVESTER-FRANKE THEOREM

KAZUYA AOKAGE, SUMITAKA TABATA AND HIRO-FUMI YAMADA

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022

**BIJECTIVE PROOFS OF THE IDENTITIES  
ON THE VALUES OF INNER PRODUCTS  
OF THE MACDONALD POLYNOMIALS**

YUTA NISHIYAMA

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022

# SYMBOLIC POWERS OF MONOMIAL IDEALS

TONY J. PUTHENPURAKAL

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022



**ON HOOK FORMULAS FOR CYLINDRIC SKEW  
DIAGRAMS**

TAKESHI SUZUKI AND YOSHITAKA TOYOSAWA

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022

**A NOTE ON A HECKE RING ASSOCIATED WITH THE  
HEISENBERG LIE ALGEBRA**

FUMITAKE HYODO

Reprinted from MATHEMATICAL JOURNAL OF OKAYAMA UNIVERSITY  
Vol. 64, 2022