



2014年度
第3回九州大学 組合せ数学セミナー
Hakata Workshop 2015¹

下記のようにセミナーを開催しますので、ご案内申し上げます。

世話人: 溝口 佳寛 (九大 IMI) 脇 隼人 (九大 IMI)
 渋谷 敬史 (九大 IMI) 谷口 哲至 (広島工大)
 島袋 修 (長崎大) 田上 真 (九州工大)
 栗原大武 (北九州高専) 千葉周也 (熊本大)
アドバイザー: 坂内 英一 (上海交通大学/九大数理)

記

日時: 2015年2月15日(日) 9:48–17:30

場所: Seminar Room I (2F) in Reference Eki Higashi Building (1-16-14 Hakata-Eki-Higashi, Hakata-Ku, Fukuoka City, 812-0013)

URL: <http://comb.math.kyushu-u.ac.jp/>

プログラム

9:48–9:50 Opening (Tetsuji Taniguchi)

9:50–10:35 Osamu Ikawa (Kyoto Institute of Technology)
Symmetric triad -a generalization of root system-

10:45–11:30 Hiroyuki Tasaki (University of Tsukuba)
Antipodal sets in oriented real Grassmann manifolds

13:00–14:30 Poster Session

Poster Session (Software in Mathematics Demonstration Track in Hakata Workshop 2015)

14:50–15:35 Masanori Sawa (Kobe University)

On a countable uniform hypergraph with generic structure and its finite-combinatorial aspect

15:45–16:30 Mami Okiyoshi (Hiroshima University)

Generating functions of Box and Ball System

16:40–17:25 Kazunori Sakurama (Tottori University)

Optimal Design of Distributed Controllers for Multi-Agent Systems

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17:25–17:30 Closing (Yoshihiro Mizoguchi)

18:00 – Post-meeting party

Poster Session

Theme: Software in Mathematics Demonstration Track

Speakers and Titles:

1. 中村圭太 (九州大学理学部数学科) シンプルフィボナッチヒープの実験的性能評価
2. 松嶋聡昭 (九州大学数理学府) 関係計算証明ライブラリによる写像の性質の証明
3. 木村圭児 (九州大学大学院数理学府数理学専攻) 混合整数非線形計画問題を用いた AIC 最小化
4. 貝原 慎一郎 (九州大学数理学府数理学府) タイリング問題の整数計画法を用いた解法とその実装
5. 工藤桃成 (九州大学大学院数理学府数理学専攻) On the computation of the dimensions of the cohomology groups of coherent sheaves on a projective space
6. 松尾拓哉, 近藤光浩 (九州大学大学院数理学府) A Mathematica module for Conformal Geometric Algebra
7. 久保陽平 (九州大学大学院数理学府) A Mathematica Implementation of Planar Shape Interpolation with Bounded Distortion
8. 村井光*, 正代隆義** (*九州大学大学院システム情報科学府, 九州先端科学技術研究所, **九州国際大学国際関係学部, 九州先端科学技術研究所) グラフベースの半教師あり学習によるデータスクリーニングソフトウェア

Abstract

Osamu Ikawa (Kyoto Institute of Technology)

Title: Symmetric triad -a generalization of root system-

Abstract: A root system was defined by a finite subset of a finite dimensional vector space with an inner product that satisfies a certain condition. A root system with multiplicities is a superstructure of a root system, that is a useful tool if we consider the orbit of an isotropy group of a symmetric space. In fact the orbit space is described in terms of a root system with multiplicities which is obtained by the symmetric space. Further the condition the orbit to be regular, singular, minimal and totally geodesic is also described in terms of a root system with multiplicities. A Hermann action is an isometric action on a symmetric space, which is a generalization of isotropy action on a symmetric space and inherits nice properties such as hyperpolarity and variational completeness. If we generalize the notion of a root system with multiplicities to that of a symmetric triad with multiplicities, then it is useful when we consider the orbit of a Hermann action. In fact the orbit space of a Hermann action is described in terms of a symmetric triad with multiplicities which is obtained by the Hermann action. Further the condition the orbit to be regular, singular, minimal and totally geodesic is also described in terms of a symmetric triad with multiplicities.

Hiroyuki Tasaki (University of Tsukuba)

Title: Antipodal sets in oriented real Grassmann manifolds

Abstract: Antipodal sets in a Riemannian symmetric space is defined in a geometric way by the use of geodesic symmetries. The oriented real Grassmann manifold is a Riemannian symmetric space and antipodal sets in it correspond to certain combinatorial objects. In the case where the rank of the oriented real Grassmann manifold is less than five we give the classification of antipodal sets in it. In the case where the rank is equal to five we determine antipodal sets of maximal cardinality. We mention a recent result of Frankl and Tokushige in the case of higher rank.

Masanori Sawa (Graduate School of System Informatics, Kobe University)

Title: On a countable uniform hypergraph with generic structure and its finite-combinatorial aspect

Abstract: In this talk we consider a sequence of finite hypergraphs, each characterized by the so-called pre-dimension function, and provide a countable graph with generic structure as well as model completeness. The aim of this talk is to inform Hrushovski's amalgamation to people in finite combinatorics, rather than making a new mathematics.

Mami Okiyoshi (Hiroshima University)

Title: Generating functions of Box and Ball System

Abstract: In 1990, Takashi-Satsuma introduced a discrete soliton system called Box and Ball System (BBS). We define generating functions of BBS and ask if they are rational functions. When the number of balls is finite, we show that the generating function is a rational function, which essentially follows from the result of Takahashi-Satsuma. When there are infinitely many balls, we conjecture that the generating function is rational if and only if the BBS is semi-periodic. We prove the conjecture in special cases. We also study the generating function of the BBS with a limited cart, including semi-periodic cases.

Kazunori Sakurama (Tottori University)

Title: Optimal Design of Distributed Controllers for Multi-Agent Systems

Abstract: Techniques of distributed control are inevitable to deal with recent social systems which are growing and getting more and more complex. In this presentation, some of these techniques for networked multi-agent systems are introduced. We give a strict class of gradient-based controllers which are distributed in a given network, and design optimal distributed controllers to solve the generalized coordination problem.