

数理解析研究所講究録 1922

変換群の位相幾何と代数構造

京都大学数理解析研究所

2014年10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。現在の共同利用・共同研究拠点（2010年発足）の前身である、全国共同利用研究所として当研究所が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、2012年には第1800巻が刊行されるに至りました。第1巻から第1840巻までに収録された論文数は26,808編、総頁数は317,199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1,254,383回（2012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。

*RIMS Kôkyûroku 1922*

*The Topology and the Algebraic Structures of  
Transformation Groups*

*May 26 ~30, 2014*

*edited by Takao Satoh*

*October, 2014*

*Research Institute for Mathematical Sciences*

*Kyoto University, Kyoto, Japan*

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

Research Institute for Mathematical Sciences



## **The Topology and the Algebraic Structures of Transformation Groups**

Organized by

Takao Satoh

(Tokyo University of Science)

May 26th – May 30th, 2014

### **Introduction by the Organizer**

This is a report on the conference on The Topology and the Algebraic Structures of Transformation Groups held at the Research Institute for Mathematical Sciences (RIMS), Kyoto University, from May 26 to May 30, 2014.

The theory of transformation groups studies various symmetries of topological spaces, in particular cell complexes and manifolds. One of its origins goes back to Klein's works in 1870s. It has been developed by a huge number of authors, and has multiple facets and widespread applications in a broad range of Mathematics, for instance, Differential Geometry, Algebraic Geometry, Differential Topology, Algebraic Topology, Homotopy Theory, Representation Theory, Group Theory and so on.

A conference on Transformation group theory holds at RIMS each year. It has been going on for forty years since the first conference held in 1973, organized by Professor Katsuo Kawakubo. Recent topics discussed in the conference have a great diversity, including the classification of toric manifolds and Bott manifolds, tangential representations and the Smith equivalence, generalizations of the Borsuk-Ulam theorem, the classification of isovariant maps on smooth manifolds, the structure of definable manifolds, and the diffeomorphism groups and the mapping class groups of surfaces. Needless to say, these researches have been studied with a wide variety of techniques including Homology and Homotopy theory, Lie group and Lie algebra theory, K-theory and L-theory, Surgery theory, Symplectic geometry and so on. The conferences have played important roles on sharing new developments and new techniques, and on the interaction of researchers of the field.

This conference brought together researchers working in various aspects of the field. The topics discussed were Transformation group theory in a broad sense. The conference of this year was well attended by 54 participants including researchers from abroad, China, Poland and Russia. The organizer kept a balance between young researchers

(graduate students, post-doctors) and newcomers to the field on the one hand, and senior specialists on the other hand. We hope that this report goes a long way toward providing valuable images of further developments of the field.

The organizer would like to express his sincere gratitude to all participants for his/her contribution to the success of the conference. He also thanks to all secretaries working at RIMS, in particular Ms. Sachiko Murayama for her continued supports for site management and accounting works, and Ms. Yuko Watanabe for editing this report. Finally, the organizer expresses his sincere appreciation to RIMS for the financial support and its warm hospitality.

Takao Satoh  
Kagurazaka, Tokyo  
September 2014

## The Topology and the Algebraic Structures of Transformation Groups

We are planning to hold the conference supported by Research Institute for Mathematical Science in Kyoto University.

Organizer: **Satoh, Takao** (Tokyo University of Science)  
e-mail: takao@rs.tus.ac.jp

**Date:** May 26 – 30, 2014

**Place :** Research Institute for Mathematical Science in Kyoto University

**Address :** Kitashirakawaoiwake-cho, Sakyo, Kyoto city, 606-8502, Japan

### Program

#### 26th May 2014

13:00~13:50 **Tomohiro Kawakami** (Wakayama University)

Definable slices in o-minimal structures

14:00~14:50 **Takeshi Harui** (Kogakuin University)

Automorphism groups and plane models of Riemann surfaces

14:55~15:45 **Masayuki Kawashima** (Tokyo University of Science)

On Alexander polynomials and Characteristic Varieties of Namba-Tsuchihashi arrangements

15:50~16:50 **Kothei Yamaguchi** (University of Electro-Communications)

The space of maps to a real toric variety

#### 27th May 2014

10:00~10:50 **Hiroaki Ishida** (RIMS)

Infinitesimal automorphisms on moment-angle manifolds with complex-analytic structures

11:00~11:50 **Hisashi Kasuya** (TITech)

An extension of the Nomizu, Hattori and Mostow theorems

13:00~13:50 **Yasuhiro Hara** (Osaka University)

On the topology of simplicial complexes associated with graphs

14:00~14:50 **Tatsuya Horiguchi** (Osaka City University)

The  $T^1$ -equivariant cohomology rings of Springer varieties (Joint work with Hiraku Abe)

15:00~15:50 **Haozhi Zeng** (Osaka City University)

The cohomology of toric origami manifolds

16:00~16:50 **Fumihito Ushitaki** (Kyoto Sangyo University)

Borsuk-Ulam type theorems and Isovariant maps (Joint work with Ikumitsu Nagasaki)

#### 28th May 2014

10:00~10:50 **Tatsuhiko Yagasaki** (Kyoto Institute of Technology)

$\kappa$ -cones and deformation of uniform embeddings

11:00~11:50 **Hiraku Abe** (OCAMI)

Young diagrams and intersection numbers for toric manifolds arising from root systems

13:00~13:50 **Naoyuki Monden** (Osaka Electro-Communication University)

Lefschetz pencils and finitely presented groups (Joint work with Ryoma Kobayashi)

14:00~14:50 **Miho Hatanaka** (Osaka City University)

Spin toric manifolds constructed from graphs

15:00~15:50 **Yusuke Suyama** (Osaka City University)

Examples of toric manifolds whose orbit spaces by the compact torus are not simple polytopes

16:00~16:50 **Yoshimi Shitanda** (Meiji University)

The degree of set-valued mappings from ANR spaces to homology spheres

**Please turn over.**

**29th May 2014**

**10:00~10:50 Anton Ayzenberg** (Osaka City University)

Quasitoric manifolds which are not toric origami manifolds

**11:00~11:50 Tsuji Shunsuke** (The University of Tokyo)

The logarithms of Dehn twists on unorientable surfaces

**13:00~13:50 Daisuke Kishimoto** (Kyoto University)

Homotopy decomposition of diagonal arrangements

**13:55~14:45 Shintaro Kuroki** (The University of Tokyo)

On complexity one GKM graphs with symmetries

**14:50~15:50 Krzysztof Pawalowski** (Adam Mickiewicz University)

Group actions on homotopy complex projective spaces

**15:55~16:55 Masaharu Morimoto** (Okayama University)

Tentative study on equivariant surgery obstructions

**30th May 2014**

**10:00~10:50 Mitsunobu Tsutaya** (Kyoto University)

On evaluation fiber sequences

**11:00~11:50 Toshiyuki Akita** (Hokkaido University)

$p$ -primary components of the homology of Coxeter groups







変換群の位相幾何と代数構造  
The Topology and the Algebraic Structures of Transformation Groups  
RIMS 研究集会報告集

2014年5月26日～5月30日  
研究代表者 佐藤 隆夫 (Takao Satoh)

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