❀ 日 本 数 学 会

2016年度年会

英 文 サ マ リ 集

2016年3月

於 筑波大学

2016　日本数学会
年会プログラム

期　　日　2016年3月16日(水)～3月19日(土)

会　　場　筑波大学 第一エリア・第三エリア
〒305-8571 つくば市天王台1–1–1

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16日(水)	代 数 学 9:30～12:00 14:15～16:50	統計数学 9:30～12:00	函数方程式論 9:30～12:00 14:15～16:15	数学基礎論および歴史 10:00～11:20 14:15～16:00	幾 何 学 9:30～12:00 14:15～16:30	トポロジー 10:00～11:55 15:30～17:10	応用数学 10:30～12:00 14:30～16:00	函 数 論 9:45～11:45 14:15～15:05	函数解析学 10:00～12:00
16日(水)	企画特別講演　13:00～14:00							
16日(水)		特別講演 14:30～15:30 15:45～16:45	特別講演 16:30～17:30	特別講演 16:15～17:15	特別講演 16:45～17:45	特別講演 14:15～15:15	特別講演 16:10～17:10	特別講演 15:25～16:25 16:45～17:45	特別講演 14:15～15:15
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17日(木)	日本数学会賞授賞式 (1H 棟 1 階 1H101) ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ (15:00～15:20) 総 合 講 演 (〃) 日本数学会賞春季賞受賞者・・・・・・・・・・・・・ (15:30～16:30) 枡 田 幹 也 (阪 市 大 理)・・・・・・・・・・・・・ (16:40～17:40) 懇 親 会 (大学会館レストラン) ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ (18:00～20:00)									
18日(金)	代 数 学 9:00～12:00	統計数学 9:45～12:00	函数方程式論 9:30～12:00 14:15～16:15	実函数論 9:30～12:00 14:15～16:10	幾 何 学 9:30～11:50 14:15～16:00	トポロジー 10:00～11:45 14:15～15:30	応用数学 14:30～16:00 特別セッション 9:15～11:55	無限可積分系 10:00～12:00 14:15～15:15	函数解析学 9:30～12:00 14:15～15:00
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19日(土)	企画特別講演　13:00～14:00							
19日(土)	特別講演 16:00～17:00		特別講演 16:00～17:00	特別講演 15:15～16:15	特別講演 11:00～12:00		特別講演 16:00～17:00	特別講演 15:30～16:30	

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総 合 講 演

3月17日(木) 1H棟 1階 1H101

日本数学会春季賞受賞者 ‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥ (15:30〜16:30)
MSJ Spring Prize Winner

枡 田 幹 也 (阪 市 大 理)   トーリックトポロジー ‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥‥ (16:40〜17:40)
Mikiya Masuda (Osaka City Univ.)   Toric topology

概要 Around 1970, a very beautiful and successful theory called toric geometry was established by Demazure, Miyake-Oda, Mumford and others. Toric geometry connects two different mathematical fields: algebraic geometry (toric varieties) and combinatorics (fans and convex polytopes). It also provides new insight and unexpected applications, e.g. an application by R. Stanley to a longstanding problem called g-conjecture about characterization of face numbers of simplicial convex polytopes. Around 1980, equivariant symplectic geometry was developed and its close relation to toric geometry was recognized, especially through the celebrated Atiyah-Guillemin-Sternberg convexity theorem.

Motivated by this success story, a new mathematical field called toric topology is emerging and rapidly developing. Toric topology is a new topological discipline concerned with a class of problems on the borders between the topology of torus actions, commutative and homological algebra, toric geometry, combinatorics and equivariant symplectic geometry etc. In this talk I overview the development of toric topology.

企 画 特 別 講 演

3月16日(水)

第 V 会場

成 　 慶 　 明（福 岡 大 理） 　重み付き体積保存平均曲率フローの λ-超曲面の幾何 ⋯⋯⋯ (13:00〜14:00)

Qing-Ming Cheng (Fukuoka Univ.) 　Geometry of λ-hypersurfaces of the weighted volume-preserving mean curvature flow

概 要 In this talk, we introduce mean curvature flow and mean curvature type flow, which is called the weighted volume-preserving mean curvature flow.

A self-shrinker of the mean curvature flow is a self-similar solution of the mean curvature flow. On the other hand, it can be seen a critical point of the weighted area functional from the view point of variations. We give a definition of a weighted volume, which is preserved by the weighted volume-preserving mean curvature flow. Thus, we consider variations of the weighted area functional, which preserve the weighted volume. A critical point of the weighted area functional for the weighted volume-preserving variations is defined a λ-hypersurface of weighted volume-preserving mean curvature flow.

We study geometry of λ-hypersurfaces of weighted volume-preserving mean curvature flow. First of all, many examples of compact embedded λ-hypersurfaces of weighted volume-preserving mean curvature flow are constructed. Secondly, complete λ-hypersurfaces are studied. The results on complete self-shrinkers of mean curvature flow due to Huisken (J. Diff. Geom., 1990) and Colding-Minicozzi (Ann. of Math., 2012) are generalized to complete λ-hypersurfaces of weighted volume-preserving mean curvature flow. We also define a $\mathcal{F}$-functional and study $\mathcal{F}$-stability of λ-hypersurfaces. Furthermore, lower bound growth and upper bound growth of the area for complete and non-compact λ-hypersurfaces are also studied.

第 VII 会場

特別招待講演（日本応用数理学会）

櫻 井 鉄 也 　　　　　　積分型固有値解法による大規模シミュレーションとデータ解析

　　（筑波大システム情報工） ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯ (13:00〜14:00)

Tetsuya Sakurai (Tsukuba Univ.) 　Large-scale simulation and data analysis using quadrature-type eigensolver

第 VIII 会場

須 川 敏 幸（東 北 大 情 報） 　シュワルツ微分の幾何と解析 ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯ (13:00〜14:00)

Toshiyuki Sugawa (Tohoku Univ.) 　Geometry and analysis of Schwarzian derivative

概 要 In this talk, we will survey the Schwarzian derivative from its birth to several recent extensions in various contexts. The Schwarzian derivative of a nonconstant meromorphic function $f(z)$ of a complex variable is defined as $f'''(z)/f'(z) - 3(f''(z)/f'(z))^2/2$. This quantity looks a little complicated but has unexpectedly many and deep applications in a wide variety of fields in Mathematics including Conformal Geometry, Mathematical Physics, Teichmüller theory, Dynamical Systems as well as Function Theory.

We start the talk with a historical account of the Schwarzian derivative and then present a couple of applications as examples. Especially, we will explain how the Schwarzian derivative is used to construct the Bers embedding of the Teichmüller space.

In the second half, we will mention possible generalizations or extensions of the Schwarzian derivative. In particular, we will present our recent higher-order analogues of the Schwarzian derivative of holomorphic maps between Riemann surfaces equipped with a conformal metric and projective structure.

3月18日(金)

第II会場

鈴 川 晶 夫 (北 大 経 済)　Multivariate survival analysis based on shared frailty models

.... (13:00〜14:00)

Akio Suzukawa (Hokkaido Univ.)　Multivariate survival analysis based on shared frailty models

概 要　Multivariate survival data occur in many areas, including medicine, biology, engineering, and economics. Shared frailty models are random effects models for analyzing multivariate survival data. They are closely related to dependence modeling based on Archimedean copulas. In this paper, we discuss about the shared frailty models and their extensions.

第IX会場

関 口 次 郎 (東京農工大工)[♭]　自由因子と微分方程式 .... (13:00〜14:00)

Jiro Sekiguchi　　　　　　　　　Free divisors and differential equations
(Tokyo Univ. of Agri. and Tech.)

3月19日(土)

第I会場

若 槻　　聡 (金 沢 大 理 工)　ジーゲル保型形式の次元公式 .... (13:00〜14:00)

Satoshi Wakatsuki (Kanazawa Univ.)　Dimension formulas of Siegel modular forms

概 要　The purpose of this talk is to discuss dimension formulas for spaces of Siegel modular forms. In particular, we give a dimension formula for spaces of Siegel cusp forms of general degree. The trace formula is one of the main tools to study the dimensions. In 1975, T. Shintani gave a formula which expresses a small part of the geometric side of the trace formula by special values of Shintani zeta functions for spaces of symmetric matrices at non-positive integers. To be precise, it is the contribution of unipotent elements corresponding to the partitions $(2^j, 1^{2n-2j})$, where n denotes the degree and $0 \leq j \leq n$. After that, several Japanese researchers conjectured that the other contributions will vanish and Shintani's formula means the dimension itself. In this talk, we report that the conjecture was solved affirmatively and the dimensions are expressed by the special values. In 1995, T. Ibukiyama and H. Saito discovered an explicit formula of the Shintani zeta functions. Their formula shows that the special values are described by the Bernoulli numbers, that is, they are rational numbers and computable. Therefore, our formula provides numerical values of dimensions.

第III会場

小 池 茂 昭 (東 北 大 理)　ABP 最大値原理について .... (13:00〜14:00)

Shigeaki Koike (Tohoku Univ.)　On ABP maximum principle

概 要　I will show a proof of the celebrated Aleksandrov-Bakelman-Pucci maximum principle and its parabolic version by Krylov-Tso. This maximum principle is a nice tool to connect point-wise estimates with integrations.

I start by the simplest case and arrive at the complete version. I hope to give some applications and extensions.

数 学 基 礎 論 お よ び 歴 史

3月16日(水)   第Ⅳ会場

10:00～11:20

1 張 替 俊 夫 (大阪産大教養)   中国古算書における立体図形について ···························· 15
   Toshio Harikae (Osaka Sangyo Univ.)   Solid figures in ancient China

概 要 In this talk, we discuss the deference of several solid figures in the mathematical books written in the Qin–Han period.

2 田 村   誠 (大阪産大教養)   秦漢期算書中の口訣について ·································· 10
   Makoto Tamura (Osaka Sangyo Univ.)   Chants in math books of the Qin and the Han Dynasties in China

概 要 The book *Shu of the Qin Dynasty housed at Yuelu Academy*, the *Suanshu slips of the Qin Dynasty housed at Peking University*, and the *Zhangjiashan bamboo slips Suanshushu of the Han Dyansty* are mathematical books in ancient China. They were textbooks for middle officers, and most of their problems are on calculation of tax, area, and so on. However one of the *Litian* problems of the *Suanshu housed at Peking University* was incomprehensible in such a way. In this talk, we show it is a type of chants for memorizing a conversion constant compared with the *Litian* problems of the *Shu housed at Yuelu Academy* and *Zhangjiashan Suanshushu.*

3 堀 口 俊 二 (新潟産大経済)   規矩元法別伝一巻・秘八事絵巻と細井廣沢「十體千字文」の筆跡比較 ·· 15
   Shunzi Horiguchi   Handwriting analysis of Chinese characters in the picture scroll of kiku-
      (Niigata Sangyo Univ.)   genpou betsuden ichimaki-hihachiji and 1000 characters of ten bodies
          written by Koutaku Hosoi

概 要 We do the handwriting analysis of Chinese characters in the picture scroll of kikugenpou betsuden ichimaki-hihachiji and 1000 characters of ten bodies written by Koutaku Hosoi. As a result, we find that the handwritings of both are similar very much. Therefor, it is supposed that Hosoi wrote the picture scroll.

4 森 本 光 生   大成算経における傍書法の現代的表記方法 ························· 15
   (四日市大関孝和数学研・上智大⋆)
   Mitsuo Morimoto   A modern transcription of the side writing method in the *Taisei Sankei*
   (Yokkaichi Univ./Sophia Univ.⋆)

概 要 The *Taisei Sankei* (1683–1711) is an encyclopedic work on mathematics by Seki Takakazu, Takebe Kata'akira and Takebe Katahiro. To express algebraic equations they use the so-called side writing method. In our enterprise to translate the work into English, we have encountered a problem of transcription of the side writing method, which is a generalization of the celestial element method developed in Song China. The *Taisei Sankei* is written in Classical Chinese, which follows vertical lines, while English as well as other modern languages are composed along horizontal lines. The side writing method is basically a vertical notation, which is required to be transcribed horizontally in English translation.

5　森 本 光 生　　　　　　　大成算経第 19 巻最終問題について ······························ 15
（四日市大関孝和数学研・上智大★）

Mitsuo Morimoto　　　　　　On the last problem of Volume 19, the Taisei Sankei
(Yokkaichi Univ./Sophia Univ.★)

概 要　Volume 19 of the *Taisei Sankei* contains 15 problems of algebraic equations of one or several unknowns, which are treated thoroughly using notation of the side writing method. The last problem is concerned with a system of eight algebraic equations with eight unknowns, which can be easily reduced to a system of four algebraic equations with four unknowns. The authors reduce this system to an equation of one unknown by means of Seki Takakazu's theory of elimination using, among others, the determinant of a 5×5 matrix.

11:20〜11:50　歴史部門懇談会

14:15〜16:00

6　増 田　　茂（流体数理古典理論研）　Poisson's paradigm in *A Study of Mathematical Physics* (*Un Traité de Physique Mathématique*) ······································· 15

Shigeru Masuda　　　　　　Poisson's paradigm in *A Study of Mathematical Physics* (*Un Traité de*
(Res. Workshop of Classical Fluid Dynamics)　*Physique Mathématique*)

概 要　We discuss Poisson's paradigm which is consisted of the books in 1831, 1833 and 1835, namely, on the capillary action, on the mechanical problems and on the heat theory, which are his last works by the book style in life, and within five years of Fourier's death in 1830, in the rivalry to Fourier, Poisson works his heavy theories including essential mathematical topics against Fourier in heat theory and Navier in fluid dynamics, namely, in these book, Poisson mentions the mathematical conclusions as the finishing strokes to complete his academic paradigm in the wave mechanics, the fluid mechanics and the heat theory. We think his works finally rank with the Lagrange's *Méchanique analytique* and the Laplace's *Méchanique céleste.*

7　増 田　　茂（流体数理古典理論研）　The theories and equations of heat come from Fourier and Poisson ··· 15

Shigeru Masuda　　　　　　The theories and equations of heat come from Fourier and Poisson
(Res. Workshop of Classical Fluid Dynamics)

概 要　We discuss Fourier's book and Poisson's books on the heat problems. Poisson's is one of his last works in life, and after five years of Fourier's death, in the rivalry to Fourier, Poisson works his heat theory including essential mathematical topics against Fourier in heat theory and Navier in fluid dynamics, namely, in these books, Poisson mentiones the mathematical conclusions as the finishing strokes of his academic activities in the fluid dynamics and heat theory.

8　中 根 美 知 代　　　　　　日本における Euler-代数解析伝説の起源 ························· 15

Michiyo Nakane　　　　　　Why do we believe that Euler began algebraic analysis?

概 要　In Japan, we have such a legend that Euler began algebraic analysis though he never named his theory so. In Cauchy's Cours d'Analyse: Analyse algébrique, Cauchy wrote an introductory course of analysis was called as algebraic analysis noting Fourier's analysis lectures. It is German translator's introduction of Cauchy's book that Euler began algebraic analysis. Teizi Takagi accepted this description and wrote his famous Kaiseki-gairon. It is an origin of the legend.

9 斎 藤   憲（阪府大人間社会） エウクレイデス『原論』と素因数分解の観念 ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯ 15
   Ken Saito （Osaka Pref. Univ.） Euclid's *Elements* and the concept of prime factorization

概 要 The question is often asked whether Euclid proved the uniqueness of prime factorization. However, the question itself is wrong, for Euclid did not have the concept of prime factorization; at least he failed to use this concept where it would have greatly simplified the proof. Through the examination of the arguments in the proposition concerning the perfect number (IX.36), I will show that this proposition is proved by preparing ad hoc lemmas, in the lack of general concept of prime factorization.

10 池 田 宏 一 郎（法 政 大 経 営） 非飽和ジェネリック構造に関する注意 ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯ 15
    Koichiro Ikeda （Hosei Univ.） A remark on non-saturated generic structures

概 要 The generic construction is a new method that was invented by Hrushovski, and has given various interesting structures. Many of them are saturated structures, but it is not well known what kind of properties non-saturated generic structures have. In this talk, we focus on non-saturated generic structures whose theories have finite closures, and want to explain their properties.

11 桔 梗 宏 孝（神 戸 大 情 報） 可算な射影平面の構成について ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯ 15
    Hirotaka Kikyo （Kobe Univ.） On constructions of countable projective planes

概 要 We present some observations on constructions of infinite projective planes. Projective planes are incidence structures of points and lines. We can consider them as bipartite graphs. Any projective plane obtained as a generic structure of an ab initio type amalgamation class contains no finite projective planes as its substructures except that of order 2 or 3. Any finite or countable bipartite graph with no 4 cycles can be expanded to a countable projective plane. There is a countable projective plane which contains any finite projective plane as a substructure. We also discuss problems relating to these results.

16:15〜17:15   特別講演

Byunghan Kim（ Yonsei Univ. ） The Lascar groups and the 1st homology groups in model theory
Byunghan Kim（Yonsei Univ.） The Lascar groups and the 1st homology groups in model theory

概 要 Given a complete type p over an algebraically closed set in any complete theory T, one can define the 1st homology group $H_1(p)$ of p depending on the choice of an independence relation satisfying symmetry, transitivity, and extension.
(For example, if any two sets are assumed to be independent over any set, then this full independence relation obviously satisfies the 3 axioms. Of course there is a non-trivial such relation for rosy theories too.) We show that regardless of the choice of the independence relation, $H_1(p)$ is always the same. More precisely, there is the canonical epimorphism from the Lascar Galois group of p to $H_1(p)$, and $H_1(p)$ is G/K where G is the group of automorphisms of p and K is the normal subgroup of G fixing each orbit of the realizations of p under the action of the derived subgroup of G. This is a joint work with Jan Dobrowolski and Junguk Lee.

3月17日(木) 　第IV会場

10:00～11:30

12 大 藪 　 卓 　　　　　　　♭ Diff(M): Physics, 他5件 ··· 5
　 Takashi Oyabu 　　　　　　　Diff(M): Physics, and other 5 talks

概要 (1) Physical laws are described by differential equations===diffeomorphism: physics====DIFF(M)-physics:

(2) Philosophy of mathematics: We interprete aut(R)::epistemology in mathematical philosophy: sein:::==idea theory:

(3) Entropy concept in mathematics is introduced :::2ND law of thermodynamics:: H=δdA$\sum(\mu i)$Ui: theory of H-theorems: dH/dt=<0====→0:

(4) Galois theory and geometry: Gllois geometry: K(V)$\hookrightarrow$=K(V): Galois group::□G:Γ):

(5) A history of thermodynamics: Clausius::Boltzmann:Gibbs::Onsager::::Prigogine:::→Equibrium thermodynamics and non equibrium thermodynamics

(6) Representation::induced representation:L2(M)=$\oplus$dim$\pi(\Gamma)\pi$ M=ΓG:G/Γ:compact

13 小 俣 安 彦 (東 北 大 理) 　Dickson's lemma and weak Ramsey theory ······················· 15
　 F. Pelupessy (東 北 大 理)

　 Yasuhiko Omata (Tohoku Univ.) 　Dickson's lemma and weak Ramsey theory
　 Florian Pelupessy (Tohoku Univ.)

概要 Dickson's lemma, originally used in algebra, in particular for showing Hilbert's basis theorem, is nowadays commonly used in termination proofs in computer science. The weak Paris–Harrington theorem for pairs was originally used as an easy intermediate version in showing lower bounds for the Paris–Harrington theorem for pairs. We provide simple constructions which show that witnesses of one of these statements can be expressed explicitly as witnesses of the other. As a consequence these statements are equivalent over RCA_0^*. Additionally our construction provides an explicit formula for weak Ramsey numbers and tight upper bounds for the weak Paris–Harrington theorem derived from those for Dickson's lemma.

14 池 上 大 祐 (東京電機大工) 　Boolean valued second order logic ····························· 15
　 Daisuke Ikegami (Tokyo Denki Univ.) 　Boolean valued second order logic

概要 In the research of second order predicate logic, the following two semantics are mainly considered; full semantics (or Tarski semantics) and Henkin semantics. Full semantics can express much more things than the standard semantics for first order logic, but it is very complicated and hard to analyze while Henkin semantics for second order logic is essentially the same as the standard semantics for first order logic.

In this talk, we propose another semantics for second order logic which is called "Boolean valued semantics". We investigate the basic properties of this semantics and compare it with full semantics. This is joint work with Jouko Väänänen.

15 渕 野 　 昌 (神戸大システム情報) 　On reflection numbers of some topological and combinatorial properties
··· 15

　 Sakaé Fuchino 　(Kobe Univ.) 　On reflection numbers of some topological and combinatorial properties

概要 We discuss about partial solutions of Galvin's Conjecture and Hamburger's Problem, and present some results on the reflection numbers related to these problems.

16 菊 池　　 誠（神戸大システム情報）　集合論における要素関係と包含関係について · 15
    J. D. Hamkins（　　CUNY　　）

Makoto Kikuchi（Kobe Univ.）　On the element-of relation and the inclusion relation in set theory
Joel David Hamkins（CUNY）

概 要 We proved that in the universe $(V, \in)$ of set theory, there is a definable relation $\in^*$, different from $\in$, such that $(V, \in^*)$ is isomorphic to the original universe $(V, \in)$ and that the corresponding inclusion relation $\subset^*$ is identical to the usual inclusion relation $\subseteq$. It follows from this fact that the element-of relation cannot be defined in terms of the inclusion relation in set theory. We proved also that if $(V, \in^*)$ is a model of set theory and $\subseteq^*$ is identical to $\subseteq$, then $(V, \in^*)$ is isomorphic to $(V, \in)$.

17 小 澤 正 直（名 大 情 報）　量子集合論における実数の順序: 異なる含意結合子に対応する順序の操作
                                          的意味の相違について · 15

Masanao Ozawa（Nagoya Univ.）　Order of reals in quantum set theory: Difference of its operational mean-
                                          ing for the different choices of conditionals

概 要 In quantum logic there are three well-known candidates for conditional: the Sasaki conditional, the contrapositive Sasaki conditional, and the relevance conditional. A fundamental problem is to show how the choice affects the probabilistic interpretation of quantum theory. Here, we attempt such an analysis through quantum set theory. We construct models of quantum set theory based on the above conditionals and consider equality and order between reals in those models. We show that the truth values of the equality are the same, whereas those of the order significantly depend on the underlying conditional. We characterize their operational meanings by joint probability for successive projective measurements. Those characterizations will play an important role in applications of quantum set theory to quantum physics.

11:30〜12:00　数学基礎論および歴史分科会総会

13:15〜14:25

18 関　　 隆 宏（新潟大経営戦略本部）　結合則を持たない部分構造論理に対する決定可能性 · · · · · · · · · · · · · · · · · 15

Takahiro Seki　（Niigata Univ.）　The decidability of some non-associative substructural logics

概 要 Associativity (of fusion) is regarded as one of the important structural rules. Recently, some studies on non-associative substructural logics have been developed. In this talk, we show that some non-associative substructural logics are decidable using a Gentzen-style formulation.

19 田 中 義 人（九州産大経済）　$\mathcal{EL}$ における S4.3 の公理とその代数モデルについて · · · · · · · · · · · · · · · · · 15

Yoshihito Tanaka　　　　　　Axioms of S4.3 in $\mathcal{EL}$ and their algebraic models
         （Kyushu Sangyo Univ.）

概 要 In this report, we introduce two sets $\mathcal{A}_{S4.3}$ and $\mathcal{B}_{S4.3}$ of concept inclusions of $\mathcal{EL}$ which axiomatize modal logic S4.3, and discuss their algebraic models. The standard semantics for $\mathcal{EL}$ is equivalent to complete atomic completely additive Boolean algebras with operators (CA) model, but a natural algebraic semantics defined from the logical connectives of $\mathcal{EL}$ is semilattices with operators (SLO) model. We show that the sets of SLOs defined by $\mathcal{A}_{S4.3}$ and $\mathcal{B}_{S4.3}$ are not equal, while the sets of CAs defined by them are equal. We also prove that SLO model and CA model are not equivalent when either $\mathcal{A}_{S4.3}$ or $\mathcal{B}_{S4.3}$ of axioms are assumed. This is a joint work with S. Kikot, A. Kurucz, F. Wolter and M. Zakharyaschev.

20 宮 部 賢 志（明 大 理 工）　ランダムの概念の多数問題 · 15

Kenshi Miyabe　（Meiji Univ.）　Mass problem of randomness notions

概 要 We study Muchnik degrees and Medvedev degrees of randomness notions, which can be seen as subsets of the Cantor space. In order to separate the randomness notions, we need detailed information of Turing degrees and uniformity.

21 只 木 孝 太 郎 (中 部 大 工)   アルゴリズム的ランダムネスによる確率概念の操作的特徴付け II ····· 15
    Kohtaro Tadaki (Chubu Univ.)   An operational characterization of the notion of probability by algorith-
                                    mic randomness II

概 要 The notion of probability plays an important role in almost all areas of science and technology. In modern mathematics, however, probability theory means nothing other than measure theory, and the operational characterization of the notion of probability is not established yet. In our former work, based on the toolkit of algorithmic randomness we presented an operational characterization of the notion of probability. Algorithmic randomness is a field of mathematics which enables us to consider the randomness of an individual infinite sequence. We used the notion of Martin–Loef randomness with respect to Bernoulli measure to present the operational characterization, in particular, to finite probability spaces. In this talk, we present an operational characterization of the notion of probability to an arbitrary discrete probability space whose sample space is countably infinite.

代 数 学

3月16日(水)   第I会場

9:30〜12:00

1 角　　俊　雄（九 大 基 幹）　ある種のテンソルにより定義される行列の行列式イデアルの実根基につ
　宮 崎 充 弘（京 都 教 育 大）　いて ··· 15
　坂 田 年 男（九 大 芸 工）

Toshio Sumi　（Kyushu Univ.）
Mitsuhiro Miyazaki
　　　　（Kyoto Univ. of Edu.）
Toshio Sakata　（Kyushu Univ.）
On the real radical of determinantal ideals of matrices defined by certain tensors

概 要　In studying tensor rank over the real number field, we used the theory of determinantal ideals over a commutative ring. We developed a theory on the determinantal ideal of a matrix defined by a tensor in order to pursue our study of tensor rank which is interesting in its own right. In this talk, we report our result.

2 渋 田 敬 史（九 大 Ｉ Ｍ Ｉ）　マトリス双対を用いた加群の標準基底の計算 ······················· 15
　田 島 慎 一（筑波大数理物質）

Takafumi Shibuta（Kyushu Univ.）
Shinichi Tajima（Univ. of Tsukuba）
Computation of the standard basis of modules based on Matlis duality

概 要　Let R be a ring of power series over a field. In this talk, we give an algorithm for computing the standard basis of a module M which is a submodule of a free R-module F such that F/M has finite length. The algorithm is based on Matlis duality.

