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数理解析研究所講究録2109

RIMS共同研究（公開型）

Workshop on Nonlinear Water Waves

京都大学数理解析研究所

2019年4月

数理解析研究所講究録は，京都大学数理解析研究所の共同利用研究集会および共同研究の記録として1964年に刊行が開始されました．当研究所が全国共同利用研究所として発足した翌年のことでしたが，以来半世紀，毎年数十巻を刊行し，2016年には第2000巻が刊行されるに至りました．第1巻から第2000巻までに収録された論文数は29,265編，総頁数は342,960頁という膨大なものであり，最先端の数学・数理科学分野の研究状況を伝えるのみならず，我が国の数学・数理科学の発展の歴史を留める文献として，他に類例を見ない論文集となっています．

講究録の内容は当研究所のウェブサイトおよび京都大学の学術情報リポジトリにおいても公開され，年間の総アクセス数は1,380,032回（2017年度）を数えるなど，多数の方にご利用いただいています．

講究録の使用言語は論文著者の判断に任されていますが，結果的に日本語が多用されていることが特徴の一つとなっています．その結果，講究録は，数学・数理科学の広い領域における最先端の専門知識に母国語でアクセスできるものとして，近年の英語化の流れの中で，重要な文献となりつつあります．

当研究所の共同利用事業に参加し講究録の論文を執筆していただいた多数の方々に対し，講究録を大きく成長させていただいたことを深く感謝いたしますとともに，これからも，当研究所の国際共同利用・共同研究拠点(*)としての活動にご参加いただき，講究録の発展にご協力いただけますよう心よりお願い申し上げます．

*数理解析研究所は2018年11月13日，共同利用・共同研究拠点の認定が廃止され，新しく国際共同利用・共同研究拠点に認定されました．

RIMS Kôkyûroku 2109

Workshop on Nonlinear Water Waves

May 23 ～ 25, 2018

edited by Sunao Murashige

April, 2019

Research Institute for Mathematical Sciences

Kyoto University, Kyoto, Japan

This is a report of research done at the Research Institute for Mathematical Sciences,
an International Joint Usage/Research Center located in Kyoto University.
The papers contained herein are in final form and will not be submitted for publication elsewhere.

講究録

Kôkyûroku

RIMS Kôkyûroku was started in 1964 as the proceedings of symposia, colloquia and workshops supported by RIMS, the Research Institute for Mathematical Sciences, Kyoto University. It was the next year of the establishment of RIMS as one of the Nationwide Cooperative Research Centers. For half a century since then, several dozen volumes have been issued each year, and the 2,000th volume was issued in 2016. The volumes of Kôkyûroku from the 1st through the 2,000th, containing enormous 29,265 articles and 342,960 pages, not only deliver the latest research activities in mathematics and mathematical sciences but also constitute valuable and incomparable collections of articles that pass down history of progress of mathematics and mathematical science in Japan.

Articles in Kôkyûroku are available on the websites of RIMS and Kyoto University Research Information Repository. They are very frequently accessed on the internet, with a total of as many as 1,380,032 accesses in 2017.

The authors choose the languages to write articles, and many are written in Japanese, which is one of the characteristics of Kôkyûroku. As a result, Kôkyûroku is regarded as a significant and important literature which allows easy access to the latest specialized knowledge in the large fields of mathematics and mathematical sciences written in native language for Japanese readers, while more and more research papers are being written in English in recent years.

We are deeply grateful to many of those who have participated in cooperative research activities of RIMS and greatly developed Kôkyûroku. We heartily ask for your continuous participation in research activities at RIMS as an International Joint Usage/Research Center(*) and your warm support and cooperation for the fruitful development of Kôkyûroku.

* RIMS was certified as an International Joint Usage/Research Center on Nov. 13, 2018.

PREFACE

This volume is a compilation of papers based on the talks given at the "Workshop on Nonlinear Water Waves in honor of Professor Mitsuhiro Tanaka on the occasion of his retirement" held at the Research Institute for Mathematical Sciences, Kyoto University, Japan, May 23–25, 2018. Professor Tanaka has conducted pioneering studies in the field of fluid mechanics, particularly nonlinear water waves, for many years and retired from Gifu University in March, 2019. For celebrating his outstanding achievements, many distinguished scientists and engineers from the various countries participated in this workshop and enjoyed valuable and stimulating discussion. This special issue commemorates the wonderful scientific interaction arranged on the occasion of honoring Professor Tanaka.

ACKNOWLEDGMENTS

This workshop was supported by the Research Institute for Mathematical Sciences, an International Joint Usage/Research Center located in Kyoto University and JSPS KAKENHI Grant No JP17H02856.