3 須 山 雄 介（阪 市 大 理）　3 次元単純整凸多面体の Ehrhart 多項式 ···························· 10

Yusuke Suyama（Osaka City Univ.）
The Ehrhart polynomial of a 3-dimensional simple integral convex polytope

概 要　For a simple integral convex polytope P of dimension d, Pommersheim gave a method for computing the $(d-2)$-th coefficient of the Ehrhart polynomial of P by using toric geometry. In this talk, we give a formula for the Ehrhart polynomial of P of dimension 3 by applying this method.

4 土 谷 昭 善（阪 大 情 報）　半順序集合に付随する正規 Gorenstein Fano 凸多面体とその Ehrhart 多
　日 比 孝 之（阪 大 情 報）　項式 ·· 15
　松 田 一 徳（阪 大 情 報）

Akiyoshi Tsuchiya（Osaka Univ.）
Takayuki Hibi　（Osaka Univ.）
Kazunori Matsuda（Osaka Univ.）
Normal Gorenstein Fano polytopes arising from partially ordered sets and the Ehrhart polynomials

概 要　Richard Stanley introduced the order polytope $\mathcal{O}(P)$ and the chain polytope $\mathcal{C}(P)$ arising from a finite partially ordered set P, and showed that the Ehrhart polynomial of $\mathcal{O}(P)$ is equal to that of $\mathcal{C}(P)$. In this talk, we will introduce study on Ehrhart polynomials of three normal Gorenstein Fano polytopes $\Gamma(\mathcal{O}(P), -\mathcal{O}(Q))$, $\Gamma(\mathcal{O}(P), -\mathcal{C}(Q))$ and $\Gamma(\mathcal{C}(P), -\mathcal{C}(Q))$, where P and Q are partially ordered sets with $|P| = |Q|$.

5 大 関 一 秀 (山口大理工)   整閉イデアルの Sally 加群の構造について ···················· 15
   M. E. Rossi (Genova Univ.)
   Kazuho Ozeki (Yamaguchi Univ.)   The structure of the Sally module of integrally closed ideals
   Maria Evelina Rossi (Genova Univ.)

概 要 The first two Hilbert coefficients of a primary ideal play an important role in commutative algebra and in algebraic geometry. In this paper we give a complete algebraic structure of the Sally module of integrally closed ideals I in a Cohen–Macaulay local ring A satisfying the equality $e_1(I) = e_0(I) - \ell_A(A/I) + \ell_A(I^2/QI) + 1$, where Q is a minimal reduction of I, and $e_0(I)$ and $e_1(I)$ denote the first two Hilbert coefficients of I.

6 東 谷 章 弘 (京都産大理)   Almost Gorenstein 標準的次数付き環とその h 列 ··················· 15
   Akihiro Higashitani   Almost Gorenstein standard graded rings and their h-vectors
          (Kyoto Sangyo Univ.)

概 要 Recently, for the study of a new class of local or graded rings which are Cohen–Macaulay but not Gorenstein, almost Gorenstein local or graded rings were defined and have been studied. In this paper, for the further study of almost Gorenstein rings, we concentrate on almost Gorenstein standard graded rings and investigate the h-vectors of almost Gorenstein standard graded rings.

7 山 中   聡 (岡山大自然)[♭] Some remarks on the weakly separability in skew polynomial rings ··· 10
   Satoshi Yamanaka (Okayama Univ.)   Some remarks on the weakly separability in skew polynomial rings

概 要 The notion of weakly separable extensions was introduced as a generalization of separable extensions. In this talk, we shall study the difference between the separability and the weakly separability in skew polynomial rings of derivation type $B[X; D]$. Moreover, we shall treat weakly separable polynomials in the general case $B[X; \rho, D]$.

8 松 岡 直 之 (明 大 理 工)   The almost Gorenstein Rees algebras of contracted ideals ··········· 15
   後 藤 四 郎 (明 大 理 工)
   谷 口 直 樹 (明 大 理 工)
   吉 田 健 一 (日 大 文 理)
   Naoyuki Matsuoka (Meiji Univ.)   The almost Gorenstein Rees algebras of contracted ideals
   Shiro Goto   (Meiji Univ.)
   Naoki Taniguchi (Meiji Univ.)
   Ken-ichi Yoshida (Nihon Univ.)

概 要 Let $(A, \mathfrak{m})$ be a two-dimensional regular local ring with infinite residue class field $A/\mathfrak{m}$. Goto-Matsuoka–Taniguchi–Yoshida showed that the Rees algebras of integrally closed ideals are almost Gorenstein. Then one can ask how about the case when I is contracted. The purpose of this talk is to give an answer to this question.

9 渡 辺 敬 一 (日 大 文 理)[♭] A characterization of two-dimensional rational singularities via Core of
   奥 間 智 弘 (山 形 大 理)   ideals ·· 15
   吉 田 健 一 (日 大 文 理)
   Kei-ichi Watanabe (Nihon Univ.)   A characterization of two-dimensional rational singularities via Core of
   Tomohiro Okuma (Yamagata Univ.)   ideals
   Kenichi Yoshida (Nihon Univ.)

概 要 We give a concrete description of the core of p_g-ideals in 2-dimensional normal sngularities and as consequences, we give a characterization of rational singularities and prove the existence of good ideals.

12   代数学

14:15～16:50

10 飯 高   茂 (学 習 院 大*)   オイラーのϕ完全数 ··· 10
Shigeru Iitaka (Gakushuin Univ.*)   On ϕ perfect numbers with respect to Euler's function

概要 Let P be a prime and m a positive integer. If $\phi(P^e) + 1 + m$ is prime then $a = P^e q$ is said to be (ϕ, m) perfect number.

11 山 崎 愛 一 (京   大   理)   Degree three unramified cohomology groups ······················· 15
星   明 考 (新 潟 大 理)
Ming-chang Kang (Nat. Taiwan Univ.)
Aiichi Yamasaki (Kyoto Univ.)   Degree three unramified cohomology groups
Akinari Hoshi   (Niigata Univ.)
Ming-chang Kang (Nat. Taiwan Univ.)

概要 Let p be an odd prime number. Peyre shows that there is a group G of order p^{12} such that $H^3_{nr}(\mathbb{C}(G), \mathbb{Q}/\mathbb{Z})$ is non-trivial. Using Peyre's method, we are able to prove that the same conclusion is true for some groups of order p^9.

12 山 崎 愛 一 (京   大   理)   Bravais group of dimension $n \le 6$ and corresponding quadratic forms
星   明 考 (新 潟 大 理)   ·· 15
Aiichi Yamasaki (Kyoto Univ.)   Bravais group of dimension $n \le 6$ and corresponding quadratic forms
Akinari Hoshi   (Niigata Univ.)

概要 We confirm that $H^1(G, F) = 0$ for any Bravais group G if dimension $n \le 6$ where F is the flabby class of the corresponding G-lattice of rank n (Voskresenskii's conjecture). By using the algorithm we developed, one can obtain (positive definite) invariant quadratic forms f under the action of Bravais group $G \le GL(n, \mathbb{Z})$.

13 星   明 考 (新 潟 大 理)   On Noether's problem for cyclic groups of prime order ·············· 15
Akinari Hoshi   (Niigata Univ.)   On Noether's problem for cyclic groups of prime order

概要 Let k be a field and G be a finite group acting on the rational function field $k(x_g \,|\, g \in G)$ by k-automorphisms $h(x_g) = x_{hg}$ for any $g, h \in G$. Noether's problem asks whether the invariant field $k(G) = k(x_g \,|\, g \in G)^G$ is rational (i.e. purely transcendental) over k. In 1974, Lenstra gave a necessary and sufficient condition to this problem for abelian groups G. However, even for the cyclic group C_p of prime order p, it is unknown whether there exist infinitely many primes p such that $\mathbb{Q}(C_p)$ is rational over $\mathbb{Q}$. Only known 17 primes p for which $\mathbb{Q}(C_p)$ is rational over $\mathbb{Q}$ are $p \le 43$ and $p = 61, 67, 71$. We show that for primes $p < 20000$, $\mathbb{Q}(C_p)$ is not (stably) rational over $\mathbb{Q}$ except for affirmative 17 primes and undetermined 46 primes. Under the GRH, the generalized Riemann hypothesis, we also confirm that $\mathbb{Q}(C_p)$ is not (stably) rational over $\mathbb{Q}$ for undetermined 28 primes p out of 46.

13　代数学

14　<u>星　　明 考</u>（新 潟 大 理）　Three-dimensional purely quasi-monomial actions $\cdots\cdots\cdots\cdots\cdots\cdots$ 15
　　北 山 秀 隆（和歌山大教育）

<u>Akinari Hoshi</u>　(Niigata Univ.)　Three-dimensional purely quasi-monomial actions
Hidetaka Kitayama (Wakayama Univ.)

概 要　Let G be a finite subgroup of $\mathrm{Aut}_k(K(x_1,\ldots,x_n))$ where K/k is a finite field extension and $K(x_1,\ldots,x_n)$ is the rational function field with n variables over K. The action of G on $K(x_1,\ldots,x_n)$ is called quasi-monomial if it satisfies the following three conditions (i) $\sigma(K) \subset K$ for any $\sigma \in G$; (ii) $K^G = k$ where K^G is the fixed field under the action of G; (iii) for any $\sigma \in G$ and $1 \le j \le n$, $\sigma(x_j) = c_j(\sigma) \prod_{i=1}^{n} x_i^{a_{ij}}$ where $c_j(\sigma) \in K^\times$ and $[a_{i,j}]_{1 \le i,j \le n} \in GL_n(\mathbb{Z})$. A quasi-monomial action is called purely quasi-monomial if $c_j(\sigma) = 1$ for any $\sigma \in G$, any $1 \le j \le n$. When $k = K$, a quasi-monomial action is called monomial. The main problem is that, under what situations, $K(x_1,\ldots,x_n)^G$ is rational over k. We determine the rationality when $n = 3$ and the action is purely quasi-monomial except for few cases. As an application, we will show the rationality of some 5-dimensional purely monomial actions which are decomposable.

15　安 藤 哲 哉（千 葉 大 理）　半代数的集合上の PSD 錐 $\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 15

Tetsuya Ando　(Chiba Univ.)　PSD cone on a semialgebraic set

概 要　We define a semialgebraic set of a real algebraic variety. This notion is stable under regular maps. We prove that an open set of a real algebraic variety with an algebraic boundary is semialgebraic. For a given linear system H on the real algebraic variety X and a semialgebraic set A of X, the set of all the functions in H which is positive semidefinite on A is called a PDS cone of H on A. This cone is semialgebraic. We study the structure of PSD cones.

16　<u>石 川 剛 郎</u>（北　 大　 理）　Nash 関数の微分に関する Leibniz 複雑性 $\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 15
　　山 下 達 也（北　 大　 理）

<u>Goo Ishikawa</u> (Hokkaido Univ.)　Leibniz complexity of Nash functions on differentiations
Tatsuya Yamashita (Hokkaido Univ.)

概 要　We show that, for any non-Nash analytic function, it is impossible to derive its derivatives algebraically, i.e., by using linearity and Leibniz rule finite times. In fact we prove algebraically the impossibility of algebraic computations, by using Kähler differentials. Then the notion of Leibniz complexity of a Nash function is introduced as the minimal number of usages of Leibniz rules to compute the total differential algebraically. We provide general observations and upper estimates on Leibniz complexity of Nash functions.

17　赤 堀 克 己（岐 阜 薬 大）　射影曲線上の次数が $2g - 1 - 4h^1(L)$ 未満の special な直線束の normal
　　　　　　　　　　　　　　generation について $\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 15

Katsumi Akahori　　　　　Remarks on normal generation of special line bundles with $\deg(L) <$
　　(Gifu Pharmaceutical Univ.)　$2g - 1 - 4h^1(L)$ on algebraic curves

概 要　Let L be a special very ample line bundle with degree $\deg(L)$ on a smooth projective curve X of large enough genus g. One says that L is normally generated if X is projectively normal under the associated projective embedding. We show that L is normally generated if $\deg(L) \ge 2g - 2s + 1 - 2(s+1)h^1(L)(s \ge 2)$ and X is not a $m(m \le s)$-sheeted covering.

18　北 川 真 也（岐 阜 工 高 専）　切断がない種数 2 曲線束を備えた有理曲面の構成例 $\cdots\cdots\cdots\cdots\cdots\cdots$ 10

Shinya Kitagawa　　　　　An example of a genus two fibration with no section on a rational surface
　　(Gifu Nat. Coll. of Tech.)

概 要　Every genus two fibration on a smooth projective surface whose geometric genus is zero has a not necessarily effective divisor whose intersection number with a general fibre equals one. However there exists a genus two fibration with no section on a rational surface.

3月17日(木)   第I会場

9:30〜12:00

19 岩 見 智 宏 (九 州 産 大 工)[b] Further refinement of Shokurov's projectivity criterion ·············· 15

  Tomohiro Iwami   Further refinement of Shokurov's projectivity criterion
        (Kyushu Sangyo Univ.)

概要 The author gave a certain refinement of Shokurov's projectivity criterion, September 2012, based on several theory of semi-log canonical (slc) pairs mainly developed by J. Kollar. On the other hand, after then,projectivity criterion for moduli spaces are rapidly achieved with special regards to the compactification of moduli of varieties of general type. In this talk,the author will report further refinement of Shokurov's projectivity criterion, as succeeding to the author's previous refinement, based on global extendability property associated to certain strata for slc pairs appearing in O. Fujino's recent work.

20 福 間 慶 明 (高 知 大 理) On polarized 4-folds (X, L) with $h^0(K_X + 3L) \leq 1$ ················· 15

  Yoshiaki Fukuma (Kochi Univ.)   On polarized 4-folds (X, L) with $h^0(K_X + 3L) \leq 1$

概要 Let (X, L) be a polarized manifold of dimension n. Then we want to study (X, L) with small $h^0(K_X + (n-1)L)$. This topic relates to a conjecture of Beltrametti and Sommese. It has been already studied for $n \leq 3$. So, in this talk, we will consider the case $n = 4$, and we will give a classification of (X, L) with $h^0(K_X + 3L) \leq 1$.

21 野 間   淳 (横浜国大環境情報) Regularity of projected Roth varieties ·························· 10

  Atsushi Noma (Yokohama Nat. Univ.)   Regularity of projected Roth varieties

概要 We work over an algebraically closed field of characteristic zero. The purpose here is to study the Castelnuovo–Mumford regularity of projected Roth varieties, which are divisors of rational scrolls of certain types. These varieties appear, as an exceptional case, in the study of finding whether a projective variety is defined by equations of the expected low degree.

22 松 村 朝 雄 (岡 山 理 大 理) 代数的コボルディズムにおける Segre 類 ··························· 15
  T. Hudson   (Postech   )
  Tomoo Matsumura   Segre classes in algebraic cobordism
        (Okayama Univ. of Sci.)
  Thomas Hudson   (Postech)

概要 In this talk, we will explain a new result about the Segre classes of vector bundles in algebraic cobordism introduced by Levine–Morel.

23 加 藤 裕 基 (宇 部 工 高 専) Loop stacks of the affine motivic stack of K-theory ················· 15

  Yuki Kato (Ube Nat. Coll. of Tech.)   Loop stacks of the affine motivic stack of K-theory

概要 We introduce the theory of motivic derived algebraic geometry which is obtained by combining Lurie's derived algebraic geometry and Voevodsky's $\mathbb{A}^1$-homotopy theory. By applying the theory of motivic derived algebraic geometry to algebraic K-theory, we define the pointed $\mathbb{P}^1$-loop stack of the affine motivic stack of the K-theory spectrum. By our main result, we obtain a relation between the pointed $\mathbb{P}^1$-loop stack of the K-theory and the logarithmic differential form Bott element on the K-theory.

24 安 福　　悠（日 大 理 工） 曲面上の Vojta 予想と, *abc* 予想・Farey 数列 ······················· 15
Yu Yasufuku　(Nihon Univ.)   Vojta's conjecture on surfaces, the *abc* conjecture, and Farey sequences

概 要 We prove Vojta's conjecture for certain rational surfaces. Moreover, for certain other rational surfaces, we prove that the Vojta's conjecture implies a special case of the *abc* conjecture, whose proof has been announced by Mochizuki. Conversely, we will also show that the *abc* conjecture implies Vojta's conjecture for these surfaces. For the proofs, we will use some properties of Farey sequences.

25 角 皆　　宏（上 智 大 理 工） 6 次以下の種数 1 の dessin の Galois 軌道の決定 ··················· 10
澤　　道 彦（上 智 大 理 工）
Hiroshi Tsunogai (Sophia Univ.)　Determination of Galois orbits of genus 1 dessins of degree up to 6
Michihiko Sawa (Sophia Univ.)

概 要 We calculated the defining equations of all Belyi pairs of genus 1 of degree up to 6, and determined the Galois orbits in these cases. As a result, we show that these Galois orbits can be separated by known Galois invariants of dessins: valency lists, monodromy groups, Nielsen classes, cartographic groups and automorphism groups.

26 大 川 幸 男（東 大 数 理） The Riemann–Hilbert correspondence for unit F-crystals ············ 15
Sachio Ohkawa (Univ. of Tokyo)　The Riemann–Hilbert correspondence for unit F-crystals

概 要 Let X be an algebraic variety defined over a perfect field k of characteristic $p > 0$ with an embedding $X \hookrightarrow P$ into a proper smooth scheme P over the Witt ring $W_n(k)$. We show that the triangulated category of bounded complexes of $\mathcal{D}_{P/W_n(k)}$-modules with unit Frobenius structures supported on X satisfying certain conditions does not depend on the choice of embeddings and this triangulated category is anti-equivalent to the triangulated category of bounded complexes of étale sheaves of $\mathbb{Z}/p^n\mathbb{Z}$-modules with constructible cohomology sheaves and of finite Tor dimension. Our results can be regarded as a generalization of some part of the Emerton–Kisin theory of the Riemann–Hilbert correspondence for unit F-crystals to the case of embeddable algebraic varieties in characteristic p.

27 奥 山 裕 介（京都工繊大工芸） A potential theoretic characterization of polynomials among rational
functions on the Berkovich projective line ························ 15
Yûsuke Okuyama (Kyoto Inst. Tech.)　A potential theoretic characterization of polynomials among rational
functions on the Berkovich projective line

概 要 Let K be an algebraically closed field that is complete with respect to a non-trivial and possibly non-archimedean absolute value $|\cdot|$. Let $\mathsf{P}^1 = \mathsf{P}^1(K)$ be the Berkovich projective line over K, which is a compactification of $\mathbb{P}^1 = \mathbb{P}^1(K)$. A potential theory on P^1 has been developed by Baker–Rumely, Favre–Rivera-Letelier, and Thuillier.
We say a rational function $f \in K(z)$ of degree > 1, which canonically acts on P^1, has a potentially good reduction if there is a point $\mathcal{S} \in \mathsf{P}^1 \setminus \mathbb{P}^1$ such that $\# \bigcup_{n \in \mathbb{N}} f^{-n}(\mathcal{S}) < \infty$, and otherwise, f has no potentially good reductions. In this talk, we will talk about a characterization of polynomials among rational functions, up to rational functions having potentially good reductions as exceptions, in terms of potential theory and dynamics on P^1.

3月18日(金)　第I会場

9:00〜12:00

28 野 村 泰 敏　　　　　♭ エイペリ型数列の合同式について ································· 10

Yasutoshi Nomura　　　　　On congruences of Apery-like numbers

概要 Let A(n), ..., G(n) denote Apery-like numbers in which A(n) and B(n) were introduced by R. Apery. In this talk we state some conjectures about values mod p, p prime, of numbers: X(p-m) for odd p, 1<m<p, X((pp-1)/8) for odd p, X((ppp-e)/9) for p congruent to e mod 3, e=1 or -1, where X denote one of A, B, ..., G.

29 田 中 孝 明（慶 大 理 工）　有限個の素数 p に対する $\mathbb{Q}_p$ と $\mathbb{R}$ の '共通部分' に属する超越数から成る
　　中 島 ミ ホ（慶 大 理 工）　代数的独立な無限集合について ····························· 10

Taka-aki Tanaka （Keio Univ.）　On the algebraically independent subsets of the 'intersection' of the real
Miho Nakashima （Keio Univ.）　numbers $\mathbb{R}$ and the finite number of the p-adic fields $\mathbb{Q}_p$

概要 The main result of this talk asserts the algebraic independence of the limits of fixed sequences of rational numbers with respect to the ordinary absolute value and to the finite number of the p-adic absolute values. We regard such limits, which are indeed the values at a rational point of Mahler functions over $\mathbb{Q}$, as numbers belonging to the 'intersection' of the rational numbers $\mathbb{R}$ and the finite number of the p-adic fields $\mathbb{Q}_p$.

30 河 田 貴 久（名　工　大）　Gegenbauer 多項式の係数の単峰性について ····················· 15
　　山 岸 正 和（名　工　大）

Takahisa Kawada　　　　　On the unimodality of the coefficients of Gegenbauer polynomials
　　　（Nagoya Inst. of Tech.）
Masakazu Yamagishi
　　　（Nagoya Inst. of Tech.）

概要 In this talk, we will focus on the unimodal property of the sequence of the coefficients of Gegenbauer polynomials $C_n^\lambda(x)$. We classify the Gegenbauer polynomials with 2 modes in the case $\lambda \in \mathbb{Z}$. This generalizes a result of Belbachir–Bencherif in which they treated (essentially) the cases $\lambda \to 0$ and $\lambda = 1$, i.e., the Chebyshev polynomials of the first and second kind. We also study asymptotic behavior of the mode of $C_n^\lambda(x)$ as a function of n.

31 谷 川 好 男（名大多元数理）　制限約数問題について ·· 10
　　古 屋　　淳（浜 松 医 科 大）
　　南 出　　真（山 口 大 理）

Yoshio Tanigawa （Nagoya Univ.）　On a restricted divisor problem
Jun Furuya
（Hamamatsu Univ. School of Medicine）
Makoto Minamide （Yamaguchi Univ.）

概要 We shall consider the function $d_\alpha(n)$ which denotes the number of positive divisors k of a positive integer n satisfying $n^\alpha \le k \le n^{1-\alpha}$ $(0 < \alpha < 1/2)$. We deduce the asymptotic formula for $\sum_{n \le x} d_\alpha(n)$, where $\alpha = 1/N$ (N is a positive integer ≥ 3). Moreover, we study the mean square of the error term of the formula.

32　D. Banerjee　　　　　　　　　On the first moment of $\Delta_{(1)}(x)$ ································· 10
　　　　(Harish-Chandra Res. Inst.)
　南　出　　　真 (山 口 大 理)

Debika Banerjee　　　　　　　On the first moment of $\Delta_{(1)}(x)$
　　　　(Harish-Chandra Res. Inst.)
Makoto Minamide (Yamaguchi Univ.)

概要　We define an arithmetical function $D_{(1)}(n)$ by the coefficients of the Dirichlet series $(\zeta'(s))^2$ (Re $s > 1$), where $\zeta'(s)$ is the derivative of the Riemann zeta function. We are studying the error term $\Delta_{(1)}(x)$ in the asymptotic formula for $\sum_{n \leq x} D_{(1)}(n)$. In this talk, we show some formulas on the first moment of $\Delta_{(1)}(x)$.

33　鈴 木 雄 太 (名大多元数理)　　素数と素数の k 乗の和について ································ 10
　　Yuta Suzuki　　(Nagoya Univ.)　On the sum of a prime and a prime power

概要　In this talk, we consider the additive problem of expressing positive integers as a sum of a prime and a prime power. In particular, we study the exceptional set for the asymptotic formula of Hardy–Littlewood type in short intervals. As for the asymptotic formula without any restriction, we succeeded in improving the previous result of C. Bauer (1998).

34　松 岡 謙 晶 (名大多元数理)[♭]　Hardy 関数の高階導関数の平均値 ···························· 10
　　Kaneaki Matsuoka (Nagoya Univ.)　Mean values of higher derivatives of Hardy's function

概要　I will talk about Mean values of higher derivatives of Hardy's function

35　町 出 智 也　　　　　　　　深さ 5 未満の正規化多重ゼータ値の巡回和に関する公式について ······ 10
　　　　(国立情報学研・JST ERATO)

Tomoya Machide　　　　　　On identities involving cyclic sums of regularized multiple zeta values
(Nat. Inst. of Information/JST ERATO)　each of depth less than 5

概要　In this talk, we give identities involving cyclic sums of regularized multiple zeta values of depth less than 5. As a corollary, we present an extension of Hoffman's theorem for symmetric sums of multiple zeta values for this case.

36　大 音 智 弘 (筑波大数理物質)　Properties of Diophantine exponents for formal Laurent series over a
　　　　　　　　　　　　　　　finite field ··· 15

Tomohiro Ooto (Univ. of Tsukuba)　Properties of Diophantine exponents for formal Laurent series over a
　　　　　　　　　　　　　　　finite field

概要　In this talk, we study about Mahler's exponent w_n and Koksma's exponent w_n^* for formal Laurent series over a finite field. We give some results related to the spectrum of the function $w_n - w_n^*$ and that of the function w_n at algebraic points.

37　佐 藤 文 広 (立　教　大[⋆])　ある 2 変数概均質ゼータ関数から構成される実解析的保型形式について
　杉 山 和 成 (千 葉 工 大)　　　 ·· 15
　上 野 隆 彦 (聖マリアンナ医大)

Fumihiro Sato　(Rikkyo Univ.[⋆])　Real analytic automorphic forms arising from certain prehomogeneous
Kazunari Sugiyama　　　　　　zeta functions in two variables
　　　　(Chiba Inst. of Tech.)
Takahiko Ueno
(St. Marianna Univ. School of Med.)

概要　In this talk, we explain that the zeta functions in two variables attached to a certain prehomogeneous vector space related to quadratic forms are essentially the Mellin transforms of real analytic automorphic forms.

38　岡 崎 匡 志 (Nat. Taiwan Univ.)　　Whittaker 関数を通じた素数とスケーリング次元の関係 ············· 15
　　Tadashi Okazaki (Nat. Taiwan Univ.)　　Prime number and scaling dimension via Whittaker function

概 要　We show that the dilatation expectation values in conformal quantum mechanics lead to the asymptotic smoothed counting function of the Riemann zeros. We propose a conceivable implication between fundamental building blocks in math and in physics as a prime number in number theory and a scaling dimension in quantum mechanics.

39　山 縣 幸 司 (名　工　大)　　円分体の最大実部分体の整数環について ························ 15
　　山 岸 正 和 (名　工　大)
　　Koji Yamagata (Nagoya Inst. of Tech.)　　On the ring of integers of real cyclotomic fields
　　Masakazu Yamagishi
　　　　　(Nagoya Inst. of Tech.)

概 要　Let ζ be a primitive nth root of unity. As is well known, $\mathbb{Z}[\zeta+\zeta^{-1}]$ is the ring of integers of $\mathbb{Q}(\zeta+\zeta^{-1})$. We give an alternative proof of this fact by using the resultants of modified cyclotomic polynomials.

14:15～14:30　2016 年度 (第 19 回) 日本数学会代数学賞授与式

14:30～15:30　2016 年度 (第 19 回) 日本数学会代数学賞受賞特別講演
　　藏 野 和 彦 (明 大 理 工)　　局所環上の交点理論と Cohen–Macaulay 加群論への応用
　　Kazuhiko Kurano (Meiji Univ.)　　Intersection theory over local rings and its application to the theory of Cohen–Macaulay modules

概 要　P.Roberts applied the singular Riemann–Roch theory to commutative ring theory in the 1980s, and affirmatively solved Serre's vanishing conjecture of intersection multiplicities in 1987. On the other hand, Dutta, Hochster and McLauglhin gave a counterexample to the generalized vanishing conjecture in 1985. After that, by the research of Levine, Roberts, Srinivas, etc, we know that such an example are not abnormal. Therefore we should study why such examples exist. Using functions does not vanish like this, we define the notion of numerical equivalence on the K-group $G_0(A)$ of finitely generated modules over a Noetherian local rings A. We prove that $\overline{G_0(A)}$ (the K-group divided by the numerical equivalence) becomes a lattice. Maximal Cohen–Macaulay (MCM) modules play a role of positive elements in this situation. We consider the cone spanned by MCM's in the lattice tensored with the real number field $\mathbb{R}$. Studying this cone, we prove that, for each positive integer r, there exist only finitely many numerical types of MCM's of rank r. Furthermore, there exist only finitely many MCM's of rank 1 over isolated hypersurface singularities of dimension 3. For such rings, we prove that $\overline{G_0(A)} \simeq \mathbb{Z} \oplus \mathrm{Cl}(A)$, in particular $\mathrm{Cl}(A)$ is torsion free. By this formula, we know that, if such a ring is not UFD, there exists an example like Dutta, Hochster and McLauglhin. (Isolated complete intersection singularities of dimension d are UFD if $d \geq 4$. In the case of $d = 2$, there exist examples that have infinitely many MCM ideals.) A part of these results are joint work with Hailong Dao (University of Kansas).

15:40～16:40　2016 年度 (第 19 回) 日本数学会代数学賞受賞特別講演
　　齋 藤 政 彦 (神 戸 大 理)　　接続のモジュライ空間とパンルヴェ型方程式
　　Masa-Hiko Saito (Kobe Univ.)　　Moduli spaces of connections and differential equations of Painlevé type

16:50〜17:50　2016年度(第19回)日本数学会代数学賞受賞特別講演

桂 田 英 典 (室 蘭 工 大 工)　保型形式の周期と合同およびそれに関連する話題

Hidenori Katsurada　　　　　　Periods and congruences of automorphic forms and related topics
　　　(Muroran Inst. of Tech.)

概要 For a primitive form f for $SL_2(\mathbb{Z})$, let $\widehat{f}$ be a certain lift of f to the space $S_l(\Gamma)$ of cusp forms for some another modular group Γ, that is, let $\widehat{f}$ be a Hecke cuspidal eigenform whose certain L-function is expressed in terms of certain L-functions of f. Then we ask the following question:

(A). Express the ratio $\dfrac{\langle \widehat{f}, \widehat{f} \rangle}{\langle f, f \rangle^e}$ of periods (Petersson products) in terms of special values of certain L-functions of f.

If the answer to (A) is affirmative, the algebraic parts of such L-values are sometimes related with congruence for $\hat{f}$, and in particular we ask the following question:

(B). Characterize primes giving congruence between $\widehat{f}$ and another Hecke eigenform in $S_l(\Gamma)$ not coming from the lift in terms of the invariants in (A).

In this talk, we give an affirmative answer to (A) in the case where $\hat{f}$ is the Duke–Imamoglu–Ikeda lift or the Hermitian Ikeda lift, and to (B) in the case where $\hat{f}$ is the Duke–Imamoglu–Ikeda lift. We also discuss some other related topics.
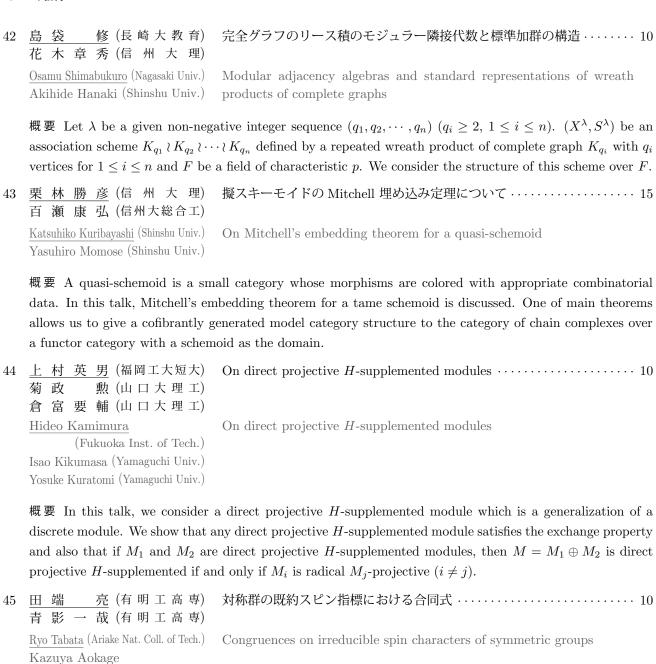
3月19日(土)　　第I会場

9:30〜12:00

40　齋 藤 三 郎 (群馬大*・再生核研)　Reality of the division by zero $z/0 = 0$ · 10
　　道 脇　　裕 (NejiLaw Inc.)
　　山 田 正 人 (再 生 核 研)

Saburou Saitoh　　　　　　　　Reality of the division by zero $z/0 = 0$
(Gunma Univ.*/Inst. of Reproducing Kernels)
Hiroshi Michiwaki (NejiLaw Inc.)
Masato Yamada
　　(Inst. of Reproducing Kernels)

概要 We will give some clear evidences of the reality of the division by zero $z/0 = 0$ with a fundamental algebraic theorem, and physical and geometrical examples; that is, A) a field structure containing the division by zero, B) by the gradient of the y axis on the (x, y) plane, C) by the reflection $1/\overline{z}$ of z with respect to the unit circle with center at the origin on the complex z plane, and D) by considering rotation of a right circle cone having some very interesting phenomenon from some practical and physical problem.

41　齋 藤 三 郎 (群馬大*・再生核研)　The concept of divisions (fractionals) in fields containing the division
　　山 田 正 人 (再 生 核 研)　　　by zero · 10

Saburou Saitoh　　　　　　　　The concept of divisions (fractionals) in fields containing the division
(Gunma Univ.*/Inst. of Reproducing Kernels)　by zero
Masato Yamada
　　(Inst. of Reproducing Kernels)

概要 We will introduce the concept of the divisions (fractions) in fields containing the division by zero whoes concept is a natural extension of the division by zero $z/0 = 0$ on the complex field **C**.

42   島 袋　　修 (長 崎 大 教 育) 完全グラフのリース積のモジュラー隣接代数と標準加群の構造 ········ 10
花 木 章 秀 (信 州 大 理)

Osamu Shimabukuro (Nagasaki Univ.) Modular adjacency algebras and standard representations of wreath
Akihide Hanaki (Shinshu Univ.) products of complete graphs

概要 Let λ be a given non-negative integer sequence $(q_1, q_2, \cdots, q_n)$ $(q_i \geq 2, 1 \leq i \leq n)$. (X^λ, S^λ) be an association scheme $K_{q_1} \wr K_{q_2} \wr \cdots \wr K_{q_n}$ defined by a repeated wreath product of complete graph K_{q_i} with q_i vertices for $1 \leq i \leq n$ and F be a field of characteristic p. We consider the structure of this scheme over F.

43   栗 林 勝 彦 (信 州 大 理) 擬スキーモイドの Mitchell 埋め込み定理について ·················· 15
百 瀬 康 弘 (信州大総合工)

Katsuhiko Kuribayashi (Shinshu Univ.) On Mitchell's embedding theorem for a quasi-schemoid
Yasuhiro Momose (Shinshu Univ.)

概要 A quasi-schemoid is a small category whose morphisms are colored with appropriate combinatorial data. In this talk, Mitchell's embedding theorem for a tame schemoid is discussed. One of main theorems allows us to give a cofibrantly generated model category structure to the category of chain complexes over a functor category with a schemoid as the domain.

44   上 村 英 男 (福岡工大短大) On direct projective H-supplemented modules ····················· 10
菊 政　　勲 (山 口 大 理 工)
倉 富 要 輔 (山 口 大 理 工)

Hideo Kamimura   On direct projective H-supplemented modules
        (Fukuoka Inst. of Tech.)
Isao Kikumasa (Yamaguchi Univ.)
Yosuke Kuratomi (Yamaguchi Univ.)

概要 In this talk, we consider a direct projective H-supplemented module which is a generalization of a discrete module. We show that any direct projective H-supplemented module satisfies the exchange property and also that if M_1 and M_2 are direct projective H-supplemented modules, then $M = M_1 \oplus M_2$ is direct projective H-supplemented if and only if M_i is radical M_j-projective $(i \neq j)$.

45   田 端　　亮 (有 明 工 高 専) 対称群の既約スピン指標における合同式 ························· 10
青 影 一 哉 (有 明 工 高 専)

Ryo Tabata (Ariake Nat. Coll. of Tech.) Congruences on irreducible spin characters of symmetric groups
Kazuya Aokage
        (Ariake Nat. Coll. of Tech.)

概要 There are congruences on the irreducible characters of ordinary representations of finite groups. The similar type of relations for irreducible spin characters has not been found, although the spin analogues of many properties to the ones of ordinary representations are expected to appear.
It is known that the row and column in the spin character table $(\zeta_\rho(\lambda))_{\rho,\lambda}$ of the symmetric group S_n are parametrized by strict partitions ρ and odd partitions λ of n, respectively. In terms of this, we will explain some congruences of the spin characters with respect to S_n; $\zeta_\rho(\lambda) \equiv \pm\zeta_\rho(\mu) \bmod p$, where the sign depends on the prime number p and its multiplicity that compose different parts in λ and μ. As the result of this, a conjecture will also be presented.

46 清 水 健 一（名大多元数理） 半単純でないモジュラーテンソル圏に関するいくつかの注意 ·········· 15
    Kenichi Shimizu (Nagoya Univ.) Remarks on non-semisimple modular tensor categories

概 要 We show that a ribbon finite tensor category is a modular tensor category in the sense of Lyubashenko if and only if it is a factorizable braided tensor category in the sense of Etingof, Nikshych and Ostrik. As a consequence, the monoidal center $\mathcal{Z}(\mathcal{C})$ of a finite tensor category $\mathcal{C}$ is a modular tensor category provided that $\mathcal{Z}(\mathcal{C})$ is a ribbon category. Generalizing a result of Kauffman and Radford, we give a necessary and sufficient condition for $\mathcal{Z}(\mathcal{C})$ to be a ribbon category. As an application, we show that $\mathcal{Z}(\mathcal{C})$ is a modular tensor category if $\mathcal{C}$ is spherical in the sense of Douglas, Schommer–Preis and Snyder.

47 西 中 恒 和（兵庫県立大経済） Uncountable locally free groups and their group rings ··············· 10
    Tsunekazu Nishinaka (Univ. of Hyogo) Uncountable locally free groups and their group rings

概 要 A group is called locally free if all of its finitely generated subgroups are free. Clearly, a locally free group G whose cardinality is countable has always a countably infinite subgroup which is free. In this talk, we extend this fact to the result for the general cardinality case: If G is a locally free group, then G has a free subgroup whose cardinality is the same as that of G itself.

48 島 倉 裕 樹（東 北 大 情 報） On orbifold constructions of holomorphic vertex operator algebras of
                                central charge 24 ··· 10
    Hiroki Shimakura (Tohoku Univ.) On orbifold constructions of holomorphic vertex operator algebras of
                                     central charge 24

概 要 In this talk, I will explain orbifold constructions of holomorphic vertex operator algebras and recent progress on the classification of holomorphic vertex operator algebras of central charge 24.

49 有 家 雄 介（筑波大数理物質） Affine vertex operator algebras and modular linear differential equations
    金 子 昌 信（九 大 数 理） ·· 15
    永 友 清 和（阪 大 情 報）
    境   優 一
    Yusuke Arike (Univ. of Tsukuba) Affine vertex operator algebras and modular linear differential equations
    Masanobu Kaneko (Kyushu Univ.)
    Kiyokazu Nagatomo (Osaka Univ.)
    Yuichi Sakai

概 要 For a C_2-cofinite and rational vertex operator algebra V, there is a modular linear differential equation whose space of solutions contains the space of characters of simple V-modules. In general, the space of solutions of this modular linear differential equation does not always coincide with the space of characters of simple V-modules. In this talk we focus on affine vertex operator algebras and show that the spaces of characters of simple modules of affine vertex operator algebras coincide with the spaces of solutions of modular linear differential equations if the dimensions of the spaces of characters are at most 5.

50　有 家 雄 介（筑波大数理物質）　Vertex operator algebras, minimal models, and modular linear differen-
　　永 友 清 和（阪 大 情 報）　tial equations of order 4 ·· 15
　　境　　優　一

Yusuke Arike (Univ. of Tsukuba)　Vertex operator algebras, minimal models, and modular linear differen-
Kiyokazu Nagatomo (Osaka Univ.)　tial equations of order 4
Yuichi Sakai

概 要　In this talk we classify vertex operator algebras with two conditions which arise from Virasoro minimal models. One is that the space of characters of simple modules is the space of solutions of a modular linear differential equation of order 4. The other restricts dimensions of spaces of lower weights of a vertex operator algebra. It is shown that such vertex operator algebras have central charges $c = -46/3$, $-3/5$, $-114/7$, $4/5$, and are isomorphic to minimal models for $c = -46/3$, $-3/5$ and their extensions for $c = -114/7, 4/5$.

14:15〜15:45

51　山 内　　博（東京女大現代教養）　宮本の自己同型の型について ································· 15
　　林　　正　洪（中華民国中央研究院）

Hiroshi Yamauchi　　　　　　　　On types of Miyamoto involutions
(Tokyo Woman's Christian Univ.)
Ching Hung Lam (Academia Sinica)

概 要　We will use VOAs generated by 3-dimensional Griess algebras and determine types of Miyamoto involutions associated to simple Virasoro vectors on the commutant subalgebras. We can apply this result to Conway–Miyamoto correspondeces for Monster, Baby–Monster and Fischer 3-transposition groups.

52　神 吉 知 博（松 江 工 高 専）　重み付き Dynkin グラフに付随する hom-orthogonal な部分傾加群の数え
　　黒 澤 恵 光（沼 津 工 高 専）　上げ ··· 10
　　長 瀬　　潤（東京学大教育）
　　名 倉　　誠（奈 良 工 高 専）

Tomohiro Kamiyoshi　　　　　　Counting hom-orthogonal partial tilting modules associated with valued
　　　　　(Matsue Coll. of Tech.)　Dynkin graphs
Yoshiteru Kurosawa
　　　(Numazu Nat. Coll. of Tech.)
Hiroshi Nagase (Tokyo Gakugei Univ.)
Makoto Nagura
　　　(Nara Nat. Coll. of Tech.)

概 要　We count the number of isomorphism classes of hom-orthogonal partial tilting modules over tensor algebras of valued graph of Dynkin type; that is, of type B_n, C_n, F_4, and G_2. This number is independent on the choice of an oriented modulation of the graph. In our presentation, we will give an explanation on type B_n as an example, with combinatorial detail.

53　毛 利　　出（静 岡 大 理）　Tilting theory for noncommutative quotient singularities ··········· 15
　　上 山 健 太（弘 前 大 教 育）

Izuru Mori　　(Shizuoka Univ.)　Tilting theory for noncommutative quotient singularities
Kenta Ueyama (Hirosaki Univ.)

概 要　In the study of triangulated categories, tilting objects play a key role. They often enable us to realize abstract triangulated categories as concrete derived categories of modules over algebras. In this talk, we show that the derived category of the noncommutative projective scheme associated to a "noncommutative quotient isolated singularity" has a tilting object. Moreover, we also show that the stable category of graded maximal Cohen–Macaulay modules over a "noncommutative Gorenstein quotient isolated singularity" has a tilting object. As a consequence, these categories are triangle equivalent to the derived categories of finite dimensional algebras.

54 宮 本 賢 伍（阪 大 情 報）   完備離散付値環上の Kronecker 代数の Heller lattice を含む stable Auslander–
                               Reiten quiver の component · 15

Kengo Miyamoto (Osaka Univ.)   A component of the stable AR quiver that contains Heller lattices: the
                                case of the Kronecker algebra over complete discrete valuation ring

概 要 Let A be the Kronecker algebra over a complete discrete valuation ring $\mathcal{O}$, and we consider the additive category consisting of A-lattices M with the property that $M \otimes \mathcal{K}$ is projective as an $A \otimes \mathcal{K}$-module, where $\mathcal{K}$ is the fraction field of $\mathcal{O}$. We determine the shape of the component of the stable Auslander–Reiten quiver, say $\mathcal{C}$, that contains Heller lattices of vertical modules and horizontal modules of the Kronecker algebra $\mathcal{O}[X,Y]/(X^2, Y^2)$. Consequently, we have $\mathcal{C} = \mathbb{Z}A_\infty$.

55 板 場 綾 子（静 岡 大 理）   Frobenius Koszul 多元環と superpotential · 15
    金   加 喜（静 岡 大 理）

Ayako Itaba (Shizuoka Univ.)   Frobenius Koszul algebras and superpotential
Gahee Kim   (Shizuoka Univ.)

概 要 Let k be an algebraically closed field of characteristic 0, A a graded k-algebra finitely generated in degree 1 and V a k-vector space. For a Frobenius Koszul algebra A satisfying $(\mathrm{rad}\,A)^4 = 0$, we consider the following two conjectures: (I) for every A, there exist a superpotential $w \in V^{\otimes 3}$ and an automorphism τ of V such that the Koszul dual $A^!$ of A and the derivation-quotient algebra $\mathcal{D}(w^\tau)$ of w^τ are isomorphic as graded algebras; (II) for every A, there exists a symmetric algebra S such that A and S are graded Morita equivalent. In this talk, we give partial results for the above two conjectures.

16:00〜17:00   特別講演

P. Baumann   Paths, polytopes and loops in representation theory
   (Univ. de Strasbourg, CNRS)

Pierre Baumann   Paths, polytopes and loops in representation theory
   (Univ. de Strasbourg, CNRS)

概 要 One word has been on purpose omitted from the title of this talk, and this word is crystal. As is well-known nowadays, Kashiwara's theory of crystals is a device that give combinatorial insight into the representation theory of a semisimple Lie algebra. I will focus on two concrete models that incarnate crystals: Littelmann's path models and Anderson and Kamnizter's MV polytopes. I will also focus on two geometric devices that allow to construct the finite-dimensional representations of a semisimple Lie algebra: the geometric Satake correspondence and Lusztig's nilpotent varieties. MV polytopes naturally emerge in both settings, but in two very different fashions. Moreover, Littelmann's path model is closely related to the geometric Satake correspondence. (This connection somehow boils down to the observation that the geometric Satake correspondence makes use of loop groups, and that loops are closed paths.) Through the geometric Satake correspondence, there is thus an indirect connection between Littelmann's paths and MV polytopes. Unfortunately, one does not know yet how to extend this connection to the case of affine Lie algebras, though Littelmann's paths and MV polytopes both exist in this setting.

幾 何 学

3月16日(水)   第Ⅴ会場

9:30〜12:00

1 廣 瀬 三 平
(芝浦工大教育イノベーション推進センター)
井 ノ 口 順 一 (筑波大数理物質)
梶 原 健 司 (九 大 Ｉ Ｍ Ｉ)
松 浦   望 (福 岡 大 理)
太 田 泰 広 (神 戸 大 理)
渦糸方程式の離散化 ·· 15

Sampei Hirose (Shibaura Inst. of Tech.)
Jun-ichi Inoguchi (Univ. of Tsukuba)
Kenji Kajiwara (Kyushu Univ.)
Nozomu Matsuura (Fukuoka Univ.)
Yasuhiro Ohta   (Kobe Univ.)
Discretization of the vortex filament equation

概 要 The local induction equation, or the binormal flow on space curves is a well-known model of deformation of space curves as it describes the dynamics of vortex filaments, and the complex curvature is governed by the nonlinear Schrödinger equation. In this paper, we present its discrete analogue, namely, a model of deformation of discrete space curves by the discrete nonlinear Schrödinger equation.

2 今 井   淳 (千 葉 大 理)
G. Solanes
(Univ. Autònoma de Barcelona)
部分多様体の Riesz エネルギーの正則化 ·························· 15

Jun O'Hara   (Chiba Univ.)
Gil Solanes
(Univ. Autònoma de Barcelona)
Regularization of Riesz energy of submanifolds

概 要 We consider the regularization of Riesz energy (which is the integration of the distance between a pair of points to some power on the product space) of knots, closed surfaces, and convex bodies in the Euclidean spaces. We study two types of geometric quantities, Hadamard's finite part of the energy and residues of the energy generalized by analytic continuation.

3 早 乙 女 飛 成 (芝 浦 工 大 工)
The Olivier Rey's inequality on the Heisenberg group ·············· 15

Takanari Saotome
(Shibaura Inst. of Tech.)
The Olivier Rey's inequality on the Heisenberg group

概 要 We will study CR analogue of the Olivier Rey's inequality on the Heisenberg group. In confromal setting this inequality is used to prove the existence of the solution to the linearized Yamabe equation. This inequality shows that the energy functional for perturbed Yamabe equation is bounded below, if the perturbation is small enough.

In this article, we identify the Heisenberg group and the standard sphere via the Cayley transformation, and analyze the eigenvalues of the sub-Laplacian Δ_b on S^{2n+1}.

4 本 田 淳 史 (都 城 工 高 専)
正曲率空間型の特異点を許容する等長はめ込み ····················· 10

Atsufumi Honda
(Miyakonojo Nat. Coll. of Tech.)
Isometric immersions with singularities between space forms of the same positive curvature

概 要 In this talk, we give a definition of coherent tangent bundles of space form type, which is a generalized notion of space forms. Then, we classify their realizations in the sphere as a wave front, which is a generalization of a theorem of O'Neill and Stiel: any isometric immersion of the n-sphere into the $(n+1)$-sphere of the same sectional curvature is totally geodesic.

5 河 井 公 大 朗 (東 大 数 理)   アフィンルジャンドル部分多様体の安定性 ························ 15
Kotaro Kawai (Univ. of Tokyo)   Stabilities of affine Legendrian submanifolds

概 要 We introduce the notion of affine Legendrian submanifolds in Sasakian manifolds and define a canonical volume called the ϕ-volume as odd dimensional analogues of affine Lagrangian (totally real or purely real) geometry. Then we derive the second variation formula of the ϕ-volume to obtain the stability result in some η-Einstein Sasakian manifolds. It also implies the convexity of the ϕ-volume functional on the space of affine Legendrian submanifolds.

6 長 谷 川 和 志 (金沢大人間社会)   Twistor lifts and factorization for conformal maps of a surface I ······ 15
守 屋 克 洋 (筑波大数理物質)
Kazuyuki Hasegawa (Kanazawa Univ.)   Twistor lifts and factorization for conformal maps of a surface I
Katsuhiro Moriya (Univ. of Tsukuba)

概 要 We consider conformal maps from Riemann surfaces to the four-dimensional Euclidean space. Such surfaces can be studied by twistor theory and quaternionic holomorphic geometry. The purpose of this talk is to give the relation between these theories explicitly and show a factorization of the differential of a conformal map with respect to the multiplication of quaternions.

7 守 屋 克 洋 (筑波大数理物質)   Twistor lifts and factorization for conformal maps of a surface II ····· 15
長 谷 川 和 志 (金沢大人間社会)
Katsuhiro Moriya (Univ. of Tsukuba)   Twistor lifts and factorization for conformal maps of a surface II
Kazuyuki Hasegawa (Kanazawa Univ.)

概 要 In this talk, we take up two classes of conformal maps and apply the canonical factorization. One is constrained Willmore surfaces and the other is minimal surfaces. A factor of a canonical factorization for a conformal map provides a canonical lift of a conformal map. We characterize constrained Willmore surfaces by canonical lifts. A factor of a canonical factorization for a conformal map provides the area element of a conformal map. We give an upper bound of the area of a minimal surface around a branch point.

8 守 屋 克 洋 (筑波大数理物質)   The Schwarz–Pick theorem for super-conformal maps ·············· 15
Katsuhiro Moriya (Univ. of Tsukuba)   The Schwarz–Pick theorem for super-conformal maps

概 要 We factorize a super-conformal map. This factorization connects a super-conformal map with a holomorphic map. Then we obtain the Schwarz–Pick theorem for super-conformal maps. Then we define a distance on the image of a super-conformal map.

9 入 江   博 (茨 城 大 理)[♭]   等径超曲面の Gauss 像の Hamiltonian non-displaceability ············ 15
Hui Ma   (清 華 大)
宮 岡 礼 子 (東 北 大 理)
大 仁 田 義 裕 (阪 市 大 理)
Hiroshi Iriyeh   (Ibaraki Univ.)   Hamiltonian non-displaceability of Gauss images of isoparametric hyper-
Hui Ma   (Tsinghua Univ.)   surfaces
Reiko Miyaoka (Tohoku Univ.)
Yoshihiro Ohnita (Osaka City Univ.)