Finally, I would like to express my appreciation to all the participants in this workshop. I would also like to thank Prof. Michio Yamada of Kyoto University and my co-organizers of this workshop for their continuous support.

Sunao Murashige
April 17, 2019

Workshop on Nonlinear Water Waves

In honor of Professor Mitsuhiro Tanaka on the occasion of his retirement

Date	:	May 23 (Wed) $\sim$ 25 (Fri), 2018
Place	:	Research Institute for Mathematical Sciences, Kyoto University Room 111 of RIMS in North Campus
URL	:	http://murasige.sci.ibaraki.ac.jp/WS_Nonlinear_Water_Waves_RIMS_2018.html
Organizers	:	Takanori Hino (Yokohama National Univ.), Tatsuo Iguchi (Keio Univ.), Taro Kakinuma (Kagoshima Univ.), Takeshi Kataoka (Kobe Univ.), Ken-ichi Maruno (Waseda Univ.), Tetsu Mizumachi (Hiroshima Univ.), Sunao Murashige (Ibaraki Univ.), Yasuhiro Ohta (Kobe Univ.)

Program

May 23 (Wed)

13:00-13:10 Opening

13:10-13:40 Sunao Murashige (Ibaraki University)
Large-amplitude solitary waves on a linear shear current

13:40-14:10 Yoshihiro Niwa (University of Tokyo)
Estimation of baroclinic tide energy available for deep ocean mixing based on three-dimensional global numerical simulations

Coffee break

14:30-15:20 Nail Akhmediev (Australian National University)
Classifying the rogue wave solutions of the nonlinear Schrödinger equation

Coffee break

15:30-16:20 Wooyoung Choi (New Jersey Institute of Technology)
On spectral formulation for nonlinear water waves and their applications

May 24 (Thu)

9:20-9:50 Taro Kakinuma (Kagoshima University)
A numerical calculation for internal waves over a slope or a mound

9:50-10:20 Takeshi Kataoka (Kobe University)
Transverse instability of surface solitary waves and breaking

Coffee break

10:30-11:20 Triantaphyllos Akylas (Massachusetts Institute of Technology)
Parametric subharmonic instability of internal waves: locally confined beams versus monochromatic wavetrains

Coffee break

11:30-12:20 Roberto Camassa (University of North Carolina)
Hydrodynamic models and boundary confinement effects

Lunch

14:00-14:30 Takuji Waseda, Wataru Fujimoto and Yuki Kita (University of Tokyo)
Modulational instability in realistic directional seas

14:30-15:00 Naoto Yokoyama (Doshisha University / Kansai University) and Masanori Takaoka (Doshisha University)
Energy budget in stratified turbulence

Coffee break

15:10-16:00 Victor Shrira (Keele University)
Evolution of wind wave angular spectra: kinetic equations vs direct numerical simulations and observations

Coffee break

16:10-17:00 Mitsuhiro Tanaka (Gifu University)
Wave turbulence in a two-layer fluid system

Banquet (invitation only)

May 25 (Fri)

9:20-9:50 Ken-ichi Maruno (Waseda University)
The interactions of dark line solitons in the Davey-Stewartson II system

9:50-10:20 Yasuhiro Ohta (Kobe University)
Time-localized solutions for some soliton equations

Coffee break

10:30-11:20 Yuji Kodama (Ohio State University)
Mach Reflection of a Solitary Wave: Revisited Part I: Theory

Coffee break

11:30-12:20 Harry Yeh (Oregon State University)
Mach Reflection of a Solitary Wave: Revisited Part II: Experiments

Group Photo

Lunch

14:30-15:20 David Lannes (The Université de Bordeaux)
The Boussinesq equations with a floating obstacle

Coffee break

15:30-16:00 Yoshimasa Matsuno (Yamaguchi University)
The N-soliton formulas for a multi-component modified nonlinear Schrödinger system with nonzero boundary conditions

16:00-16:30 Tetsu Mizumachi (Hiroshima University)
On the phase shift of line solitary waves for the KP-II equation

16:30-17:00 Tatsuo Iguchi (Keio University)
Kakinuma model for internal gravity waves in the rigid-lid case

This workshop is supported by JSPS KAKENHI Grant-in-Aid for Scientific Research (B) Grant Number JP17H02856.

Workshop on Nonlinear Water Waves
RIMS 共同研究（公開型）報告集

２０１８年５月２３日 ～ ５月２５日
研究代表者　村重　淳 (Sunao Murashige)

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