概 要 We study the Hamiltonian non-displaceability of Gauss images of isoparametric hypersurfaces in the spheres as Lagrangian submanifolds embedded in complex hyperquadrics.
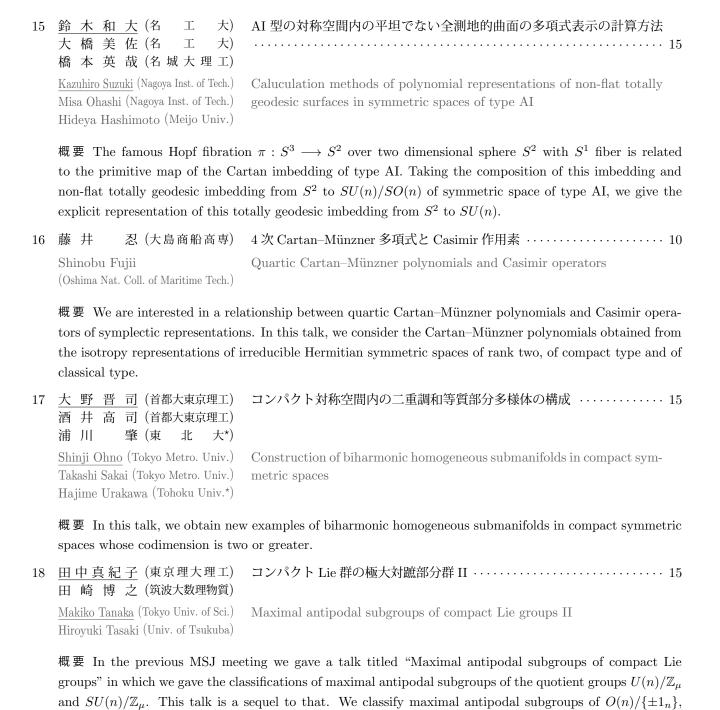
14:15〜16:30

10 今 田 充 洋（茨 城 工 高 専）   Complex contact metric structures on complex hypersurfaces in hyperkähler manifolds · 10

Mitsuhiro Imada
      (Ibaraki Nat. Coll. of Tech.)   Complex contact metric structures on complex hypersurfaces in hyperkähler manifolds

概 要 We showed that any complex hypersurface in hyperkähler manifolds admits complex almost contact metric structures. In this talk, we show the condition that complex hypersurfaces in hyperkähler manifolds admit complex contact metric structures.

11 澤 井   洋（沼 津 工 高 専）   Vaisman 完全可解多様体の構造定理 · 15

Hiroshi Sawai   Structure theorem for Vaisman completely solvmanifolds
      (Numazu Nat. Coll. of Tech.)

概 要 Locally conformal Kähler manifold is said to be a Vaisman manifold if the Lee form is parallel with respect to Riemannian metric. In this talk, we have the structure theorem for Vaisman completely solvmanifolds.

12 Changhwa Woo   Ricci semi-symmetric hypersurface in complex two-plane Grassmanni-
      (Kyungpook Nat. Univ.)   ans · 15
    Young Jin Suh
      (Kyungpook Nat. Univ.)
    Doo Hyun Hwang
      (Kyungpook Nat. Univ.)
    Changhwa Woo   Ricci semi-symmetric hypersurface in complex two-plane Grassmanni-
      (Kyungpook Nat. Univ.)   ans
    Young Jin Suh (Kyungpook Nat. Univ.)
    Doo Hyun Hwang
      (Kyungpook Nat. Univ.)

概 要 We introduce a new notion of Ricci semi-symmetric hypersurface in complex two-plane Grassmannians. Then we give a non-existence property for Ricci semi-symmetric Hopf hypersurfaces in complex two-plane Grassmannians by using simultaneous diagonalization of commuting symmetric operators.

13 古 賀   勇（九 大 数 理）   複素グラスマン多様体への強射影平坦写像の剛性について · · · · · · · · · · · 15

Isami Koga   (Kyushu Univ.)   Rigidity of a certain strongly projectively flat map into the complex Grassmannian

概 要 In this talk, the author defines a strongly projectively flat map, which is a certain holomorphic map of compact Kähler manifold into the complex Grassmannian manifold. And then, the author show that if strongly projectively flat maps of compact simplly connected homogeneous Kähler manifolds into the complex Grassmannian is equivariant with respect to the identity component of isometry groups, then they are rigid.

14 梶 ヶ 谷 徹（阪 市 大 数 学 研）   複素双曲空間内の可解群作用により得られる等質ラグランジュ部分多様体
    橋 永 貴 弘（北 九 州 工 高 専）   · 10

Toru Kajigaya (Osaka City Univ.)   Homogeneous Lagrangian submanifolds obtained by solvable Lie groups
Takahiro Hashinaga   in complex hyperbolic space
(Kitakyushu Nat. Coll. of Tech.)

概 要 Let $M = \mathbb{C}H^n \simeq G/K = SU(1,n)/S(U(1) \times U(n))$ be the complex hyperbolic space and S the solvable part of the Iwasawa decomposition of G. We classify homogeneous Lagrangian submanifolds in M which are obtained by the actions of connected Lie subgroups of S.

15 鈴 木 和 大（名　工　大）　AI 型の対称空間内の平坦でない全測地的曲面の多項式表示の計算方法
　　大 橋 美 佐（名　工　大）　· 15
　　橋 本 英 哉（名 城 大 理 工）

Kazuhiro Suzuki (Nagoya Inst. of Tech.)
Misa Ohashi (Nagoya Inst. of Tech.)
Hideya Hashimoto (Meijo Univ.)

Caluculation methods of polynomial representations of non-flat totally
geodesic surfaces in symmetric spaces of type AI

概要 The famous Hopf fibration $\pi : S^3 \longrightarrow S^2$ over two dimensional sphere S^2 with S^1 fiber is related to the primitive map of the Cartan imbedding of type AI. Taking the composition of this imbedding and non-flat totally geodesic imbedding from S^2 to $SU(n)/SO(n)$ of symmetric space of type AI, we give the explicit representation of this totally geodesic imbedding from S^2 to $SU(n)$.

16 藤 井　　忍（大島商船高専）　4 次 Cartan–Münzner 多項式と Casimir 作用素 · 10

Shinobu Fujii
(Oshima Nat. Coll. of Maritime Tech.)

Quartic Cartan–Münzner polynomials and Casimir operators

概要 We are interested in a relationship between quartic Cartan–Münzner polynomials and Casimir operators of symplectic representations. In this talk, we consider the Cartan–Münzner polynomials obtained from the isotropy representations of irreducible Hermitian symmetric spaces of rank two, of compact type and of classical type.

17 大 野 晋 司（首都大東京理工）　コンパクト対称空間内の二重調和等質部分多様体の構成 · · · · · · · · · · · · 15
　　酒 井 高 司（首都大東京理工）
　　浦 川　　肇（東　北　大⋆）

Shinji Ohno (Tokyo Metro. Univ.)
Takashi Sakai (Tokyo Metro. Univ.)
Hajime Urakawa (Tohoku Univ.⋆)

Construction of biharmonic homogeneous submanifolds in compact symmetric spaces

概要 In this talk, we obtain new examples of biharmonic homogeneous submanifolds in compact symmetric spaces whose codimension is two or greater.

18 田 中 真 紀 子（東京理大理工）　コンパクト Lie 群の極大対蹠部分群 II · 15
　　田 崎 博 之（筑波大数理物質）

Makiko Tanaka (Tokyo Univ. of Sci.)
Hiroyuki Tasaki (Univ. of Tsukuba)

Maximal antipodal subgroups of compact Lie groups II

概要 In the previous MSJ meeting we gave a talk titled "Maximal antipodal subgroups of compact Lie groups" in which we gave the classifications of maximal antipodal subgroups of the quotient groups $U(n)/\mathbb{Z}_\mu$ and $SU(n)/\mathbb{Z}_\mu$. This talk is a sequel to that. We classify maximal antipodal subgroups of $O(n)/\{\pm 1_n\}$, $SO(n)/\{\pm 1_n\}$, $Sp(n)/\{\pm 1_n\}$ and G_2.

16:45～17:45　特別講演

J.-H. Eschenburg（Univ. of Augsburg）♭　Extrinsic symmetric spaces

Jost-Hinrich Eschenburg　　　　Extrinsic symmetric spaces
　　　　　（Univ. of Augsburg）

概 要　Compact submanifolds of euclidean space with parallel second fundamental form have many astonishing properties. All their isometries extend to the ambient space. They are "extrinsic symmetric", that is invariant under reflection along all of their normal spaces. Thus they form an interesting subclass of symmetric spaces which are linked to other symmetric spaces in several ways. E.g. they form certain isotropy orbits of symmetric spaces, real forms of hermitian symmetric spaces, and midpoint components between center elements of symmetric spaces. Moreover, they are symmetric R-spaces: the action of the isometry group can be enlarged to a noncompact transformation group, like the conformal group on the sphere. They contain their noncompact dual space as an open subset, and the dual isometry group becomes a subgroup of this noncompact group. We try to link all these properties.

3月17日(木)　　第Ⅴ会場

9:00～10:45

19　山 本 悠 登（東 大 数 理）　トロピカル極限の周りの幾何学的モノドロミー ···················· 15
Yuto Yamamoto（Univ. of Tokyo）　Geometric monodromy around the tropical limit

概 要　The main subjects of study in tropical geometry are tropical varieties which are defined as polyhedral complexes which have certain kinds of affine structures. One can associate a tropical variety T to a one-parameter family of complex varieties $\{X_q\}_q$ by tropicalization. It is known that the tropical variety T encodes the information of the behavior of $\{X_q\}_q$ in the limit $q \to \infty$. In this talk, we give a concrete description of the monodromy transformation of $\{X_q\}_q$ around $q = \infty$ in terms of the tropical variety T.

20　小 林 和 志（千 葉 大 理）　$\mathbb{T}^2$ 上の正則直線束とその写像錐の構造 ························· 15
Kazushi Kobayashi（Chiba Univ.）　Structure of the mapping cone of a morphism between holomorphic line bundles on $\mathbb{T}^2$

概 要　We construct the mapping cone of a morphism between holomorphic line bundles on $\mathbb{T}^2$ and discuss it's structure geometrically via the homological mirror symmetry.

21　杉 山　　聡（東 大 数 理）　深谷圏のコシュール双対性への応用 ···························· 15
Satoshi Sugiyama（Univ. of Tokyo）　On an application of the Fukaya categories to the Koszul duality

概 要　The Koszul duality is known as a duality between certain finite dimensional algebras, called Koszul algebras, which are isomorphic to quotient algebras of path algebras divided by quadratic ideals. In this talk, we construct the Koszul dual $A^!$ of a Koszul algebra A via Fukaya category of a Riemann surface and prove the bounded derived equivalence of them. Finally, we generalize this construction to higher Koszul algebras and obtain their Koszul duals as A_∞-algebras and prove their bounded derived equivalences.

22　森 田 陽 介（東 大 数 理）　等質空間を局所モデルとするコンパクト多様体が存在するための障害 ·· 15
Yosuke Morita（Univ. of Tokyo）　Obstructions to the existence of compact manifolds locally modelled on homogeneous spaces

概 要　Extending the result of Kobayashi–Ono, we give necessary conditions, which are written in terms of relative Lie algebra cohomology, for the existence of a compact manifold locally modelled on a given homogeneous space. Applications include both reductive and nonreductive cases.

23 早 野 健 太（北　大　理）   アーベル曲面上の正則レフシェッツペンシルのトポロジー ‥‥‥‥‥ 15
    浜 田 法 行（東 大 数 理）
    Kenta Hayano (Hokkaido Univ.)   Topology of holomorphic Lefschetz pencils on abelian surfaces
    Noriyuki Hamada (Univ. of Tokyo)

概 要 In this talk, we will discuss smooth isomorphism classes of holomorphic Lefschetz pencils on 2-dimensional complex tori. Our main result states that the isomorphism class of such a pencil is uniquely determined by its genus and the divisibility of the homology class of its regular fiber. We will also show some applications of this result to problems on topology of Lefschetz pencils.

24 今 城 洋 亮（ Kavli IPMU ）[b] Construction of compact special Lagrangian T^2-conifolds ‥‥‥‥‥‥ 15
    Yohsuke Imagi　(Kavli IPMU)　Construction of compact special Lagrangian T^2-conifolds

概 要 Special Lagrangian submanifolds are volume-minimizing submanifolds of Calabi–Yau manifolds. I have been studying singularity of them. Compact special Lagrangian T^2-conifolds are theoretically well-studied but their existence has been unproven so far as I know. I have recently proved it using an idea of Mark Haskins and Dominic Joyce. I explain it in the talk. I start with an explicit algebro-geoemtric data and use a gluing technique in non-linear analysis, which goes back to Taubes' result in Yang–Mills gauge theory.

11:00～12:00　特別講演

野 沢　　啓（立命館大理工） (G, X)-葉層構造の剛性と特性類について
Hiraku Nozawa (Ritsumeikan Univ.)   On rigidity and characteristic classes of (G, X)-foliations

概 要 We will discuss some rigidity results on foliations with geometric structures. First we make a brief introduction to characteristic classes of foliations, and review some related rigidity results and open problems. The first results of this talk, obtained in a collaboration with Jesús Antonio Álvarez López, are Bott–Thurston–Heitsch type formulas to compute the Godbillon–Vey classes of certain foliated sphere bundles, and a rigidity result on transversely conformally flat foliations on the unit tangent sphere bundles of hyperbolic manifolds. The second results, obtained in a collaboration with Gaël Meigniez, is that Riemannian foliations whose leaves are isometric to a locally symmetric space is diffeomorphic to some standard foliations on double coset spaces of Lie groups.

3月18日（金）　　第Ⅴ会場

9:30～11:50

25 土 屋 拓 也（早 大 理 工）   一般相対論における三体問題に対する三角解の線形安定性 ‥‥‥‥‥ 15
    山 田 慧 生（京　大　理）
    浅 田 秀 樹（弘 前 大 理 工）
    Takuya Tsuchiya (Waseda Univ.)   Linear stability of the triangular solution for the three problems in gen-
    Kei Yamada　　(Kyoto Univ.)   eral relativity
    Hideki Asada　(Hirosaki Univ.)

概 要 In this talk, the three problems in general relativity are considered. The three problems are well known that the general solution does not exists. Whereas the collinear solution and the triangular solution exist. We examine the post-Newtonian effects to the linear stability of the triangular solution in two dimensional space using the Einstein–Infeld–Hoffmann equation which is the motion of equation included the general relativistic effects. Furthermore, we will discuss the stability of the triangular solution in three dimensional space.

26 ホロホリンステファンアンドリュー   On the Stokes matrices of the tt^*-Toda equations $\cdots\cdots\cdots\cdots\cdots\cdots$ 15
         （首都大東京理工）
    Stefan Andrew Horocholyn   On the Stokes matrices of the tt^*-Toda equations
         (Tokyo Metro. Univ.)

概 要 We derive a formula for the signature of the symmetrized Stokes matrix $\mathcal{S} + \mathcal{S}^T$ for the tt^*-Toda equations. As a corollary, we verify a conjecture of Cecotti and Vafa regarding when $\mathcal{S} + \mathcal{S}^T$ is positive definite, reminiscent of a formula of Beukers and Heckmann for the generalized hypergeometric equation. The condition $\mathcal{S} + \mathcal{S}^T > 0$ is prominent in the work of Cecotti and Vafa on the tt^* equation; we show that the Stokes matrices $\mathcal{S}$ satisfying this condition are parameterized by a convex polytope.

27 加葉田雄太朗（北　大　理）   平面から平面への写像芽の認識問題とその射影微分幾何学への応用 $\cdots$ 10
    Yutaro Kabata (Hokkaido Univ.)   Recognition problem of plane-to-plane map-germs and its application
                                     to projective differential geometry

概 要 We show useful criteria to determine the types of given plane-to-plane map-germs, which gives a new insight to the classification result given by J. H. Rieger from the viewpoint of recognition problem. We also show the application of our criteria to generic projective differential geometry.

28 矢 野 充 志（北　大　理）   多未知関数の二階偏微分方程式系の微分式系による特徴付けについて $\cdot\cdot$ 10
    Atsushi Yano (Hokkaido Univ.)   On the characterization of second order partial differential equations of
                                     several unknown functions

概 要 Differential systems may be regarded as systems of first order differential equations according to Realization Lemma. We characterize the geometric structure of systems of second order partial differential equations of several unknown functions in terms of differential systems.

29 石 川 剛 郎（北　大　理）   アフィン接続と空間曲線の接線曲面の特異点 $\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 15
    山 下 達 也（北　大　理）
    Goo Ishikawa (Hokkaido Univ.)   Affine connections and singularities of tangent surfaces to space curves
    Tatsuya Yamashita (Hokkaido Univ.)

概 要 We give the complete solution to the local diffeomorphism classification problem of generic singularities which appear in tangent surfaces, in as wider situations as possible. We interpret geodesics as lines whenever a (semi-)Riemannian metric, or, more generally, an affine connection is given in an ambient space of arbitrary dimension. Then, given an immersed curve, or, more generally a directed curve which has well-defined tangent directions along the curve, we define the tangent surface by the ruled surface by tangent geodesics to the curve. We give the generic classification of singularities of tangent surfaces and provide the characterizations of singularities.

30 渡 邊 一 義（東 北 大 理）[b]   Zero-points of closed 1-form on topological spaces $\cdots\cdots\cdots\cdots\cdots\cdots$ 10
    Kazuyoshi Watanabe (Tohoku Univ.)   Zero-points of closed 1-form on topological spaces

概 要 A new Lusternik–Schnirelmann type theory for closed 1-forms on smooth manifolds is introduced by M. Farber. This theory aims at finding relations between topology of the zero set of a closed 1-form and homotopical information, based on the cohomology class of the form. And more, it is related to a dynamics of closed 1-form, a homoclinic cycle. A continuous closed 1-form on topological spaces is defined in this theory. I will talk the definition of zero-point of continuous closed 1-form and show that the Lusternik–Schnirelmann type theory is constructed for CW-complexes used by continuous closed 1-form.

31 雪 田 友 成（早 大 教 育） 非コンパクト 3 次元双曲コクセター多面体の増大度について ·········· 15
　　Tomoshige Yukita (Waseda Univ.)   On the growth rate of cofinite Coxeter groups in hyperbolic 3-space

概 要 Certain classes of real algebraic integers show up in the study of the growth rates of hyperbolic Coxeter groups. We study the arithmetic property of growth rates of cofinite Coxeter groups in hyperbolic 3-space and prove that their growth rates are always Perron numbers.

32 松 田 能 文（青 学 大 理 工） トンプソン群 T の一様単純性 ·································· 15
　　Yoshifumi Matsuda   Uniform simplicity of Thompson's group T
　　　　　（Aoyama Gakuin Univ.)

概 要 We show uniform simplicity of Thompson's group T. As a corollary, it follows that Thompson's group T does not admit any unbounded conjugation-invariant norms and any unbounded real-valued quasimorphisms.

33 近 藤 剛 史（鹿 児 島 大 理） ヒルベルト空間へのアフィン作用に対する固定点性質 ··············· 15
　　納 谷 　 信（名大多元数理）
　　井 関 裕 靖（慶 大 理 工）
　　Takefumi Kondo (Kagoshima Univ.)   Fixed point property for affine actions on a Hilbert space
　　Shin Nayatani (Nagoya Univ.)
　　Hiroyasu Izeki   (Keio Univ.)

概 要 We report that any affine action of a random group in the Gromov graph model on a Hilbert space, satisfying a certain mild-growth condition, has a fixed point.

14:15〜16:00

34 高 橋 良 輔（名大多元数理） ケーラー・リッチソリトンの漸近的安定性 ························· 10
　　Ryosuke Takahashi (Nagoya Univ.)   Asymptotic stability for Kähler–Ricci solitons

概 要 Kähler–Ricci solitons arise from the geometric analysis, such as Hamilton's Ricci flow, and have been studied extensively in recent years. It is expected that the existence of canonical metrics is closely related to some GIT stability of manifolds. For instance, Donaldson showed that any cscK polarized manifold with discrete automorphisms admits a sequence of balanced metrics and this sequence converges to the cscK metric. In this talk, we explain that a similar result holds for Kähler–Ricci solitons. This generalizes a previous work of Berman–Witt Nyström, and is an analogous result on asymptotic relative Chow stability for extremal metrics obtained by Mabuchi.

35 高 橋 良 輔（名大多元数理） Fano 多様体上に anti-canonically balanced 計量が存在するための障害
　　斎 藤 俊 輔（東 大 数 理） ··· 10
　　Ryosuke Takahashi (Nagoya Univ.)   An obstruction to the existence of anti-canonically balanced metrics on
　　Shunsuke Saito (Univ. of Tokyo)   Fano manifolds

概 要 Anti-canonically balanced metrics are approximations to Kähler–Einstein metrics obtained by means of holomorphic sections of high powers of the anti-canonical line bundle. In this talk, we use the jumping of complex struxtures to produce a new obstruction to the existence of anti-canonically balanced metrics on Fano manifolds. We also discuss some relation to asymptotic Chow stability.

36 十 鳥 健 太（東 北 大 理）   Calabi's conjecture of the Kähler–Ricci soliton type ················· 15
    Kenta Tottori（Tohoku Univ.）   Calabi's conjecture of the Kähler–Ricci soliton type

概 要 In this talk, we discuss Calabi's equation of the Kähler–Ricci soliton type on a compact Kähler manifold. This equation was introduced by Zhu as a generalization of Calabi's conjecture. We give necessary and sufficient conditions for the unique existence of a solution for this equation on a compact Kähler manifold with a holomorphic vector field which has a zero point. We also consider the case of a nowhere vanishing holomorphic vector field, and give sufficient conditions for the unique existence of a solution for this equation.

37 川 村 昌 也（首都大東京理工） C^α-convergence of the Chern–Ricci flow on elliptic surfaces ·········· 15
    Masaya Kawamura C^α-convergence of the Chern–Ricci flow on elliptic surfaces
            （Tokyo Metro. Univ.）

概 要 We will study the Chern–Ricci flow on minimal non-Kähler properly elliptic surfaces. These surfaces are compact complex surfaces whose first Betti number is odd, Kodaira dimension is equal to 1, admitting an elliptic fibration $\pi : M \to S$ to a smooth compact curve S and no (-1)-curve in any fibers of π. We will show that a solution of the Chern–Ricci flow is uniformly bounded in the C^1-topology and converges in the C^α-topology on these elliptic surfaces by choosing a special initial metric.

38 山 本   光（東 大 数 理）   勾配縮小リッチソリトン内に拡張された意味での自己相似解の性質につ
                                いて ··· 10
    Hikaru Yamamoto（Univ. of Tokyo）   On self-similar solutions in gradient shrinking Ricci solitons

概 要 There are many results about self-similar solutions in a Euclidean space. In this talk, I introduce the notion of self-similar solutions in a gradient shrinking Ricci soliton, and I talk about some properties of these, which are some kind of generalizations of results of Futaki-Li-Li and Cao-Li established for self-similar solutions in a Euclidean space.

39 小 池 直 之（東 京 理 大 理）   平均曲率流に沿う curvature-adapted 性の保存性について ············ 15
    Naoyuki Koike（Tokyo Univ. of Sci.）   On the preservability of the curvature-adaptedness along the mean cur-
                                        vature flow

概 要 In this talk, we state some results related to the preservability of the curvature-adaptedness along the mean curvature flow starting from a compact curvature-adapted hypersurface in irreducible locally symmetric spaces, where the curvature-adaptedness means that the shape operator and the normal Jacobi operator of the hypersurface commute.

40 利 根 川 吉 廣（東 工 大 理 工）   Mean curvature flow of grain boundaries ························· 10
    Lami Kim   （東 工 大 理 工）
    Yoshihiro Tonegawa（Tokyo Tech）   Mean curvature flow of grain boundaries
    Lami Kim   （Tokyo Tech）

概 要 Suppose that $\Gamma_0 \subset \mathbb{R}^{n+1}$ is a closed countably n-rectifiable set whose complement $\mathbb{R}^{n+1} \setminus \Gamma_0$ consists of more than one connected component. Assume that the n-dimensional Hausdorff measure of Γ_0 is finite or grows at most exponentially near infinity. Under these assumptions, we prove a global-in-time existence of mean curvature flow in the sense of Brakke starting from Γ_0. There exists a finite family of open sets which move continuously with respect to the Lebesgue measure, and whose boundaries coincide with the space-time support of the mean curvature flow.

16:15〜17:15　特別講演

E. Fried　　　　　　　　　　Variational problems for soap films spanning flexible loops
　　　　（沖縄科学技術大学院大）

Eliot Fried　　　　　　　　Variational problems for soap films spanning flexible loops
(Okinawa Inst. of Sci. and Tech. Grad. Univ.)

概 要　We discuss recent results concerning the onset of instability for flat circular solutions to the equilibrium equations for a system in which a soap film spans a flexible loop. Adopting a variational approach, we base our analysis on an energy functional which is the sum of a term proportional to the mapping area of the surface representing the soap film and the shape energy of an elastic rod that models the bounding loop. We also discuss a possible strategy for obtaining nontrivial equilibrium configurations by studying a simple and yet physically motivated model for the dissipative evolution of the system, in which internal friction produces a viscoelastic behavior.

3月19日（土）　　第Ⅴ会場

9:00〜10:45

41　蛭 子 井 博 孝　　　　　　2 円 (2 楕円) にまたがる 4 点共線定理 · 15
　　　　（Oval Research Center）

Hirotaka Ebisui (Oval Research Center)　4 points collinear theorem among two given circles (Ellipses)

概 要　In mathematics history,a lot of Collinear Theorem have apeared.For Example,Papus Therem ,Pascal Theorem, Desargues Theorem,Simson Theorem apear in big year interval. Some of them are some kind of Projective Geometry Theorem,and,these are Basic on Geometry.This time ,We found another kind of Collinear Theorem.This theorem consist of Two circles(2 Ellipses) and 9 lines,and Among them 4points Collinear line apear. We show this theorem composition by Figure 1,2. This figure is very simple,so,we can see Importancy in geometry on it. Anyway, we report New THeorem,here.

42　佐 藤 健 治（玉 川 大 工）　高次元ユークリッド空間における傍接単体・内接単体の定義と Bevan 点
　　　　　　　　　　　　　　　　定理の拡張 · 15

Kenzi Satô　(Tamagawa Univ.)　A definition of escribed and inscribed simplices of higher dimensional Euclidean spaces and an expansion of Bevan point theorem

概 要　Escribed and inscribed triangles for a triangle on the plane is generalized to a simplex on the n-dimensional Euclidean space with $n \geqq 3$. As an application, we can get Bevan point theorem for a simplex on the n-dimensional Euclidean space.

43　伊 藤 光 弘（筑波大数理物質）　確率測度空間の Fisher 情報計量と距離関数 · 10
　　　佐 藤 弘 康（日 本 工 大 工）

Mitsuhiro Itoh (Univ. of Tsukuba)　Fisher information metric on the space of probability measures and
Hiroyasu Satoh (Nippon Inst. of Tech.)　distance function

概 要　Let $\mathcal{P}^+(M)$ be the space of probability measures on a compact, connected smooth manifold M. We report that the distance between two probability measures of $\mathcal{P}^+(M)$ with respect to Fisher metric is exactly the arc-length function of the uniquely defined geodesic segment between them. This result is verified by the aid of three propositions, familiar in a finite dimensional Riemannian geometry; Gauss lemma, Existence theorem of totally normal neighborhood and theorem of characterization of curve minimizing length.

44 伊 藤 光 弘（筑波大数理物質）   Fisher 情報計量の測地線と一般化平均 ···························· 10
    佐 藤 弘 康（日 本 工 大 工）
    Mitsuhiro Itoh (Univ. of Tsukuba)   Generalized mean of probability measures and geodesics for Fisher in-
    Hiroyasu Satoh (Nippon Inst. of Tech.)   formation metric

概 要 The space of all probability measures having positive density function on a compact connected C^∞-manifold M, denoted by $\mathcal{P}^+(M)$, carries the Fisher information metric G. In this talk we consider generalized means, called the α-power mean, of two probability measures and give characterizations of geodesics for G by the normalized geometric mean (0-power mean). Moreover, we also mention the α-geodesics of dualistic structure $(\nabla^{(\alpha)}, \nabla^{(-\alpha)})$ on $(\mathcal{P}^+(M), G)$.

45 小 澤 龍 ノ 介（京　大　理）   空間列の集中と Talagrand 不等式の安定性 ······················· 15
    Ryunosuke Ozawa (Kyoto Univ.)   Stability of Talagrand's inequality under the concentration topology

概 要 Gromov introduced the observable distance between two metric measure spaces. The topology generated by the observable distance function admits a convergence sequence of Riemannian manifolds of unbounded dimension. We talk about the stability of Talagrand's inequality under the topology generated by the observable distance function.

46 印 南 信 宏（新 潟 大 理）   Finsler 回転面上の測地線の大域挙動 ···························· 10
    Nobuhiro Innami (Niigata Univ.)   Geodesics in a Finsler surface of revolution

概 要 We show the global behavior of geodesics in a Finsler surface of revolution. In particular, we generalize Clairaut's theorem for geodesics in a Riemannian torus of revolution.

47 近 藤　　慶（山 口 大 理）   微分異種球面定理 ·· 15
    田 中　　實（東 海 大 理）
    Kei Kondo   (Yamaguchi Univ.)   Differentiable exotic sphere theorem
    Minoru Tanaka   (Tokai Univ.)

概 要 We prove a differentiable sphere theorem for a pair of topological spheres, even for that of exotic ones. Furthermore, we prove that for each exotic sphere Σ^n of dimension $n > 4$, there exists a bi-Lipschitz homeomorphism between the n-dimensional unit standard sphere and Σ^n which is a diffeomorphism except for a single point.

11:00〜12:00　特別講演

高 津 飛 鳥（首都大東京理工）[♭]   Wasserstein/Information geometry and its applications
Asuka Takatsu (Tokyo Metro. Univ.)   Wasserstein/Information geometry and its applications

概 要 Both Wasserstein geometry and the information geometry are geometry on the space of probability measures. On the one hand the Wasserstein geometry is a metric geometry, where the metric heritages the nature of the underlying space; on the other hand, in the Information geometry, we regard the space of probability measures as a Riemannian manifold, where the Riemannian metric with a pair of connection play central roles. Although these two geometries are completely different from each other, they are related to each other.

By the combined use of two geometry, we develop the theory of Wasserstein geometry, Information geometry. We moreover apply both geometry to the analysis of some evolution equations.
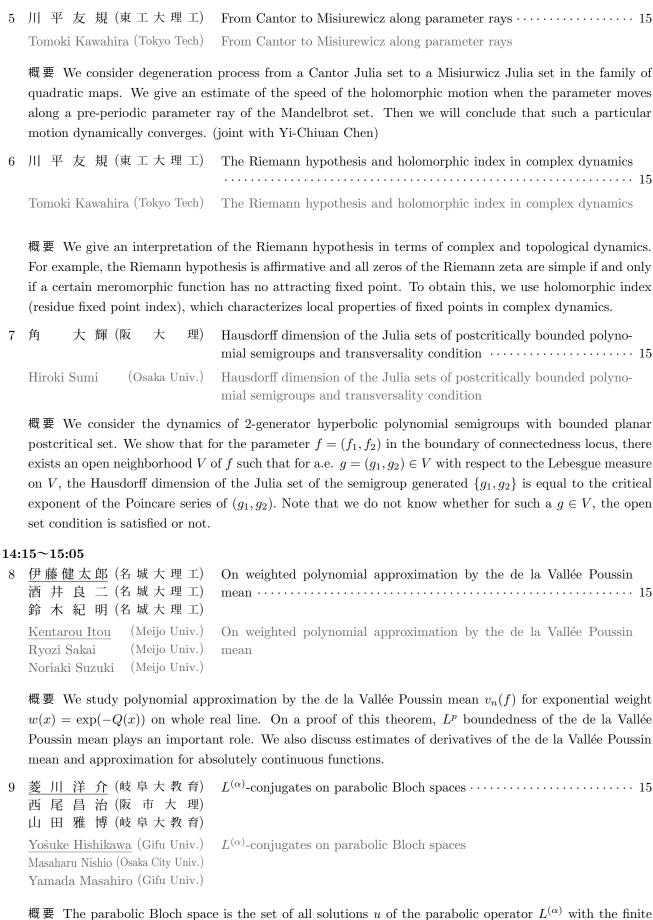
函 数 論

3月16日（水） 第Ⅷ会場

9:45～11:45

1 大 野 林 太 郎（東 北 大 情 報） On a Fekete–Szegö-type problem of concave functions ·············· 15
 須 川 敏 幸（東 北 大 情 報）

Rintaro Ohno （Tohoku Univ.） On a Fekete–Szegö-type problem of concave functions
Toshiyuki Sugawa （Tohoku Univ.）

概要 In the present talk we discuss coefficients of bounded holomorphic functions with a fixed point inside the unit disk as well as a maximum value problem for a quadratic polynomial. As an application, we are going to apply the results for the Fekete–Szegö-type problem of concave functions with simple pole at some $p \in (0,1)$.

2 大 野 林 太 郎（東 北 大 情 報）[♭] On the second Hankel determinant of concave functions ············· 10
 須 川 敏 幸（東 北 大 情 報）

Rintaro Ohno （Tohoku Univ.） On the second Hankel determinant of concave functions
Toshiyuki Sugawa （Tohoku Univ.）

概要 First, we will characterize the coefficient body of order 2 for the class of analytic functions $\varphi(z)$ on $|z| < 1$ with $|\varphi| < 1$ and $\varphi(p) = p$ where $p \in (0,1)$. Using the obtained results, we will consider the Hankel determinants $H(f) = a_2 a_4 - a_3^2$ of order 2 for normalized concave functions $f(z) = z + \sum_{n=2}^{\infty} a_n z^n$ with a pole at p.

3 天 野 政 紀（東 工 大 理 工） 漸近的 Jenkins–Strebel 測地線を伴うタイヒミュラー空間の大域パラメータについて ·· 15

Masanori Amano （Tokyo Tech） A global coordinate of the Teichmüller space related to asymptotic Jenkins–Strebel rays

概要 In this talk, we give a parametrization of asymptotic Jenkins–Strebel rays. It is a kind of global coordinates of the Teichmüller space. For any admissible curve family of a surface, the subset of the boundary of the Teichmüller space which is constructed by pinching of the given curve family can be determined. There exists a homeomorphism of the product of the boundary space and several parameter spaces onto the Teichmüller space such that each family of asymptotic Jenkins–Strebel rays is represented when varies only the parameters.

4 木 坂 正 史（京大人間環境） Julia sets appear quasi-conformally in the Mandelbrot set ··········· 15
 川 平 友 規（東 工 大 理 工）

Masashi Kisaka （Kyoto Univ.） Julia sets appear quasi-conformally in the Mandelbrot set
Tomoki Kawahira （Tokyo Tech）

概要 If we zoom in a certain part of the Mandelbrot set, we can see a figure J' which is very similar to a certain Julia set. Furthermore, as we zoom in the middle part of J', we can see a certain nested structure which is similar to the iterated preimages of J' by z^2 and finally a small Mandelbrot set M' appears. We explain how to formulate this phenomena and show that this actually occurs. Also we show that this kind of nested structure exists in J_c for $c \in M'$.

5　川 平 友 規 (東 工 大 理 工)　From Cantor to Misiurewicz along parameter rays ·················· 15
　　Tomoki Kawahira (Tokyo Tech)　From Cantor to Misiurewicz along parameter rays

概要 We consider degeneration process from a Cantor Julia set to a Misiurwicz Julia set in the family of quadratic maps. We give an estimate of the speed of the holomorphic motion when the parameter moves along a pre-periodic parameter ray of the Mandelbrot set. Then we will conclude that such a particular motion dynamically converges. (joint with Yi-Chiuan Chen)

6　川 平 友 規 (東 工 大 理 工)　The Riemann hypothesis and holomorphic index in complex dynamics
　　　　　　　　　　　　　　　·· 15

　　Tomoki Kawahira (Tokyo Tech)　The Riemann hypothesis and holomorphic index in complex dynamics

概要 We give an interpretation of the Riemann hypothesis in terms of complex and topological dynamics. For example, the Riemann hypothesis is affirmative and all zeros of the Riemann zeta are simple if and only if a certain meromorphic function has no attracting fixed point. To obtain this, we use holomorphic index (residue fixed point index), which characterizes local properties of fixed points in complex dynamics.

7　角　　大 輝 (阪　　大　　理)　Hausdorff dimension of the Julia sets of postcritically bounded polyno-
　　　　　　　　　　　　　　　mial semigroups and transversality condition ····················· 15

　　Hiroki Sumi　　(Osaka Univ.)　Hausdorff dimension of the Julia sets of postcritically bounded polyno-
　　　　　　　　　　　　　　　mial semigroups and transversality condition

概要 We consider the dynamics of 2-generator hyperbolic polynomial semigroups with bounded planar postcritical set. We show that for the parameter $f = (f_1, f_2)$ in the boundary of connectedness locus, there exists an open neighborhood V of f such that for a.e. $g = (g_1, g_2) \in V$ with respect to the Lebesgue measure on V, the Hausdorff dimension of the Julia set of the semigroup generated $\{g_1, g_2\}$ is equal to the critical exponent of the Poincare series of (g_1, g_2). Note that we do not know whether for such a $g \in V$, the open set condition is satisfied or not.

14:15〜15:05

8　伊 藤 健太郎 (名 城 大 理 工)　On weighted polynomial approximation by the de la Vallée Poussin
　　酒 井 良 二 (名 城 大 理 工)　mean ·· 15
　　鈴 木 紀 明 (名 城 大 理 工)

　　Kentarou Itou　(Meiji Univ.)　On weighted polynomial approximation by the de la Vallée Poussin
　　Ryozi Sakai　(Meiji Univ.)　mean
　　Noriaki Suzuki　(Meiji Univ.)

概要 We study polynomial approximation by the de la Vallée Poussin mean $v_n(f)$ for exponential weight $w(x) = \exp(-Q(x))$ on whole real line. On a proof of this theorem, L^p boundedness of the de la Vallée Poussin mean plays an important role. We also discuss estimates of derivatives of the de la Vallée Poussin mean and approximation for absolutely continuous functions.

9　菱 川 洋 介 (岐 阜 大 教 育)　$L^{(\alpha)}$-conjugates on parabolic Bloch spaces ························· 15
　　西 尾 昌 治 (阪 市 大 理)
　　山 田 雅 博 (岐 阜 大 教 育)

　　Yoŝuke Hishikawa (Gifu Univ.)　$L^{(\alpha)}$-conjugates on parabolic Bloch spaces
　　Masaharu Nishio (Osaka City Univ.)
　　Yamada Masahiro (Gifu Univ.)

概要 The parabolic Bloch space is the set of all solutions u of the parabolic operator $L^{(\alpha)}$ with the finite Bloch norm $\|u\|_{\mathcal{B}_\alpha(\sigma)}$. In this talk, we introduce a notion of $L^{(\alpha)}$-conjugates, and investigate several properties of $L^{(\alpha)}$-conjugates on parabolic Bloch spaces.

10 田 中 清 喜（阪市大数学研）   外部領域上の重調和 Bergman 核について · 15
    Kiyoki Tanaka（Osaka City Univ.）   Biharmonic Bergman kernel of an external domain

概 要 We consider the weighted biharmonic Bergman space on an external domain. The weighted biharmonic
Bergman space has the reproducing kernel, which is called the weighted biharmonic Bergman kernel. In this
talk, we introduce the form of the weighted biharmonic Bergman kernel of an external domain.

15:25〜16:25   特別講演

イェーリッシュヨハネス   Hausdorff dimension of the Julia sets of non-hyperbolic polynomial semi-
      （島根大総合理工）   groups and the method of inducing

Johannes Jaerisch（Shimane Univ.）   Hausdorff dimension of the Julia sets of non-hyperbolic polynomial semi-
                                groups and the method of inducing

概 要 There is a rich interplay between the geometric and dynamical properties of Julia sets of semigroups of
holomorphic maps on the Riemann sphere $\hat{\mathbb{C}}$. In the 1970s, R. Bowen characterised the Hausdorff dimension
of the limit sets of certain Fuchsian groups in terms of the dynamical notion of topological pressure. This
formula, which is referred to as Bowen's formula, has been generalized to Julia sets of rational maps on $\hat{\mathbb{C}}$
by D. Sullivan, and it is still an active area of research.

After a brief introduction of the necessary preliminaries on Bowen's formula, we will formulate a new version
of Bowen's formula for the Hausdorff dimension of the Julia sets of certain non-hyperbolic postcritically
bounded polynomial semigroups satisfying the open set condition. The key to investigate these semigroups
is to develop a fractal theory for an associated infinitely generated hyperbolic subsemigroup and to use the
method of inducing. By using this method we have a strong tool to analyze the geometric and dynamical
properties of various non-hyperbolic semigroups of holomorphic maps on the Riemann sphere. We will
discuss the underlying ideas and concepts from ergodic theory and complex analysis. This is a joint work
with H. Sumi.

16:45〜17:45   特別講演

松 本 佳 彦（東 工 大 理 工）   有界強擬凸領域における完備アインシュタイン計量の変形
Yoshihiko Matsumoto（Tokyo Tech）   Deformations of complete Einstein metrics on strictly pseudoconvex do-
                                mains

概 要 We discuss a certain construction of new complete Einstein metrics on a smoothly bounded strictly
pseudoconvex domain Ω of a Stein manifold. S. Y. Cheng and S. T. Yau showed in 1980 that one obtains a
complete Kähler–Einstein metric on Ω with negative scalar curvature by solving the complex Monge–Ampère
equation. The approach that we take here is to deform this Cheng–Yau metric by an application of the
inverse mapping theorem, which generalizes the work of O. Biquard on the deformations of $\mathbb{C}H^n$ (and the
corresponding work of R. Graham and J. Lee for the real case). Recasting the problem into the question
of vanishing of an L^2-cohomology and taking advantage of the "asymptotic complex hyperbolicity" of the
Cheng–Yau metric at the boundary, we establish the possibility of such a deformation when the dimension
of Ω is at least 3. I intend to make this talk so organized that it also works as an introduction to geometric
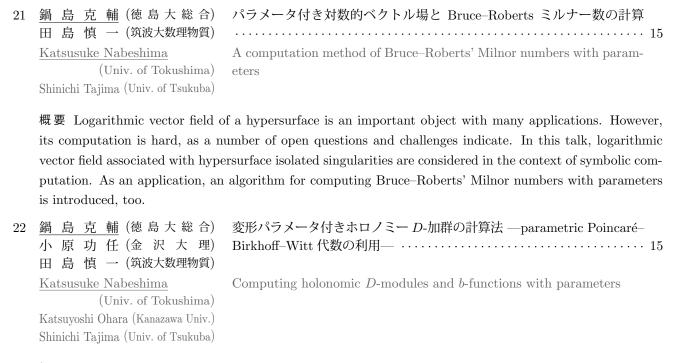analysis on asymptotically complex hyperbolic manifolds.

3月17日(木)　　第Ⅷ会場

9:45〜11:50

11　木 村 光 一　　　　　　　Homogeneous pseudoconvex Reinhardt domains in $\mathbf{C}^3$ ·············· 15

　　Kouichi Kimura　　　　　Homogeneous pseudoconvex Reinhardt domains in $\mathbf{C}^3$

概要　A homogeneous Reinhardt domain in $\mathbf{C}^*$ coinsides with $\mathbf{C}^*$. Generalizing this fact, we showed that a homogeneous pseudoconvex Reinhardt domain in $(\mathbf{C}^*)^n$ coinsides with $(\mathbf{C}^*)^n$. Conversely, we investigate pseudoconvex Reinhardt domains containing the origin in $\mathbf{C}^3$ this time, and we decide Liouville foliations which can be defined on them. From this, when the preceeding domains are homogeneous, we classify these domains by means of algebraic equivalence and determine thier canonical forms.

12　山 盛 厚 伺 (名大多元数理)　Yet another proof of Poincaré's theorem on the inequivalence of the unit ball and the polydisk ··· 10

　　Atsushi Yamamori (Nagoya Univ.)　Yet another proof of Poincaré's theorem on the inequivalence of the unit ball and the polydisk

概要　This talk gives a concise proof of a classical Poincaré's theorem which asserts that the unit ball $\mathbb{B}^n$ and the polydisk $\mathbb{D}^n$ are not biholomorphic equivalent for any $n > 1$.

13　本 田 竜 広 (広 島 工 大 工)　Radius of univalence and related problems in complex Hilbert spaces
　　I. Graham　　(Univ. of Toronto)　··· 15
　　濱 田 英 隆 (九 州 産 大 工)
　　G. Kohr　　(Babeş-Bolyai Univ.)
　　Kwang Ho Shon (Pusan Nat. Univ.)

　　Tatsuhiro Honda　　　　　Radius of univalence and related problems in complex Hilbert spaces
　　　　(Hiroshima Inst. of Tech.)
　　Ian Graham (Univ. of Toronto)
　　Hidetaka Hamada
　　　　(Kyushu Sangyo Univ.)
　　Gabriela Kohr (Babeş-Bolyai Univ.)
　　Kwang Ho Shon (Pusan Nat. Univ.)

概要　There are various results related to radius of univalence, parametric representation, starlikeness or convexity for holomorphic mappings on the Euclidean unit ball in $\mathbb{C}^n$. In this talk, we are concerned with certain radius problems for holomorphic mappings on the unit ball in a complex Hilbert space.

14　F. Bracci　　　　　　　Variation of Loewner chains, extreme and support points in the class
　　(Univ. di Roma"Tor Vergata")　S^0 in several complex variables ······························· 15
　　I. Graham　　(Univ. of Toronto)
　　濱 田 英 隆 (九 州 産 大 工)
　　G. Kohr　　(Babeş-Bolyai Univ.)

　　Filippo Bracci　　　　　Variation of Loewner chains, extreme and support points in the class
　　(Univ. di Roma"Tor Vergata")　S^0 in several complex variables
　　Ian Graham (Univ. of Toronto)
　　Hidetaka Hamada
　　　　(Kyushu Sangyo Univ.)
　　Gabriela Kohr (Babeş-Bolyai Univ.)

概要　In this talk, we introduce a family of normalized Loewner chains in $\mathbb{B}^n$, which we call "geräumig"—spacious—which allow to construct, by means of suitable variations, other normalized Loewner chains which coincide with the given ones from a certain time on. We apply our construction to the study of support points, extreme points in the class S^0 of mappings admitting parametric representation.

15 阿 部 幸 隆 (富 山 大 理 工)   トロイダル群上の等質直線束の断面のコホモロジー群 ·············· 15

Yukitaka Abe (Univ. of Toyama)   Cohomology groups of sections of homogeneous line bundles over a toroidal group

概要 We completely determine cohomology groups of sections of homogeneous line bundles over a toroidal group.

16 厚 地   淳 (慶 大 経 済)   Nevanlinna type theorems for meromorphic functions on negatively curved Kähler manifolds ··· 10

Atsushi Atsuji   (Keio Univ.)   Nevanlinna type theorems for meromorphic functions on negatively curved Kähler manifolds

概要 We give a second main theorem of Nevanlinna theory on complete negatively curved Kähler manifolds. It's remainder term depends only on Ricci curvature of the manifolds.

17 足 立 真 訓 (東京理大理工)   複素射影平面内の Levi 平坦面の曲率評価 ························· 15
    J. Brinkschulte (Univ. Leipzig)

Masanori Adachi (Tokyo Univ. of Sci.)   Curvature restrictions for Levi-flat real hypersrufaces in complex projective planes
Judith Brinkschulte (Univ. Leipzig)

概要 We study curvature restrictions of Levi-flat real hypersurfaces in complex projective planes, whose existence is in question. We focus on its totally real Ricci curvature, the Ricci curvature of the real hypersurface in the direction of the Reeb vector field, and show that it cannot be greater than -4 along a Levi-flat real hypersurface. We rely on a finiteness theorem for the space of square integrable holomorphic 2-forms on the complement of the Levi-flat real hypersurface, where the curvature plays the role of the size of the infinitesimal holonomy of its Levi foliation.

18 大 沢 健 夫 (名大多元数理)[♭]   An optimal L^2 extension theorem on $\mathbb{C}^n$ ························· 10
    Takeo Ohsawa (Nagoya Univ.)   An optimal L^2 extension theorem on $\mathbb{C}^n$

概要 In view of the proofs of optimal L^2 extension theorems due to Błocki and Guan–Zhou, I could find a straightforward proof of their optimal L^2 extension theorem (to appear in Nagoya Math. J.). Applying this method, an optimal L^2 extension theorem will be shown on $\mathbb{C}^n$.

13:15〜14:20

19 田 島 愼 一 (筑波大数理物質)[♭]   Limiting tangent spaces と local cohomology ····················· 15
    鍋 島 克 輔 (徳 島 大 総 合)
Shinichi Tajima (Univ. of Tsukuba)   Limiting tangent spaces and local cohomology
Katsusuke Nabeshima
        (Univ. of Tokushima)

概要 Limiting tangent spaces associated with hypersurface isolated singularities are considered. A new effective method for computing limiting tangent spaces is described. The key is the use of the concept of parametric local cohomology system.

20 泊   昌 孝 (日 大 文 理)[♭]   有理曲線を中心曲線とする 2 次元次数付き特異点の極大イデアルサイク
    都 丸   正 (群 馬 大 医)   ルについて ··· 15
Masataka Tomari (Nihon Univ.)   On maximal ideal cycle of normal two-dimensional graded singularity
Tadashi Tomaru (Gunma Univ.)   whose centeral curve is a nonsingular rational curve

概要 We study the maximal ideal cycle and the fundamental cycle for normal two-dimensional singularities with star-shaped resolution where the central curve is a nonsingular rational curve. Our interest is the identification of these, when the cordinated ring of singularity do not have a homogeneous reduced element in the minimal degree.

21　<u>鍋 島 克 輔</u>（徳 島 大 総 合）　パラメータ付き対数的ベクトル場と Bruce–Roberts ミルナー数の計算
　　田 島 慎 一（筑波大数理物質）　·· 15

Katsusuke Nabeshima
　　　　　　（Univ. of Tokushima）
Shinichi Tajima (Univ. of Tsukuba)

A computation method of Bruce–Roberts' Milnor numbers with parameters

概 要　Logarithmic vector field of a hypersurface is an important object with many applications. However, its computation is hard, as a number of open questions and challenges indicate. In this talk, logarithmic vector field associated with hypersurface isolated singularities are considered in the context of symbolic computation. As an application, an algorithm for computing Bruce–Roberts' Milnor numbers with parameters is introduced, too.

22　<u>鍋 島 克 輔</u>（徳 島 大 総 合）　変形パラメータ付きホロノミー D-加群の計算法 —parametric Poincaré–
　　小 原 功 任（金 沢 大 理）　Birkhoff–Witt 代数の利用— ····································· 15
　　田 島 慎 一（筑波大数理物質）

Katsusuke Nabeshima
　　　　　　（Univ. of Tokushima）
Katsuyoshi Ohara (Kanazawa Univ.)
Shinichi Tajima (Univ. of Tsukuba)

Computing holonomic D-modules and b-functions with parameters

概 要　Let f be a polynomial with n variables. In this talk an annihilater ideal $Ann(f^s)$ is considered in $D_X[s]$. A computation method of $Ann(f^s)$ is introduced by using Poincaré–Birkhoff–Witt algebra. As an application, an algorithm for computing b-fucntions with parameters, is given, too.

函 数 方 程 式 論

3月16日(水)　　第Ⅲ会場

9:30～12:00

1　松 田 克 己　　　　　等質量平面 3 体問題の 8 の字厳密解について ·· 12
　　（東海大清水教養教育センター）

　　Katsumi Matsuda (Tokai Univ.)　　On the exact figure eight solution of the eqal-mass planar 3-body problem

概 要　I describe a new constructon method of planar choreographic three bodies, whose center of mass is the original point and whose angular momentum is constantly zero. Moreover, I explain a trial toward the exact figure eight solution of the equal-mass planar 3-body problem.

2　山 城 拓 也 (熊 本 大 自 然)♭　3 つのカスプを持つ既約 4 次曲線を特異点集合に持つホロノミック系 ·· 12
　　原 岡 喜 重 (熊 本 大 理)

　　Takuya Yamashiro (Kumamoto Univ.)　　Holonomic system singular along quartic curve with three cusps
　　Yoshishige Haraoka (Kumamoto Univ.)

概 要　We consider the problem to construct the regular holonomic system singular along a prescribed curve. As a curve, we choose a irreducible quartic curve with three cusps. We classified the irreducible representations of the fundamental group of the complement of the curve. The irreducible representations exist only in the case dimension two. Then we construct a corresponding rank two regular holonomic system explicitly. It turns out that we need an appearent singular locus.

3　吉 野 正 史 (広 島 大 理)　　Application of Borel summability to small denominator problem ····· 12

　　Masafumi Yoshino (Hiroshima Univ.)　　Application of Borel summability to small denominator problem

概 要　Convergence of formal series solution of some semilinear partial differential equation in the case of small denominators is shown without assuming the Diophantine condition. Instead of the Diophantine condition we make use of Borel summability with respect to a certain parameter introduced in the equation in order to show the convergence.

4　五 十 嵐 光 (中 大 理 工)　　New Airy-type solutions of the ultradiscrete Painlevé II equation with
　　礒 島　　伸 (法 政 大 理 工)　　parity variables ·· 12
　　竹 村 剛 一 (中 大 理 工)

　　Hikaru Igarashi　　(Chuo Univ.)　　New Airy-type solutions of the ultradiscrete Painlevé II equation with
　　Shin Isojima　　　(Hosei Univ.)　　parity variables
　　Kouichi Takemura (Chuo Univ.)

概 要　The q-difference Painlevé II equation admits special solutions written in terms of determinant whose entries are the general solution of the q-Airy equation. An ultradiscrete limit of the special solutions is studied by the procedure of ultradiscretization with parity varialbes. Then we obtain new Airy-type solutions of the ultradiscrete Painlevé II equation with parity variables, and the solutions have richer structure than the known solutions.

5　反　田　美　香
(関西学院大理工・近畿大総合理工)
高　橋　甫　宗 (近畿大総合理工)
青　木　貴　史 (近 畿 大 理 工)

The Voros coefficients of the Gauss hypergeometric differential equation with a large parameter ··· 12

Mika Tanda
(Kwansei Gakuin Univ./Kinki Univ.)
Toshinori Takahashi　(Kinki Univ.)
Takashi Aoki　　　(Kinki Univ.)

The Voros coefficients of the Gauss hypergeometric differential equation with a large parameter

概 要　We consider the Gauss hypergeometric differential equation with a large parameter from the viewpoint of the exact WKB analysis. We introduce a large parameter η in the parameters of the hypergeometric equation as general linear forms of η. We define the Voros coefficient of the Gauss hypergeometric differential equation with a large parameter for the origin. Explicit form of the Voros coefficient is given. Moreover, we compute the Borel sums of the Voros coefficient in each Stokes region.

6　高　橋　甫　宗 (近畿大総合理工)
反　田　美　香
(関西学院大理工・近畿大総合理工)
青　木　貴　史 (近 畿 大 理 工)

The hypergeometric function with a large parameter and WKB solutions ··· 12

Toshinori Takahashi (Kinki Univ.)
Mika Tanda
(Kwansei Gakuin Univ./Kinki Univ.)
Takashi Aoki　　　(Kinki Univ.)

The hypergeometric function with a large parameter and WKB solutions

概 要　We consider the Gauss hypergeometric differential equation and its WKB solutions. These solutions are Borel summable under suitable conditions. We investigate the relation between the hypergeometric function and the Borel resummed WKB solutions.

7　P. van Meurs　(金 沢 大 理 工)　Discrete-to-continuum convergence of interacting particle systems ···· 12
Patrick van Meurs (Kanazawa Univ.)　Discrete-to-continuum convergence of interacting particle systems

概 要　We study the many-particle limit of an interacting particle system. The velocities of the particles are described by a non-linear function which depends on all particle positions. The resulting system of first-order ODEs has a gradient flow structure with respect to an energy functional E_n, where n is the number of particles. Our first main result states Γ-converge of the energy functionals E_n as $n \to \infty$ to the Γ-limit E. The functional E is defined on the space of measures, equipped with the 2-Wasserstein topology. These measures represent the particle density. Our second result guarantees the convergence of the related gradient flows.

8　鬼　塚　政　一 (岡 山 理 大 理)
田　中　　　敏 (岡 山 理 大 理)

Attractivity, rectifiability and non-rectifiability of solutions for two-dimensional linear differential systems ··························· 12

Masakazu Onitsuka
　　　(Okayama Univ. of Sci.)
Satoshi Tanaka (Okayama Univ. of Sci.)

Attractivity, rectifiability and non-rectifiability of solutions for two-dimensional linear differential systems

概 要　We consider a nonautonomous linear differential system $x' = y$, $y' = -x - h(t)y$, where $h \in C[t_0, \infty)$. The aim of this talk is to establish a necessary and sufficient condition for every nontrivial solution to be rectifiable. Moreover, a necessary and sufficient condition for the zero solution to be attractive is also presented.

9　豊 田 昌 史 (玉 川 大 工)　Note on Knežević–Miljanović's theorem in a class of fractional differen-
　　川 﨑 敏 治 (玉 川 大 工)　tial equations ··· 10

Masashi Toyoda (Tamagawa Univ.)　Note on Knežević–Miljanović's theorem in a class of fractional differen-
Toshiharu Kawasaki (Tamagawa Univ.)　tial equations

概要　In this talk, we show the existence and uniqueness of solutions of the Cauchy problem in a class of singluar fractional differential equations.

10　宇 佐 美 広 介 (岐 阜 大 工)♭　ある Lanchester 型モデルの緩減衰解の漸近形 ····················· 12

Hiroyuki Usami　(Gifu Univ.)　Asymptotic forms of slowly decaying solutions of a kind of Lanchester-
　　　　　　　　　　　　　　　type system

概要　It is shown that some class of Lanchester type systems have slowly decaying solutions. In this talk, we give the asymptotic forms of such solutions near the infinity.

14:15〜16:15

11　谷 川 智 幸 (熊 本 大 教 育)　混合型 2 階半分線形関数微分方程式の正値解の漸近挙動について ······ 12

Tomoyuki Tanigawa (Kumamoto Univ.)　Asymptotic behavior of positive solutions of second order half-linear
　　　　　　　　　　　　　　　functional differential equations with deviating arguments of mixed type

概要　It is well known that there is the qualitative similarity between linear differential equations and half-linear differential equations. Therefore, in our previous paper we proved how useful the regularly varing functions were for the study of nonoscillation and asymptotic analysis of the half-linear functional differential equation with both retarded and advanced arguments. Aim of this talk is to establish a sharp condition of the existence of generalized regularly varying solutions of differential equations with deviating arguments of mixed type.

12　松 永 秀 章 (阪 府 大 工)　Center manifold theorem and stability for integral equations with infi-
　　村 上　　悟　　　　　　　nite delay ··· 12
　　長 渕　　裕 (岡 山 理 大 理)
　　Nguyen Van Minh
　　　　　　(Univ. of Arkansas)

Hideaki Matsunaga (Osaka Pref. Univ.)　Center manifold theorem and stability for integral equations with infi-
Satoru Murakami　nite delay
Yutaka Nagabuchi
　　　　(Okayama Univ. of Sci.)
Nguyen Van Minh (Univ. of Arkansas)

概要　For autonomous integral equations with infinite delay, we establish existence, local exponential attractivity and other properties of center manifold by means of the variation-of-constants formula in the phase space. And then we investigate stability properties of the zero solution of certain nonlinear scalar integral equation in the critical case.

13　柴 田 徹 太 郎 (広 島 大 工)　Inverse bifurcation problems for the equation of population model ···· 12
Tetsutaro Shibata (Hiroshima Univ.)　Inverse bifurcation problems for the equation of population model

概要　We consider the bifurcation curves for the equation which is related to the population model. Let $\lambda > 0$ be a bifurcation parameter, and $m, k > 0$ be the unknown constants which control the growth of the number of population. We determine the unknown constants m, k from the asymptotic behavior of the bifurcation curves $\lambda(\alpha)$, where $\alpha = \|u_\lambda\|_\infty > 0$.

14 竹 内 慎 吾   一般化三角関数の倍角公式と p-Laplacian への応用 ················ 12
        (芝浦工大システム理工)

Shingo Takeuchi   Multiple-angle formula of generalized trigonometric functions and its
        (Shibaura Inst. of Tech.)   applications to the p-Laplacian

概 要 Generalized trigonometric functions with two parameters were introduced by Drábek and Manásevich
in 1999 to study an inhomogeneous eigenvalue problem of p-Laplacian. Concerning these functions, no
multiple-angle formula has been known except for the classical case and a special case discovered by
Edmunds–Gurka–Lang in 2012, not to mention addition theorems. In this talk, we will present a new
multiple-angle formula which is established between two kinds of generalized trigonometric functions, and
apply the formula to some problems for p-Laplacian.

15 橋 詰 雅 斗 (阪 市 大 理)   Hardy–Sobolev 不等式に関連する最小化問題 ······················ 12
Masato Hashizume (Osaka City Univ.)   Minimization problem on the Hardy–Sobolev inequality

概 要 We consider a minimization problem related to the Hardy–Sobolev inequality on a bounded domain.
The attainability of the best constant of the inequality is affected by the position of the singularity. In
this talk, we consider the interior singularity case and we prove that the attainability of the best constant
changes depending on the scale of the domain.

16 佐 野 め ぐ み (阪 市 大 理)   Scale invariance structures of the critical and the subcritical Hardy in-
    高 橋   太 (阪 市 大 理)   equalities and their improvements ······························· 12
Megumi Sano (Osaka City Univ.)   Scale invariance structures of the critical and the subcritical Hardy in-
Futoshi Takahashi (Osaka City Univ.)   equalities and their improvements

概 要 First we establish an improved subcritical Hardy inequality on the whole space. This also enables us to
improve the sharp version of the critical Hardy inequality on a ball. A key ingredient is a new transformation
connecting the Hardy inequalities in critical and subcritical cases. By using the transformation, we reveal a
relationship between the scale invariance structures of those Hardy inequalities.

17 佐 野 め ぐ み (阪 市 大 理)   Scaling invariant Hardy type inequalities with non-standard remainder
                terms ·· 12
Megumi Sano (Osaka City Univ.)   Scaling invariant Hardy type inequalities with non-standard remainder
                terms

概 要 We consider the Rellich inequality on the whole space and the critical Hardy inequality on a ball.
These two Hardy type inequalities can be refined by adding remainder terms. Our remainder terms are
expressed by a distance from the families of the "virtual" extremals. A key ingredient is the critical Hardy
inequality on the whole space which was proved by Machihara, Ozawa, and Wadade in 2015.

16:30〜17:30   特別講演

柴 山 允 瑠 (京 大 情 報) n 体問題の周期軌道の変分解析
Mitsuru Shibayama (Kyoto Univ.)   A variational approach to periodic orbits in the n-body problem

概 要 In recent years variational methods have been successfully applied to the N-body problem to prove
the existence of periodic solutions. In this talk we outline ideas and proofs for some recent progresses, and
show our results.

3月17日(木)   第Ⅲ会場

9:30〜12:00

18 小 坂 篤 志（阪市大数学研）   滑らかではない領域における半線型楕円型方程式の最小エネルギー解の
凝集現象 · 12

Atsushi Kosaka (Osaka City Univ.)   Singular perturbation of semilinear Neumann problems on non-smooth
domains

概要 In this talk we consider singular perturbation of semilinear Neumann problems, and investigate the
asymptotic behavior of least-energy solutions. On domains with smooth boundary, it is known that a
least-energy solution concentrates at the point where the mean curvature is attained. We consider similar
problems on cone-like domains. Then a least-energy solution concentrates at the vertex which has the least
angle.

19 内 免 大 輔（東 工 大 理 工）   高次元臨界 Kirchhoff 型方程式の 2 つの正値解の存在について · · · · · · · 12
柴 田 将 敬（東 工 大 理 工）

Daisuke Naimen (Tokyo Tech)   Two solutions for the Kirchhoff type elliptic problem with critical non-
Masataka Shibata (Tokyo Tech)   linearity in high dimension

概要 We consider the Kirchhoff type elliptic problem involving the critical Sobolev exponent in high
dimension. We show the existence of two positive solutions of the problem. A typical difficulty occurs
because of the lack of the compactness of the associated Sobolev embedding. In addition, the Kirchhoff
type nonlocal coefficient induces the multiplicity of solutions of the limiting problem. This causes a serious
difficulty in the concentration compactness argument. We overcome this by new techniques utilizing the
fibering map method combined with the description of Palais–Smale sequences.

20 生 駒 典 久（金 沢 大 理 工）   Existence of positive solutions for nonlinear elliptic equations involving
P. Felmer   （Univ. de Chile）   the Pucci operators · 12

Norihisa Ikoma (Kanazawa Univ.)   Existence of positive solutions for nonlinear elliptic equations involving
Patricio Felmer (Univ. de Chile)   the Pucci operators

概要 This talk concerns with the existence of positive solutions for nonlinear elliptic equations involving
the Pucci operators and potential functions. Under suitable conditions on the potential functions, we shall
give the existence or the nonexistence result of positive solutions which decay at infinity.

21 渡 辺 宏 太 郎（防　　衛　　大） n 次元双曲空間上の Brezis–Nirenberg 問題の正値解の一意性について · · 12
塩 路 直 樹（横 浜 国 大 工）

Kotaro Watanabe   Uniqueness of positive solutions of Brezis–Nirenberg problems on $\mathbb{H}^n$
  (Nat. Defense Acad. of Japan)
Naoki Sioji (Yokohama Nat. Univ.)

概要 We study the uniqueness of positive solutions of $\Delta_{\mathbb{H}^n}\varphi + \lambda\varphi + \varphi^p = 0$ on the n-dimensional hyperbolic
space $\mathbb{H}^n$, where $n \in \mathbb{N}$ with $n \geq 2$, $\lambda \leq (n-1)^2/4$, and p is subcritical or critical. In particular, in the case
$n = 2$, we improve Mancini and Sandeep's uniqueness result.

22 梶 木 屋 龍 治（佐 賀 大 理 工）   Nonradial positive solutions of the p-Laplace Emden–Fowler equation
· 12

Ryuji Kajikiya   (Saga Univ.)   Nonradial positive solutions of the p-Laplace Emden–Fowler equation

概要 We study the p-Laplace Emden–Fowler equation with a radial and sign-changing weight in the unit
ball under the Dirichlet boundary condition. We show that no least energy solution is radially symmetric.
Moreover, we prove in the one dimensional case that a positive solution is unique under a suitable assumption
of the weight function.

23　田 中　　敏 (岡 山 理 大 理)　Morse index and symmetry-breaking bifurcation for the one-dimensional
Liouville type equation ··· 12

Satoshi Tanaka (Okayama Univ. of Sci.)　Morse index and symmetry-breaking bifurcation for the one-dimensional
Liouville type equation

概要　The one-dimensional Liouville type equation is considered. The Morse indexes of even solutions are studied, and the existence of at least one symmetry-breaking bifurcation is shown.

24　佐 藤 友 彦 (日 大 生 産 工)　Morse indices of the solutions to the Liouville–Gel'fand problem with
鈴 木　　貴 (阪 大 基 礎 工)　variable coefficients ··· 12

Tomohiko Sato　(Nihon Univ.)　Morse indices of the solutions to the Liouville–Gel'fand problem with
Takashi Suzuki　(Osaka Univ.)　variable coefficients

概要　We consider a sequence of blow-up solutions to the Liouville–Gel'fand problem with variable coefficients, and their linearized eigenvalue problems. We show the precise coincides of the Morse indices of the solution and the critical point of the Hamiltonian of the singular limit. The results are natural extensions of those for constant coefficients.

25　水 上 雅 昭 (東 京 理 大 理)　Boundedness in a two-species chemotaxis system with any chemical dif-
横 田 智 巳 (東 京 理 大 理)　fusion ··· 12

Masaaki Mizukami　Boundedness in a two-species chemotaxis system with any chemical dif-
　　　　　(Tokyo Univ. of Sci.)　fusion
Tomomi Yokota (Tokyo Univ. of Sci.)

概要　This talk is concerned with boundedness of solutions to a two-species chemotaxis system. Negreanu and Tello studied the system with "non"-diffusive chemoattractant in 2015 and dealt with "slow" chemical diffusion in 2014. The main result asserts existence of bounded global-in-time solutions to the system with "any" chemical diffusion.

26　森　　　竜 樹 (龍 谷 大 理 工)　All global bifurcation curves for a cell polarization model ··········· 12
久 藤 衡 介 (電通大情報理工)
辻 川　　亨 (宮 崎 大 工)
四 ツ 谷 晶 二 (龍 谷 大 理 工)

Tatsuki Mori　(Ryukoku Univ.)　All global bifurcation curves for a cell polarization model
Kousuke Kuto
　　　　(Univ. of Electro-Comm.)
Tohru Tsujikawa (Univ. of Miyazaki)
Shoji Yotsutani (Ryukoku Univ.)

概要　We have investigated a stationary limiting problem for a cell polarization model proposed by Y. Mori, A. Jilkine and L. Edelstein-Keshet (SIAM J.Appl Math, 2011). We give answers to the existence, nonexistence, direction, connection of all global bifurcation curves including the unique existence of the secondary bifurcation point. We also clarify all limiting profiles of solutions as a diffusion coefficient tends to 0.

13:30〜14:30　2015年度(第14回)日本数学会解析学賞受賞特別講演

田 中 和 永 (早 大 理 工)　非線形楕円型方程式に対する特異摂動問題 —特に退化する場合を巡って—

Kazunaga Tanaka (Waseda Univ.)　Singular perturbation problems for nonlinear elliptic equations —variational methods for degenerate setting—

概要　We consider the existence of solutions for nonlinear elliptic problems. Especially we are interested in peaked (or bump) soluitons. In this talk, we introduce a variational approach together with applications. Our approach can be applicable to a wide class of nonlinear elliptic problems.

3月18日（金）　　第Ⅲ会場

9:30〜12:00

27　伊　藤　　翼（東 工 大 理 工）　The growth of the vorticity gradient for the two-dimensional Euler flow
　　三　浦　英　之（東工大情報理工）　on domains with a corner ··· 10
　　米　田　　剛（東 工 大 理 工）

Tsubasa Itoh　　（Tokyo Tech）　The growth of the vorticity gradient for the two-dimensional Euler flow
Hideyuki Miura　（Tokyo Tech）　on domains with a corner
Tsuyoshi Yoneda（Tokyo Tech）

概 要　In this talk, we consider the two-dimentional Euler equation on domains with a coner. We are concerned with the question how fast the maximum of the gradient of the vorticity can grow as $t \to \infty$. It is shown that the growth of the vorticity gradient is depending on the angle of the sector.

28　柘　植　直　樹（岐 阜 大 教 育）　外力項のついた圧縮性オイラー方程式の初期値問題について ·········· 12
　　Naoki Tsuge　　　（Gifu Univ.）　Cauchy problem for the compressible Euler equation with an outer force

概 要　We study the compressible Euler equation with an outer force. The global existence theorem has been proved in many papers, provided that the outer force is bounded. However, the stability of their solutions has not yet been obtained until now. Our goal in this paper is to prove the existence of a global solution without such an assumption as boundedness. Moreover, we deduce a uniformly bounded estimate with respect to the time. This yields the stability of the solution. When we prove the global existence, the most difficult point is to obtain the bounded estimate for approximate solutions. To overcome this, we employ an invariant region, which depends on both space and time variables. To use the invariant region, we introduce a modified difference scheme. To prove their convergence, we apply the compensated compactness framework.

29　本　多　泰　理　　　　　　　　On maximal attractor and inertial set for Kuramoto–Sakaguchi equation
　　　（NTTネットワーク基盤技術研）　··· 12
　　谷　　　温　之（慶　　　　大⋆）

Hirotada Honda　　　　　（NTT）　On maximal attractor and inertial set for Kuramoto–Sakaguchi equation
Atusi Tani　　（Keio Univ.⋆）

概 要　We show the existence of the maximal attractor and inertial set of the Kuramoto– Sakaguchi equation.

30　沖　田　匡　聡（久留米工高専）　Asymptotic profiles for the compressible Navier–Stokes equations in the
　　隠　居　良　行（九 大 数 理）　whole space ·· 12
　　Masatoshi Okita　　　　　　　　Asymptotic profiles for the compressible Navier–Stokes equations in the
　　　（Kurume Nat. Coll. of Tech.）　whole space
　　Yoshiyuki Kagei（Kyushu Univ.）

概 要　We will consider the large time behavior of the strong solutions of the compressible Navier–Stokes equation in whole space. We show asymptotic profiles of nonlinear term. Kawashima–Matsumura–Nishida ('79) and Hoff–Zumbrun ('95) proved that the solution is time-asymptotic to the one of the linearized problem. In this talk we will show the second-order asymptotics of strong solution.

48 　函数方程式論

31　津 田 和 幸（九 大 数 理）　Time periodic problem for the compressible Navier–Stokes equation on $\mathbb{R}^2$ with antisymmetry ··· 12

Kazuyuki Tsuda (Kyushu Univ.)　Time periodic problem for the compressible Navier–Stokes equation on $\mathbb{R}^2$ with antisymmetry

概要　We consider the existence of a time periodic solution to the compressible Navier–Stokes equation on the whole space. We show the existence when the space dimension is equal to 2 for sufficiently small time periodic external force with antisymmetry. The proof is based on the spectral properties of the time-T-map associated with the linearized problem around the motionless state with constant density in some weighted L^∞ and Sobolev spaces. We also obtain the existence of a stationary solution for the stationary problem on $\mathbb{R}^2$ for small external force with the antisymmetry.

32　榎 本 裕 子 　　　　　　♭　圧縮性粘性流体に対する時間大域解の一意存在について ·············· 12
　　　　（芝浦工大システム理工）
　　柴 田 良 弘（早大基幹理工）

Yuko Enomoto (Shibaura Inst. of Tech.)　Some global well-posedness results for the compressible barotropic viscous fluid flow
Yoshihiro Shibata (Waseda Univ.)

概要　I would like to talk about some asymptotic behaviors of Matsumura–Nishida solutions in the study of compressible barotropic viscous fluid flow.

33　隠 居 良 行（九 大 数 理）　On Chorin's method for stationary solutions of the Oberbeck–Boussinesq
　　西 田 孝 明（京 大 情 報）　equation ··· 12

Yoshiyuki Kagei (Kyushu Univ.)　On Chorin's method for stationary solutions of the Oberbeck–Boussinesq
Takaaki Nishida (Kyoto Univ.)　equation

概要　A. Chorin proposed an artificial compressible system to find stationary solutions of the Oberbeck–Boussinesq equation. The proposed system is obtained by adding the time derivative of the pressure $\epsilon\partial_t p$ to the continuity equation of the Oberbeck–Boussinesq equation, where $\epsilon > 0$ is a small parameter. If the solution of the artificial compressible system converges to a stationary solution, then the stationary solution is also a stationary solution of the Oberbeck–Boussinesq equation. In this talk a mathematical justification of Chorin's method is considered. It will be shown that if a stationary solution of the Oberbeck–Boussinesq equation is asymptotically stable and the velocity field of the stationary solution satisfies some smallness condition, then it is also asymptotically stable as a stationary solution of the artificial compressible system for sufficiently small ϵ.

34　古 場　　一（早 大 理 工）　時間発展する曲面上における圧縮性流体方程式の導出 ··············· 10

Hajime Koba　(Waseda Univ.)　On compressible fluid flow on an evolving hypersurface

概要　We consider compressible fluid flow on an evolving hypersurface. We focus on kinetic, dissipation, and thermal energies to derive governing equations for the motion of compressible viscous flow on an evolving hypersurface.

35　古 場　　一（早 大 理 工）　時間発展する曲面上における熱の影響を考慮した非圧縮性流体方程式の
　　　　　　　　　　　　　　　導出 ·· 10

Hajime Koba　(Waseda Univ.)　On incompressible fluid flow on an evolving hypersurface

概要　We consider incompressible fluid flow on an evolving hypersurface. We focus on kinetic, dissipation, and thermal energies to derive governing equations for the motion of incompressible viscous flow on an evolving hypersurface.

36   <u>牛 越 惠 理 佳</u>（玉 川 大 工）   Hadamard variational formula for the eigenvalues of the Stokes equa-
     神 保 秀 一（北   大   理）   tions and its application ··· 10
     小 薗 英 雄（早大基幹理工）
     寺 本 惠 昭（摂 南 大 工）

<u>Erika Ushikoshi</u> (Tamagawa Univ.)   Hadamard variational formula for the eigenvalues of the Stokes equa-
Shuichi Jimbo (Hokkaido Univ.)   tions and its application
Hideo Kozono (Waseda Univ.)
Yoshiaki Teramoto (Setsunan Univ.)

概要 By means of the Hadamard variational formula for the multiple eigenvalues of the Stokes equations,
we shall analyze the geometry of the domain.

37   小 林 徹 平（明 大 理 工）♭   A steady flow of an incompressible viscous fluid in a generalized aperture
     domain for a plane ··· 12

Teppei Kobayasi (Meiji Univ.)   A steady flow of an incompressible viscous fluid in a generalized aperture
domain for a plane

概要 In this talk, we introduce a generalized aperture domain in a plane. Furthermore we consider the steady
Navier–Stokes equations approaching Jeffery–Hamel's flow at infinity in a generalized aperture domain in a
plane.

14:15〜16:15

38   A. Silvestre   ♭ 粘性流体の中の剛体の self-propelled motion の境界上での制御 ······· 12
           (Tech. Univ. of Lisbon)
     T. Takahashi (Univ. of Lorraine)
     <u>菱 田 俊 明</u>（名大多元数理）

Ana Silvestre (Tech. Univ. of Lisbon)   A boundary control problem for the steady self-propelled motion of a
Takéo Takahashi (Univ. of Lorraine)   rigid body in a Navier–Stokes fluid
<u>Toshiaki Hishida</u> (Nagoya Univ.)

概要 A boundary control problem for the steady self-propelled motion of a rigid body in a viscous
incompressible fluid is studied. We provide a physically relevant control, which vanishes outside a prescribed
portion of the boundary but leads to a given rigid motion. It is also shown that the self-propelled condition
implies better summability of the fluid flow at infinity.

39   小 薗 英 雄（早大基幹理工）   A remark on Liouville-type theorems for the stationary Navier–Stokes
     寺 澤 祐 高（名大多元数理）   equations in three space dimensions ···························· 10
     <u>若 杉 勇 太</u>（名大多元数理）

Hideo Kozono (Waseda Univ.)   A remark on Liouville-type theorems for the stationary Navier–Stokes
Yutaka Terasawa (Nagoya Univ.)   equations in three space dimensions
<u>Yuta Wakasugi</u> (Nagoya Univ.)

概要 Consider the 3D homogeneous stationary Navier–Stokes equations in the whole space $\mathbb{R}^3$. We deal
with solutions vanishing at infinity in the class of the finite Dirichlet integral. By means of quantities having
the same scaling property as the Dirichlet integral, we establish new a priori estimates. As an application,
we prove the Liouville theorem in the marginal case of scaling invariance.

40 岡 部 考 宏（弘 前 大 教 育） Time periodic strong solution to the Navier–Stokes equations with large
                                   data · 12

Takahiro Okabe (Hirosaki Univ.) Time periodic strong solution to the Navier–Stokes equations with large
                                   data

概 要 We consider the incompressive Navier–Stokes equation in a three dimensional bounded smooth domain.
For any large periodic external force, we construct a periodic strong solution, provided the period is short
enough. Moreover, for a long period and a large external force, we construct a unique and stable time
periodic strong solution of the Navier–Stokes equations introducing the highly oscillating data in the sense
of eigenfunctions of the Stokes operator.

41 檜 垣 充 朗（東 北 大 理） Navier wall law for nonstationary viscous incompressible flows · · · · · · · 12

Mitsuo Higaki (Tohoku Univ.) Navier wall law for nonstationary viscous incompressible flows

概 要 The Navier wall law is an effective boundary condition to describe the viscous incompressible flows
near the rough boundary, which is formally derived from the boundary layer analysis. In this talk we study
the Navier wall law for the two-dimensional initial boundary value problem of the Navier–Stokes system.
The Navier wall law is verified for the initial data in C^1 class under the natural compatibility condition.
Our proof relies on the boundary layer analysis and the L^∞ theory of the Navier–Stokes equations in the
half space.

42 千 頭   昇（東 北 大 理） Global solution for the Navier–Stokes–Poisson system in two and higher
    R. Danchin   （Univ. Paris-Est） dimensions · 12

Noboru Chikami (Tohoku Univ.)   Global solution for the Navier–Stokes–Poisson system in two and higher
Raphaël Danchin (Univ. Paris-Est) dimensions

概 要 We obtain a new a priori estimate for solutions of the Navier–Stokes–Poisson system. As a corollary,
we establish the unique global solvability in critical spaces for that system in any dimension $n \geq 2$.

43 齋 藤 平 和（早 大 理 工） On the $\mathcal{R}$-boundedness of solution operator families for two-phase Stokes
    S. Maryani   （早大基幹理工） resolvent equations · 10

Hirokazu Saito (Waseda Univ.)   On the $\mathcal{R}$-boundedness of solution operator families for two-phase Stokes
Sri Maryani   (Waseda Univ.)   resolvent equations

概 要 In this talk, we show the $\mathcal{R}$-boundedness of solution operator families for two-phase Stokes resolvent
equations on a general domain. Such a domain covers e.g. $\dot{\mathbf{R}}^N = \mathbf{R}_+^N \cup \mathbf{R}_-^N$ $(N \geq 2)$, perturbed $\dot{\mathbf{R}}^N$, layers,
perturbed layers, bounded domains, and exterior domains, where $\mathbf{R}_+^N$ and $\mathbf{R}_-^N$ are the open upper and lower
half spaces, respectively. The essential assumption is the unique solvability of the weak Dirichlet–Neumann
problem, which will be introduced in the talk.

44 阿 部   健（京   大   理） 外部領域における軸対称ナヴィエ・ストークス流の正則性について · · · · 10

Ken Abe   （Kyoto Univ.） On regularity of axisymmetric Navier–Stokes flows in an exterior domain

概 要 We consider the initial-boundary value problem of the Navier–Stokes equations for axisymmetric
initial data with swirl in the exterior of an infinite cylinder $\Pi_\varepsilon = \{x \in \mathbb{R}^3 | |x_{\tan}| > \varepsilon, x_3 \in \mathbb{R}\}$, subject
to the slip boundary condition. We prove global well-posedness of the problem and study spatial profiles
of potential singularities as $\varepsilon \to 0$. We establish an upper blow-up estimate in terms of energy for the
azimuthal component of vorticity, and prove that a blow-up rate of the energy is at most $O(\varepsilon^{-2})$ as $\varepsilon \to 0$.
The proof is based on the Boussinesq system. It is shown that the system is globally well-posed in the
exterior domain for axisymmetric initial data without swirl.

45　鈴 木　　貴（阪 大 基 礎 工）　2D Smoluchowski–Poisson 方程式〜 sub-collapse の衝突条件 ········· 8
　　Takashi Suzuki　（Osaka Univ.）　2D Smoluchowski–Poisson equation: criteria on collision of sub-collapses

概 要　We study the blowup in finite time in the 2D Smoluchowski–Poisson equation. Any blowup point is simple if and only if it has type II blowup rate and the total free energy is bounded.

46　小 川 卓 克（東 北 大 理）♭　高次元における移流拡散方程式の解の非有界性と有限時間爆発について
　　和 久 井 洋 司（東 北 大 理）　·· 12
　　Takayoshi Ogawa（Tohoku Univ.）　Non-uniform bound and finite time blow up for solutions to a drift-
　　Hiroshi Wakui（Tohoku Univ.）　diffusion equation in higher dimensions

概 要　We show the non-uniform bound for a solution to the Cauchy problem of a drift-diffusion equation of a parabolic-elliptic type in higher space dimensions. If an initial data satisfies a certain condition involving the entropy functional, then the corresponding solution to the equation does not remains uniformly bounded in a scaling critical space.

16:30〜17:30　特別講演

　　黒 木 場 正 城（室 蘭 工 大）♭　高次元移流拡散方程式系の解の有限時間爆発について
　　Masaki Kurokiba　　　　　　　Finite time blow up for a solution to system of the drift-diffusion equa-
　　　　（Muroran Inst. of Tech.）　tions in higher dimensions

概 要　We discuss the existence of the blow-up solution for multi-component parabolic-elliptic drift diffusion model in higher space dimensions. We show that the local existence, uniqueness and well-posedness of a solution in the weighted L2 spaces. Moreover we prove that if the initial data satisfies a certain condition, then the corresponding solution blows up in a finite time. This is a system case for the blow up result of the chemotactic and drift-diffusion equation proved by Nagai (2001) and Nagai–Senba–Suzuki (2000) and gravitational interaction of particles by Biler (1995), Biler–Nadzieja (1994, 1998). We generalize the result in Kurokiba–Ogawa (2003,2015) and Kurokiba (2014) for multi-component problem and give a sufficient condition for the finite time blow up of the solution.

3月19日（土）　第Ⅲ会場

9:30〜12:00

47　木 村 悠 紀（東 北 大 理）　2 次元熱弾性体方程式における解の漸近挙動 ······················ 12
　　Yuki Kimura　（Tohoku Univ.）　Asymptotic profile of a solution to thermoelastic equations

概 要　We consider the asymptotic behavior of a solution to a linear thermoelastic equation in 2-dimension. Decomposing the elastic wave into irrotational and rotational components via the Helmholtz decomposition, we obtain that the solution converges to the solution of heat equations and the diffusive wave by eliminating the certain wave parts.

48   伊 藤 弘 道（東 京 理 大 理）   ある非線形弾性体におけるき裂問題について ······················· 12
V. A. Kovtunenko
                (Univ. of Graz)
K. R. Rajagopal（Texas A & M Univ.）
Hiromichi Itou (Tokyo Univ. of Sci.)   On a crack problem for nonlinear elasticity
Victor A. Kovtunenko (Univ. of Graz)
Kumbakonam R. Rajagopal
                (Texas A & M Univ.)

概要 Within the framework of nonlinear elasticity with limiting small strains introduced by Rajagopal, the nonlinear crack problem subject to non-penetration conditions is considered. In this talk, we introduce a solution of generalized variational inequalities, which coincides with the weak solution if the solution possesses extra regularity. The wellposedness is provided by the construction of an approximation problem using elliptic regularization and penalization techniques.

49   曽 我 日 出 夫（茨 城 大 教 育）   Maxwell 方程式の一般化と弾性方程式との関係 ····················· 12
Hideo Soga   (Ibaraki Univ.)   Generalization of the Maxwell equation and relation to elastic equations

概要 This talk is on generalization of the Maxwell equation. A real-symmetric system of partial differential equations is proposed as the generalized Maxwell equation. It is explained that this equation can be transformed each other into a generalized elastic equation and that the equation can be decomposed into two parts associated with waves of the transversal type and ones of the longitudinal type. Expression by the potential is also described.

50   三 好 啓 也（早 大 理 工）   Convergence of hydrodynamical limits for generalized Carleman models
     堤   正 義（早 大 理 工）   with nonhomogeneous boundary condition ························· 10
Hironari Miyoshi (Waseda Univ.)   Convergence of hydrodynamical limits for generalized Carleman models
Masayoshi Tsutsumi (Waseda Univ.) with nonhomogeneous boundary condition

概要 We consider the initial boundary value problem for a 2-speed system of first order semi-linear hyperbolic equations with inhomogeneous boundary data. We establish the existence of global weak solutions in L^1 by the theory of nonlinear evolution operators in a non reflexive Banach space. Using the monotone method and the div-curl lemma, we investigate the hydrodynamical limits of solutions of the hyperbolic systems and show that the limits verify the doubly nonlinear parabolic equations.

51   佐 々 木 浩 宣（千 葉 大 理）   Small analytic solutions to the Hartree equation ··················· 10
Hironobu Sasaki (Chiba Univ.)   Small analytic solutions to the Hartree equation

概要 We consider the Cauchy problem for the Hartree equation in space dimension $d \geq 3$. We assume that the interaction potential V belongs to the weak $L^{d/2}$ space. We prove that if the initial data ϕ is sufficiently small in the L^2-sense and the Fourier transform $\mathcal{F}\phi$ satisfies a real-analytic condition, then the solution $u(t)$ is also real-analytic for any $t \neq 0$. We also prove that if ϕ and V satisfy some strong condition, then $u(t)$ can be extended to an entire function on $\mathbb{C}^d$ for any $t \neq 0$. We remark that no L^2 smallness condition is imposed on first and higher order partial derivatives of ϕ and $\mathcal{F}\phi$.

52 村 井 宗 二 郎（電　　通　　大）　時間に依存する摂動項をもつ Klein–Gordon 方程式の外部領域における
　　望　月　　清　　　　　　　　　平滑化効果と散乱理論 ··· 10
　　　　（首都大東京⋆・中大理工）

Sojiro Murai (Univ. of Electro-Comm.)
Kiyoshi Mochizuki
(Tokyo Metro. Univ.⋆/Chuo Univ.)

Smoothing and scattering for Klein–Gordon equations in exterior do-
main with time dependent perturbations

概要 This paper deals with the existence, smoothing properties and scattering of solutions to magnetic
Klein–Gordon equations in exterior domain with time dependent small perturbations. Smoothing properties
based on the resolvent estimates will reinforce the abstract scattering theory developed in our previous
paper, and our concrete problems are treated in this framework.

53 岡　本　　葵（信 州 大 工）　空間 1 次元非線形 Dirac 方程式の初期値問題の適切性と非適切性 ····· 10
　　町 原 秀 二（埼 玉 大 理 工）
　　Hyungjin Huh（Chung-Ang Univ.）

Mamoru Okamoto (Shinshu Univ.)
Shuji Machihara (Saitama Univ.)
Hyungjin Huh (Chung-Ang Univ.)

Well-posedness and ill-posedness of the Cauchy problem for the one
dimensional nonlinear Dirac equations

概要 We consider the Cauchy problem for the nonlinear Dirac equations $(\partial_t \pm \partial_x)U_\pm = i|U_\pm|^k|U_\mp|^{m-k}U_\pm$
in one spatial dimension which was introduced by Huh (2013). Several results on well-posedness and
ill-posedness have been btained. Since the nonlinearity is not smooth if k or m is odd, an upper bound of s
to be well-posed appears. We prove that the upper bound is essential. More precisely, we show ill-posedness
in $H^s(\mathbb{R})$ for sufficiently large s.

54 佐々木多希子（東 大 数 理）　非線形項に未知関数の導関数を含む波動方程式の爆発曲線について ···· 10
Takiko Sasaki (Univ. of Tokyo) Blow-up curve for a derivative nonlinear wave equation

概要 We study one dimensional wave equation $\partial_t^2 u - \partial_x^2 u = (\partial_t u)^p$. The solution of this equation blows
up in finite time, under the appropriate initial condition. We are concerned with the shape of the blow-up
curve which is defined by $\Gamma = \partial\{(x,t) \in \mathbb{R} \times (0,\infty) \mid |\partial_t u| < +\infty\}$. The purpose of this paper is to show
that Γ is a C^1 space-like surface if the initial values are large and smooth enough. Our proof is based on
the proof Caffarelli and Friedman (1986).

55 高 村 博 之（公立はこだて未来大）　加藤の補題の改良と空間 2 次元半線形波動方程式の解のライフスパンに
　　　　　　　　　　　　　　　　　　　関する新しい予想 ·· 12
Hiroyuki Takamura
　　　　(Future Univ.-Hakodate)

Improved Kato's lemma and a new conjecture on the lifespan of solutions
of semilinear wave equations in two space dimensions

概要 We introduce improved Kato's lemma for ordinary differential inequality to have a new conjecture
on the lifespan of solutions of semilinear wave equations in two space dimensions. Our result is the upper
bound of the lifespan only, but it is shorter than the one from the analogy to higher space dimensions when
the integral of the initial speed does not vanish.

56　池 畠　　優（広 島 大 工）　On finding an obstacle embedded in the rough background medium via the enclosure method in the time domain ・・・・・・・・・・・・・・・・・・・・・・・ 12

　　Masaru Ikehata (Hiroshima Univ.)　On finding an obstacle embedded in the rough background medium via the enclosure method in the time domain

概 要　A mathematical method for through-wall imaging via wave phenomena in the time domain is introduced. The method makes use of a single reflected wave over a finite time interval and gives us a criterion whether a penetrable obstacle exists or not in a general rough background medium. Moreover, if the obstacle exists, the lower and upper estimates of the distance between the obstacle and the center point of the support of the initial data are given.

57　若 杉 勇 太（名大多元数理）　Scaling variables and asymptotic profiles of solutions to the semilinear damped wave equation with variable coefficients ・・・・・・・・・・・・・・・・・・ 10

　　Yuta Wakasugi (Nagoya Univ.)　Scaling variables and asymptotic profiles of solutions to the semilinear damped wave equation with variable coefficients

概 要　We study the asymptotic behavior of solutions for the semilinear damped wave equation with variable coefficients. We prove that if the damping is effective, and the nonlinearity can be regarded as perturbations, then the solution is approximated by the scaled Gaussian of the corresponding linear parabolic problem. The proof is based on the scaling variables and energy estimates.

14:15〜15:45

58　蘆 田 聡 平（京　　大　　理）　N 体シュレーディンガー作用素の 2 つのクラスターを含むチャネルに対する伝播評価 ・・・ 12

　　Sohei Ashida　　(Kyoto Univ.)　Propagation estimates for the scattering channels with 2 clusters of N-body Schrödinger operators

概 要　We consider the propagation estimates for the scattering channels with two clusters. When there are bounded clusters, the clusters are accelerated by the gain of the kinetic energy from the bound state energy. To obtain the minimal velocity estimates positivity of the commutator of the generator of the dilations and the Hamiltonian restricted to small energy interval is used. We use the operator which consists of the generator of the dilations of external coordinates, the projection to the bound state and the cutoff function restricting the channel instead.

59　林　　　雅 行（早 大 理 工）　Global solutions for a generalized nonlinear derivative Schrödinger equation ・・・ 12
　　小 澤　　徹（早 大 理 工）
　　Masayuki Hayashi (Waseda Univ.)　Global solutions for a generalized nonlinear derivative Schrödinger equation
　　Tohru Ozawa　(Waseda Univ.)

概 要　We consider the Cauchy problem for a generalized nonlinear derivative Schrödinger equation $i\partial_t u + \partial_x^2 u + i|u|^{2\sigma}\partial_x u = 0$, with the Dirichlet boundary condition. We prove small data global in time well-posedness in H_0^1 if $\sigma \geq 1$, and large data global existence of solutions in H_0^1 if $1/2 \leq \sigma < 1$.

60　百 名 亮 介（早 大 理 工）　L^p-初期値に対する非線形シュレディンガー方程式の大域解の存在について 3 ・・・ 10

　　Ryosuke Hyakuna (Waseda Univ.)　On global solutions to the nonlinear Schrödinger equations with large L^p-initial data

概 要　We investigate the Cauchy problem for the nonlinear Schrödinger equation with the pure power nonlinearity $|u|^{\alpha-1}u$. It is shown that a local solution of the initial value problem exists in $L_{[-T,T]}^q(L^r)$-space if $p < 2$ and p is close to 2. Moreover, we show that the local solution can be extended globally if p is sufficiently close to 2.

61 戌 亥 隆 恭（京 大 理） Dirac のデルタ関数をポテンシャルに持つ非線形シュレディンガー方程式
    池 田 正 弘（京 大 理） の解の分類について $\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 12
    Takahisa Inui   (Kyoto Univ.)   Global Dynamics for a nonlinear Schrödinger equation with a repulsive
    Masahiro Ikeda (Kyoto Univ.)   Dirac delta potential

概 要 We consider a focusing L^2-supercritical nonlinear Schrödinger equation with a repulsive Dirac delta potential (δNLS). It is well known that δNLS is locally well-posed in $H^1(\mathbb{R})$ and there exist standing wave solutions $e^{i\omega t}Q_\omega(x)$ when $\omega > \gamma^2/2$ where Q_ω is a unique radial positive solution to $-\frac{1}{2}\partial_x^2 Q + \omega Q - \gamma\delta_0 Q = |Q|^{p-1}Q$. Our aim is to find a necessary and sufficient condition to determine the behavior of solutions below the standing waves.

62 瓜 屋 航 太（東 北 大 理） 3 次の非線形 Schrödinger 方程式系に対する終値問題 $\cdots\cdots\cdots\cdots\cdots$ 12
    Kota Uriya   (Tohoku Univ.)   Final state problem for systems of cubic nonlinear Schrödinger equations

概 要 We are concerned with the asymptotic behavior of the solution to systems of cubic nonlinear Schrödinger equations in one dimension. It is known that mass transition phenomenon occur for a system of quadratic nonlinear Schrödinger equations in two dimensions under the mass resonance condition. We show that mass transition phenomenon also occurs for cubic nonlinearities under the corresponding mass resonance conditions.

63 佐 川 侑 司（阪 大 理） The lifespan of small solutions to cubic derivative nonlinear Schrödinger
    砂 川 秀 明（阪 大 理） equations in one space dimension $\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 10
    Yuji Sagawa   (Osaka Univ.)   The lifespan of small solutions to cubic derivative nonlinear Schrödinger
    Hideaki Sunagawa (Osaka Univ.)   equations in one space dimension

概 要 Consider the initial value problem for cubic derivative nonlinear Schrödinger equations in one space dimension. We provide a detailed lower bound estimate for the lifespan of the solution, which can be computed explicitly from the initial data and the nonlinear term. This is an extension and a refinement of the previous work (H. Sunagawa; Osaka J. Math. 43 (2006), 771–789) where the gauge-invariant nonlinearity was treated.

16:00～17:00   2015 年度 (第 14 回) 日本数学会解析学賞受賞特別講演
    杉 本   充（名大多元数理） シュレディンガー方程式の角方向への平滑化作用について
    Mitsuru Sugimoto (Nagoya Univ.)   Smoothing effect of Schrödinger equations in the angular direction

概 要 In 1997, Hoshiro discovered a smoothing effect of Schrödinger equations in the angular direction. We will discuss how this result has been developed in the last two decades.

実 函 数 論

3月18日(金)   第IV会場

9:30〜12:00

1 伊 東 由 文 (徳 島 大*)♭ プランシュレルの定理の新しい証明 · 15
   Yoshifumi Ito (Univ. of Tokushima*)   New proof of Plancherel's theorem

概要 In this paper, we give the new proof of Plancherel's theorem by using the method of orthogonal measure.

2 山 崎 洋 平 (大 和 大 教 育) R^3 において正の体積をもつ Jordan 曲線を巡って · · · · · · · · · · · · · · · · · · 15
   Yōhei Yamasaki (Yamato Univ.)   Around a Jordan curve of positive measure in R^3

概要 We construct a Jordan curve of positive measure in the eucledean space of dimension 3 and a measure preserving homeomorphism between the closed simplex and a ball with an additional measure on the center pole.

3 山 崎 洋 平 (大 和 大 教 育) C^1 級でないときの「向き付きの広さ」について · 15
   Yōhei Yamasaki (Yamato Univ.)   On the "directed measure" not in the C^1 class

概要 This talk shows that the absolute continuity does not suffice to develope the theory of directed measure not in the C^1 class.

4 徳 永 清 久 (山 口 大 理 工)   反対称全二重積分 · 15
   Kiyohisa Tokunaga (Yamaguchi Univ.)   The antisymmetric total double integral

概要 Our new kind of antisymmetric total double integral and the conventional double partial integrals as the iterated anti-derivatives figure out same values for an integrand of various kinds of monomials, and for a domain of a segment and three types of conic section. Moreover, our integral has advantage over the conventional one for approximate values calculated as finite double sums. However, the relationship between the definition of our integral and that of the conventional one is not known. If it is possible to derive one kind of definition from the other between these two kinds of double integrals, it is conjectured that our integral may be reduced to be the conventional one as its special case.

5 川 崎 敏 治 (日 大 工)   Some examples between the Lebesgue and Denjoy integrals · · · · · · · · · · 15
   Toshiharu Kawasaki (Nihon Univ.)   Some examples between the Lebesgue and Denjoy integrals

概要 In this talk, we give new integrals between the Lebesgue integral and the restricted Denjoy integral. Moreover we give some examples of these integrable functions.

6 冨 澤 佑 季 乃 (中 大 理 工)   Bregman 距離に関する不動点性 · 10
   Yukino Tomizawa (Chuo Univ.)   Fixed point property with respect to the Bregman distance

概要 The purpose is to consider the fixed point property of firmly nonexpansive mappings with respect to the Bregman distance.

7　M. Ali Khan　(Johns Hopkins Univ.)　Maharam-types and Lyapunov's theorem for vector measures on locally
　佐 柄 信 純 (法 政 大 経 済)　convex spaces without control measures ························· 15

M. Ali Khan (Johns Hopkins Univ.)
Nobusumi Sagara (Hosei Univ.)

概 要　We formulate the saturation property for vector measures in locally convex Hausdorff spaces as a
nonseparability condition on the derived Boolean σ-algebras by drawing on the topological structure of vector
measure algebras. We exploit a Pettis-like notion of vector integration in locally convex Hausdorff spaces,
the Bourbaki–Kluvánek–Lewis integral, to derive an exact version of the Lyapunov convexity theorem in
locally convex Hausdorff spaces without the Bartle–Dunford–Schwartz property. We apply our Lyapunov
convexity theorem to the bang-bang principle in Lyapunov control systems in locally convex Hausdorff
spaces to provide a further characterization of the saturation property.

8　田 中 亮 太 朗 (新 潟 大 自 然)　回転不変ノルムに対する James 定数の双対性について ··············· 15
　小 室 直 人 (北 教 大 旭 川)
　斎 藤 吉 助 (新 潟 大 自 然)

Ryotaro Tanaka (Niigata Univ.)
Naoto Komuro
　　　　(Hokkaido Univ. of Edu.)
Kichi-Suke Saito (Niigata Univ.)

On the duality of James constant of rotation invariant norms

概 要　In this talk, we show that the James constant of the space $\mathbb{R}^2$ endowed with a $\pi/2$-rotation invariant
norm coincides with that of its dual space. In particular, we have the same statement on the symmetric
absolute norms on $\mathbb{R}^2$ as a corollary.

9　水 口 洋 康 (新 潟 大 自 然)　Isosceles 直交に関連したある定数の双対性 ························ 15

Hiroyasu Mizuguchi (Niigata Univ.)　On the duality of a new constant related to Isosceles orthogonality

概 要　We consider Isosceles orthogonality and Birkhoff orthogonality, which are the most used notions of
generalized orthogonality. In 2006, Ji and Wu introduced a geometric constant $D(X)$ to measure the
difference between these two orthogonality types. From their results, we have that $D(X) = D(X^*)$ holds
for any symmetric Minkowski plane. On the other hand, for the James constant $J(X)$, Saito, Sato and
Tanaka recently showed that if the norm of a two-dimensional space X is absolute and symmetric then
$J(X) = J(X^*)$ holds. We consider a new constant $D(X, \lambda)$ such that $D(X) = \inf_{\lambda \in \mathbb{R}} D(X, \lambda)$ and obtain
that in the same situation $D(X, \lambda) = D(X^*, \lambda)$ holds for any $\lambda \in (0, 1)$.

14:15～16:10

10　眞 中 裕 子 (横浜国大理工)　Fixed point theorems for an elastic nonlinear mapping in Banach spaces
　　　　·· 15

Hiroko Manaka (Yokohama Nat. Univ.)　Fixed point theorems for an elastic nonlinear mapping in Banach spaces

概 要　Let E be a smooth Banach space with a norm $||\cdot||$. Let $V(x, y) = ||x||^2 + ||y||^2 - 2 < x, Jy >$ for
any $x, y \in E$, where $< \cdot, \cdot >$ stands for the duality pair and J is the normalized duality mapping. We
defined a V-strongly nonexpansive mapping with respect to this bifunction $V(\cdot, \cdot)$. This nonlinear mapping
is nonexpansive in a Hilbert space. However, we could show that this mapping is not nonexpansive in some
Banach spaces. In this talk, we shall introduce convergence theorems and existence theorems for fixed points
of this elastic nonlinear mapping.

11 高 阪 史 明（東 海 大 理）   バナッハ空間における極大単調作用素に対する陰的な零点近似列の強収
束性 · 15

Fumiaki Kohsaka (Tokai Univ.)   Strong convergence of an implicitly defined iterative sequence for max-
imal monotone operators in Banach spaces

概要 In this talk, we study the strong convergence of an iterative sequence which is implicitly defined by
using the resolvent of maximal monotone operators in Banach spaces.

12 青 山 耕 治（千葉大法政経）   Strongly quasi-nonexpansive mappings · 15

Koji Aoyama   (Chiba Univ.)   Strongly quasi-nonexpansive mappings

概要 In this talk, we focus on strongly quasinonexpansive mappings in a metric space or a Banach space.
In particular, we present some properties and characterizations of such mappings.

13 鈴 木 智 成（九 工 大 工） ν-generalized metric space の位相 · 15

Tomonari Suzuki   Topology on ν-generalized metric spaces
        (Kyushu Inst. of Tech.)

概要 We will talk about topology on ν-generalized metric spaces.

14 本 田 あ お い（九工大情報工）   非整数階 Shepp 数列空間と L_p の非整数階差分作用素 · · · · · · · · · · · · · · 15
岡 崎 悦 明（ファジィシステム研）

Aoi Honda (Kyushu Inst. of Tech.)   Fractional Shepp sequence space and fractional difference operators on
Yoshiaki Okazaki L_p
        (Fuzzy Logic Systems Inst.)

概要 We have introduced the Shepp sequence space which is determined by an L_p function. In this talk,
we generalize the Shepp sequence space to the fractional Shepp sequence space and discuss its topological
structure and linearity.

15 岡 崎 悦 明（ファジィシステム研）   劣加法的単調測度の作る L_p 空間と双対 $L_p^\dagger$ · 15
本 田 あ お い（九工大情報工）

Yoshiaki Okazaki L_p space for a subadditive monotone measure and its dual $L_p^\dagger$
        (Fuzzy Logic Systems Inst.)
Aoi Honda (Kyushu Inst. of Tech.)

概要 We introduce the L_p-space for a sub-additive monotone measure based on the Choquet integral and
its dual space $L_p^\dagger$. The basic properties of L_p and $L_p^\dagger$ are studied. L_p is a quasi-metric space and $L_p^\dagger$ is a
complete metric space by the dual metric.

16 冨 田 直 人（阪 大 理）   Multilinear Fourier multipliers with minimal Sobolev regularity · · · · · · 15
L. Grafakos   (Univ. of Missouri)
宮 地 晶 彦（東京女大現代教養）
Hanh Van Nguyen
        (Univ. of Missouri)

Naohito Tomita (Osaka Univ.)   Multilinear Fourier multipliers with minimal Sobolev regularity
Loukas Grafakos (Univ. of Missouri)
Akihiko Miyachi
(Tokyo Woman's Christian Univ.)
Hanh Van Nguyen (Univ. of Missouri)

概要 The problem to find the smoothness conditions for multilinear Fourier multipliers that are as small
as possible to ensure the boundedness of the corresponding operators from products of Hardy spaces
$H^{p_1} \times \cdots \times H^{p_m}$ to L^p, $1/p_1 + \cdots + 1/p_m = 1/p$, is considered.

16:30〜17:30   特別講演

佐 藤 圓 治（山　形　大⋆）　いくつかの関数空間上の Fourier multiplier 等の作用素について

Enji Sato　（Yamagata Univ.⋆）　The operators related to Fourier multipliers on some function spaces

概 要 We talk about the operators related to Fourier multipliers on some function spaces which are L^p spaces, Morrey spaces and etc.

<div align="center">

3月19日（土）　　第IV会場

</div>

9:30〜12:00

17　都 築　　寛（東 京 理 大 理）　Existence of solutions to Vlasov–Poisson systems in a half-space ····· 15
A. L. Skubachevskii
(Peoples' Friendship Univ. of Russia)

Yutaka Tsuzuki (Tokyo Univ. of Sci.)　Existence of solutions to Vlasov–Poisson systems in a half-space
Alexander Leonidovich Skubachevskii
(Peoples' Friendship Univ. of Russia)

概 要 This talk is concerned with solvability of Vlasov–Poisson systems in a half-space. In 2013, an existence result on a time interval $(0, T)$ was obtained by Skubachevskii. However largeness of initial function f_0^β is too strong. The purpose of this talk is to weaken the condition of largeness of f_0^β.

18　伊 藤 昭 夫　　　　　撹拌の効果を考慮した日本酒醸造過程モデルの解の存在について ······ 15
村 瀬 勇 介（名 城 大 理 工）

Akio Ito　　　　　　　Existence of solutions for brewing model of Japanese Sake with stirring
Yusuke Murase　（Meiji Univ.）　effect.

概 要 In this talk, we discuss the existence of solution for brewing model of Japanese Sake with stirring effect. This model is formulated by using partial differential equations with constraint condition. The constraint set in the model is fixed if temperature is given. In other words, the solution of this model depends upon the solution self. It shows that the model is a problem of quasi-variational inequality type.

19　登 口　　大（早 大 教 育）　確率外力を持つ退化放物型方程式の解の存在定理 ··················· 15
小 林 和 夫（早 大 教 育）

Dai Noboriguchi (Waseda Univ.)　The existence theorem of solutions for degenerate parabolic equations
Kazuo Kobayasi (Waseda Univ.)　with stochastic forcing

概 要 We consider the initial value problem for degenerate parabolic partial differential equations with multiplicative noise on a d-dimensional torus $\mathbb{T}^d$:

$$du + \mathrm{div}(B(u))\ dt = \mathrm{div}(A(u)\nabla u)\ dt + \Phi(u)\ dW(t) \qquad\qquad \text{in}\ \ \mathbb{T}^d \times (0, T)$$

We focus on the existence of a solution. Using nondegenerate smooth approximations, Debussche, Hofmanová and Vovelle proved the existence of a kinetic solution. On the other hand, we propose to construct a sequence of approximations by applying a time splitting method. This method will somewhat give us not only a simpler and more clear discussion but an improvement over the existence result.

20　渡 邉　　紘（サレジオ工高専）　変数係数を持つ強退化放物型方程式の BV-エントロピー解に対する連続
的依存性 ··· 15

Hiroshi Watanabe (Salesian Polytech.) Continuous dependence of BV-entropy solutions to strongly degenerate
parabolic equations with variable coefficients

概 要 We consider the initial value problem (CP) for strongly degenerate parabolic equations with variable coefficients. Strongly degenerate parabolic equations are regarded as a linear combination of the time-dependent conservation laws (quasilinear hyperbolic equations) and the porous medium type equations (nonlinear degenerate parabolic equations). Thus, this equation has both properties of hyperbolic equation and those of parabolic equations and describes various nonlinear convective diffusion phenomena such as filtration problems, Stefan problems and so on.
In this talk, we consider BV-entropy solutions to (CP). Our purpose is to prove the continuous dependence of the BV-entropy solutions.

21　白 川　　健（千 葉 大 教 育）　異方性を加味した結晶粒界運動のフェーズ・フィールドモデルに対する
　　渡 邉　　紘（サレジオ工高専）　エネルギー消散性 ·· 15
　　S. Moll　　　（Univ. of Valencia）

Ken Shirakawa　（Chiba Univ.）
Hiroshi Watanabe (Salesian Polytech.)
Salvador Moll (Univ. of Valencia) Energy-dissipation for phase field model of grain boundary motion with
anisotropy

概 要 In this talk, a system of parabolic variational inequalities is considered. The system is a modified version of the Kobayashi–Warren–Carter system of grain boundary motion such that the governing free-energy includes some anisotropic effects of grains. Additionally, we note that our mathematical model enables to reproduce the dynamic changes of structural units, caused by the rotations of crystalline orientations. In the last MSJ meeting (in Kyoto Sangyo Univ.), we reported the solvability result for our system. Based on the previous work, we set the subject of this talk to discuss about the continuing topics, that are concerned with energy-dissipation and large-time behavior for our system.

22　加 納 理 成（高 知 大 教 育）　完全塑性モデルに関連した変分不等式の解の収束について ··········· 15
　　深 尾 武 史（京 都 教 育 大）

Risei Kano　　　（Kochi Univ.）
Takesi Fukao (Kyoto Univ. of Edu.) The convergence of solutions for the perfect plasticity models

概 要 In this talk, in the variational inequalities related to the perfect plasticity models, we discuss the convergence of the solution at the diffusion parameter to 0.

23　深 尾 武 史（京都教育大教育）　力学的境界条件下での退化放物型方程式について ·················· 15
Takeshi Fukao (Kyoto Univ. of Edu.) Degenerate parabolic equations with dynamic boundary conditions

概 要 In this talk, an asymptotic limit of Cahn–Hilliard systems to a degenerate parabolic equation with dynamic boundary condition is focused. The target diffusion equation is an abstract form of the Stefan problem, porous media equation, Hele-Shaw profile, nonlinear diffusion of singular logarithmic potential, nonlinear diffusion of Penrose–Fife type, fast diffusion equation and so on. By setting the suitable potential of the Cahn–Hilliard systems all of these problems are characterized by the limit of the Cahn–Hilliard systems.

61   実函数論

24 山 崎 教 昭（神奈川大工）　Lagrange multiplier and singular limit of double obstacle problems for
    深 尾 武 史（京都教育大教育）　Allen–Cahn equation with constraint ···························· 15
    M. H. Farshbaf-Shaker
            (WIAS, Germany)

Noriaki Yamazaki (Kanagawa Univ.)
Takeshi Fukao (Kyoto Univ. of Edu.)
Mohammad Hassan Farshbaf-Shaker
            (WIAS, Germany)

Lagrange multiplier and singular limit of double obstacle problems for
Allen–Cahn equation with constraint

概 要 In this talk we study the properties of the Lagrange multiplier to an Allen–Cahn equation with double
obstacle potential. Here, dynamic boundary condition, including the Laplace–Beltrami operator on the
boundary, is investigated. Then, we establish the singular limit of our system and clarify the limit of the
solution and the Lagrange multiplier to our problem.

25 愛 木 豊 彦（日本女大理）　水分吸着過程を記述する自由境界問題の解のヒステリシス的な挙動につ
    佐 藤 直 紀（長岡工高専）　いて ·· 15
    村 瀬 勇 介（名城大理工）

Toyohiko Aiki (Japan Women's Univ.)
Sato Naoki
    (Nagaoka Nat. Coll. of Tech.)
Murase Yusuke   (Meijo Univ.)

Hysteresis behavior of a solution to the free boundary problem describ-
ing an adsorption phenomena

概 要 In this talk we consider a free boundary problem which is proposed as a mathematical model for
adsorption phenomena in a porous media. The existence, uniqueness and large time behavior of solutions
were already discussed. Also, we pointed out that the relationship between the humidity and the degree of
saturation observed in experiments are represented by our model through some numerical simulations. In
this talk we investigate the asymptotic behavior of a free boundary as the density of water in air tends to
0, and hysteresis behavior of a solution to the limit problem.

14:15〜15:00

26 藤 江 健 太 郎（東京理大理）　退化拡散項をもつ癌浸潤走化性モデルの時間大域的可解性と解の漸近挙動
    石 田 祥 子（東京理大理）　·· 15
    伊 藤 昭 夫
    横 田 智 巳（東京理大理）

Kentarou Fujie (Tokyo Univ. of Sci.)
Sachiko Ishida (Tokyo Univ. of Sci.)
Akio Ito
Tomomi Yokota (Tokyo Univ. of Sci.)

Existence and large time behavior of a global-in-time solution to a
chemotaxis tumor invasion model with degenerate diffusion

概 要 In this talk, we consider an initial-boundary problem of a chemotaxis, not haptotaxis, tumor invasion
system with a degenerate diffusion. Actually, first of all we can show that our problem has at least one
global-in-time solution by considering appropriate approximate systems with non-degenerate diffusions and
deriving some uniform estimates, which are independent of approximate parameters and enable us to use
the limit procedure. Moreover, we succeed investing a large-time behavior of this global-in-time solution.

27 吉 野 徳 晃（東京理大理）　　放物・放物型走化性方程式系への作用素論的アプローチ ･････････････ 15

Noriaki Yoshino (Tokyo Univ. of Sci.)　　An operator theoretic approach to parabolic-parabolic chemotaxis systems

概 要 In this talk we consider existence of solutions to parabolic-parabolic chemotaxis systems of general form. In the case of parabolic-ellipic chemotaixis systems, existence of local solutions was already shown via nonlinear m-accretive operator theory. However, in the case of parabolic-parabolic chemotaxs systems there is no existence result by this approach. In this talk existence of solutions is obtained by applying nonlinear m-accretive operator theory.

28 松 本 敏 隆（静 岡 大 理）　　サイズ構造モデルへの準線形理論的接近法 ･･････････････････････ 15
　　田 中 直 樹（静 岡 大 理）

Toshitaka Matsumoto (Shizuoka Univ.)　　Quasilinear theoretical approach to size-structured models
Naoki Tanaka (Shizuoka Univ.)

概 要 The well-posedness for abstract quasilinear evolution equations in Banach spaces is discussed. We do not assume the denseness of the domain of quasilinear operators. Global well-posedness of C^1-solutions is obtained and the abstract result is applied to size-structured models.

15:15〜16:15　特別講演

側 島 基 宏（東 京 理 大 理）　　非有界な係数をもつ 2 階楕円型作用素の L^p 理論について

Motohiro Sobajima　　　　　　On an L^p-theory for second-order elliptic operators with unbounded
　　　　　(Tokyo Univ. of Sci.)　coefficients

概 要 This talk is concerned with an L^p-theory for second-order elliptic operators of the form $Au = -\mathrm{div}\,(a\nabla u) + F \cdot \nabla u + V u$ in $\mathbb{R}^N$, where $N \in \mathbb{N}, 1 < p < \infty$ and all coefficients $a = (a_{jk})_{jk}$, $F = (F_j)_j$ and V are allowed to be unbounded at infinity. The essential m-accretivity and m-sectoriality in L^p-spaces have been investigated in recent years. In this talk we deal with the m-accretivity and m-sectoriality in L^p-spaces of minimal realization of A from the view-point of the decomposition formula

$$\int_{\mathbb{R}^N} (Au)\overline{v}\,dx = \int_{\mathbb{R}^N} \left[a\nabla u \cdot \nabla \overline{v} + \left(V - \frac{\mathrm{div}F}{p}\right) u\overline{v} \right]\,dx + \int_{\mathbb{R}^N} F \cdot \left(\frac{\overline{v}\nabla u}{p} - \frac{u\nabla\overline{v}}{p'}\right)\,dx$$

which may be regarded as a generalization of the formula decomposing sesqui-linear forms in L^2 into symmetric and skew-symmetric parts. Particularly, the L^2-theory for Schrödinger operators has been widely considered since it plays an important role in the field of quantum mechanics. Despite of this, the problem for selfadointness of operators having rapidly growing diffusion and potential, posed by T. Kato in 1981, has been remained open until 2010. As a byproduct of the L^p-theory in this talk, the answer seems to be very close.

函 数 解 析 学

3月16日(水)　　第IX会場

10:00～12:00

1　<u>森 岡　　悠</u>
　　(芝浦工大教育イノベーション推進センター)
　　安 藤 和 典 (愛 媛 大 工)
　　磯 崎　　洋 (筑波大数理物質)

<u>Hisashi Morioka</u>
　　　　　　(Shibaura Inst. of Tech.)
Kazunori Ando　(Ehime Univ.)
Hiroshi Isozaki (Univ. of Tsukuba)

Spectral properties of Schrödinger operators on perturbed lattices · · · · 15

Spectral properties of Schrödinger operators on perturbed lattices

概要　We show the absence of eigenvalues embedded in the continuous spectrum of discrete Schrödinger operators on perturbed lattices, and we construct its scattering theory. Our theory covers the square, triangular, diamond, Kagome lattices, as well as the ladder, the graphite and the subdivision of square lattice.

2　<u>安 藤 和 典</u> (愛 媛 大 工)
　　ヒョンベカン (　Inha Univ.　)

<u>Kazunori Ando</u>　(Ehime Univ.)
Hyeonbae Kang　(Inha Univ.)

Spectral properties of the Neumann–Poincaré operator and anomalous localized resonance · 15

Spectral properties of the Neumann–Poincaré operator and anomalous localized resonance

概要　We study the spectral properties of the Neumann–Poincaré operator on bounded simply connected domains in two and three dimensions with $C^{1,\alpha}$-boundaries. Then, using the quasi-static approximation, we show that anomalous localized resonance (ALR) occurs on ellipses in two dimensions; on the other hand, ALR does not occur on balls in three dimensions.

3　髙 江 洲 俊 光 (群 馬 大 理 工)

Toshimitsu Takaesu (Gunma Univ.)

Essential spectrum of a fermionic quantum field model and its application · 15

Essential spectrum of a fermionic quantum field model and its application

概要　We consider an interaction system of a fermionic quantum field. The state space is defined by a tensor product of a fermion Fock space and a Hilbert space, and the total Hamiltonian is a self-adjoint operator on the Hilbert space. Then it is proven that a subset of real numbers is the essential spectrum. Its application to the Yukawa model is also considered, and the HVZ theorem is obtained.

4　石 田 敦 英 (追手門学院大経済)

Atsuhide Ishida (Otemon Gakuin Univ.)

A propagation property for the fractional power of negative Laplacian · 15

A propagation property for the fractional power of negative Laplacian

概要　Enss (1983) obtained one of the propagation estimates for the free Schrödinger operator and it turned out that this estimate was very useful for the inverse scattering problem by Enss–Weder (1995). Since then, this method has been called the Enss–Weder method. We study the same type of propagation estimate for the fractional power of negative Laplacian. In the same way of Enss–Weder, we try to apply our estimate to the inverse scattering problem.

5　渡 辺 道 之 (新 潟 大 人 文)
　　磯 崎　　洋 (筑波大数理物質)
　　門 脇 光 輝 (滋 賀 県 大 工)

Michiyuki Watanabe (Niigata Univ.)
Hiroshi Isozaki (Univ. of Tsukuba)
Mitsuteru Kadowaki
　　　　　(Univ. of Shiga Pref.)

半空間における弾性波動方程式の定常解の漸近挙動 ················· 15

Asymptotic behavior of stationary solutions to elastic wave equations in half-spaces

概 要　We consider the stationary scattering problem for the elastic operator in a perturbed half-space. In this talk, we present

(1) Construction of the generalized Fourier transform.

(2) Characterization of solutions in terms of the generalized Fourier transform.

(3) Asymptotic expansion of solutions and the S-matrix.

6　山 岸 弘 幸 (産 業 技 術 高 専)
　　亀 高 惟 倫 (阪　　　　　大*)

Hiroyuki Yamagishi
(Tokyo Metropolitan Coll. of Indus. Tech.)
Yoshinori Kametaka (Osaka Univ.*)

2 重結合を含む正多面体上の 離散ソボレフ不等式の最良定数 ········· 15

The best constant of discrete Sobolev inequalities on the regular polyhedra including double bond

概 要　We have obtained the best constant of discrete Sobolev inequalities on the regular polyhedra including double bond. By giving appropriate indices on vertices of polyhedra and by introducing discrete Laplacians, we have obtained Green matrices and pseudo Green matrices. (Pseudo) Green matrices are the reproducing kernels by setting appropriate vector spaces and inner products. By applying Schwarz inequality to the reproducing relations, the discrete Sobolev inequalities are obtained.The maximum of the diagonal values of pseudo Green matrices is the best constants of inequalities.

7　香 川 智 修 (東 京 都 市 大)
　　吉 野 邦 生 (東京都市大知識工)

Toshinao Kagawa (Tokyo City Univ.)
Kunio Yoshino (Tokyo City Univ.)

The Hermite expansion of the characteristic functions ·············· 15

The Hermite expansion of the characteristic functions

概 要　The aim of this talk is to show the examples of the Hermite function expansion. We determine the coefficients of the Hermite expansion of the characteristic function of $[-a, a]$ and $[0, a]$, explicitly. As applications, we determine the coefficients of the Hermite expansion of the sinc function, the Heaviside function

14:15〜15:15　特別講演

新 國 裕 昭（前 橋 工 科 大）　カーボンナノチューブのバンドギャップスペクトル構造

Hiroaki Niikuni　　　　　　　　Band-gap spectral structure of carbon nanotubes
　　　（Maebashi Inst. of Tech.）

概 要　Carbon has possibilities of forming a lot of types of allotropes: diamonds, fullerenes, graphite and graphene. Allotropes of carbons located on lattices with cylindrical structures are called carbon nanotubes and have been playing important roles in the field of mechanical engineering due to their outstanding properties such as electrical conduction and hardness. In this talk, we study the spectrum of carbon nanotubes from the point of view of quantum graphs. Namely, we examine the spectral properties of periodic Schrödinger operators on metric graphs corresponding to carbon nanotubes. Especially, we deal with one of the simplest models of periodically broken carbon nanotubes and examine its spectral properties. By utilizing the Floquet–Bloch theory, we show that its spectrum has the band-gap structure. Namely, we notice that its spectrum consists of the absolutely continuous spectrum and the set of eigenvalues with infinite multiplicities. Furthermore, we prove that the absolutely continuous spectrum is characterized by the corresponding discriminants and consists of infinitely many closed intervals. We note that our spectral discriminants are generally not entire functions but meromorphic functions, whereas the spectral discriminants for the standard Hill operators are entire.

3月17日（木）　　第Ⅸ会場

10:00〜12:00

8　伊 師 英 之（名大多元数理）　Bergman–Hartogs 領域上の調和解析 ····························· 15

Hideyuki Ishi　（Nagoya Univ.）　Harmonic analysis on Bergman–Hartogs domains

概 要　The Bergman–Hartogs domain is a Hartogs domain defined by a negative power of the Bergman kernel function over a bounded homogeneous domain. This domain has a relatively large holomorphic automorphism group, though the domain is not homogeneous in general. We discuss unitary representations of the group realized on Hilbert spaces of holomorphic functions on the Bergman–Hartogs domain. The multiplicity free decomposition of the representation is described in terms of harmonic analysis on the bounded homogeneous domain.

9　中 濱 良 祐（東 大 数 理）　Explicit embeddings of holomorphic discrete series representations ··· 15

Ryosuke Nakahama (Univ. of Tokyo)　Explicit embeddings of holomorphic discrete series representations

概 要　In this talk the speaker presents the result on the explicit construction of embedding maps between two holomorphic discrete series representations. Today we mainly deal with the embedding of the holomorphic discrete series representation of $Sp(r,\mathbb{R}) \times Sp(r,\mathbb{R})$ into that of $Sp(2r,\mathbb{R})$.

10　北 川 宜 稔（東 大 数 理）　The BGG category $\mathcal{O}$ and the category of generalized Harish-Chandra
　　　　　　　　　　　　　　modules ··· 15

Masatoshi Kitagawa (Univ. of Tokyo)　The BGG category $\mathcal{O}$ and the category of generalized Harish-Chandra modules

概 要　Using Zuckerman's derived functor, Enright gave a functor from the BGG category to the category of Harish-Chandra modules of a connected semisimple complex Lie group. He proved that the functor is exact and preserve irreducibility. In this talk, the speaker generalizes the functor defined by Enright to a functor from the BGG category to the category of generalized Harish-Chandra modules. The main purpose of this talk is to introduce that the functor is exact fully faithful, and preserve irreducibility. As an application, we can see that Enright's functor gives an category equivalence.

11 <u>中 垣 成 史</u>（奈 良 教 育 大）   既約表現の誘導と制限から得られる分岐則代数 · 15
    釣 井 達 也（阪 府 大 理）

<u>Narufumi Nakagaki</u>   Fusion rule algebras associated with inductions and restrictions of irre-
            (Nara Univ. of Edu.)   ducible representations
Tatsuya Tsurii (Osaka Pref. Univ.)

概要 For a compact group G, the fusion rule algebra $\mathcal{F}(\hat{G})$ is obtained associated with the dual $\hat{G}$ of G. Let G_0 be a closed subgroup of G such that the index $[G : G_0]$ is finite. Then Frobenius diagram $D(\hat{G} \cup \widehat{G_0})$ is obtained by Frobenius' reciprocity theorem. We discuss the fusion rule algebra $\mathcal{F}(\hat{G} \cup \widehat{G_0})$ related with Frobenius diagram $D(\hat{G} \cup \widehat{G_0})$.

12 <u>親 木 翔 平</u>（奈 良 教 育 大）   ハイパー群の双対と幾何学的双対 · 15
    釣 井 達 也（阪 府 大 理）

<u>Shohei Oyanoki</u> (Nara Univ. of Edu.)   Hypergroup duals and geometric duals
Tatsuya Tsurii (Osaka Pref. Univ.)

概要   Associated with many symmetric graphs (diagrams) we obtain finite commutative hypergroups by considering random walks. Conversely, associated with faithful irreducible ∗-actions of many finite commutative hypergroups we obtain symmetric graphs. We make clear the correspondence between hypergroups and graphs and discuss their duals.

13 <u>岡 本 太 樹</u>（奈 良 教 育 大）   有限ハイパー群の多項式表現 · 15
    釣 井 達 也（阪 府 大 理）

<u>Taiki Okamoto</u> (Nara Univ. of Edu.)   Polynomial representations of hypergroups
Tatsuya Tsurii (Osaka Pref. Univ.)

概要 We introduce polynomial representations π (of one-variable and two-variable) of certain finite commutative hypergroups $\mathcal{K}$. Moreover we make clear the relation between hypergroup structure of the dual $\hat{\mathcal{K}}$ of $\mathcal{K}$ and the roots of the determinant equations of $\pi(\mathcal{K})$.

14 <u>釣 井 達 也</u>（阪 府 大 理）   位数 5 の非可換ハイパー群 · 15
    大 野 博 道（信 州 大 工）
    鈴 木 章 斗（信 州 大 工）
    松 澤 泰 道（信 州 大 教 育）
    山 中 聡 恵（奈 良 女 大 理）

<u>Tatsuya Tsurii</u> (Osaka Pref. Univ.)   Non-commutative hypergroup of order five
Hiromichi Ohno (Shinshu Univ.)
Akito Suzuki   (Shinshu Univ.)
Yasumichi Matsuzawa (Shinshu Univ.)
Satoe Yamanaka (Nara Women's Univ.)

概要 We discuss a commutativity of finite hypergroups. For a group, the minimum order of non-commutative groups is six. But in the case of a hypergroup there exists a non-commutative hypergroup of order five.

13:15〜14:15   特別講演

笹 木 集 夢（東 海 大 理）   Admissible representations, multiplicity-free representations and visible
                    actions on non-tube type Hermitian symmetric spaces

Atsumu Sasaki   (Tokai Univ.)   Admissible representations, multiplicity-free representations and visible
                    actions on non-tube type Hermitian symmetric spaces

概要 In this talk, we give a new characterization for a non-compact Hermitian symmetric space to be of tube type (or non-tube type) by multiplicities in some branching laws and visible actions. Further, we provide an example of a kind of the Cartan decomposition for non-symmetric homogeneous spaces.

3月18日（金）　　第IX会場

9:30～12:00

15　岩 田 友 紀 子（気　　象　　大）　Constrictive なマルコフ作用素について ·························· 15
Yukiko Iwata (Meteorological Coll.)　　Constrictive Markov operators

概 要　Consider a Markov operator $T : L^1(X, \Sigma, \mu) \to L^1(X, \Sigma, \mu)$ defined on a finite measure space (X, Σ, μ). In this talk, we shall give a necessary and sufficient condition for a constrictive Markov operator T which is an integral operator with stochastic kernel satisfying $T\mathbf{1}_X = \mathbf{1}_X$.

16　岡 村 和 弥（名 大 情 報）　Measurement theory in local quantum physics ···················· 15
　　小 澤 正 直（名 大 情 報）
<u>Kazuya Okamura</u> (Nagoya Univ.)　　Measurement theory in local quantum physics
Masanao Ozawa (Nagoya Univ.)

概 要　In this talk, we aim to establish foundations of measurement theory in local quantum physics. We introduce a condition called the normal extension property (NEP) and establish a one-to-one correspondence between completely positive (CP) instruments with the NEP and statistical equivalence classes of measuring processes. We show that every CP instrument on an atomic von Neumann algebra has the NEP and that every CP instrument on an injective von Neumann algebra is approximated by those with the NEP. Two examples of CP instruments without the NEP are obtained. It is thus concluded that in local quantum physics not every CP instrument represents a measuring process, but in most of physically relevant cases every CP instrument can be realized by a measuring process within arbitrary error limits.

17　大 野 修 一（日 本 工 大）[♭]　Weighted composition operators on $H^\infty \cap \mathcal{B}_o$ ···················· 10
Shûichi Ohno (Nippon Inst. of Tech.)　　Weighted composition operators on $H^\infty \cap \mathcal{B}_o$

概 要　We here characterize the boundedness and compactness of weighted composition operators on $H^\infty \cap \mathcal{B}_o$. Moreover we will consider the domain of weighted composition operators as H^∞ bigger than $H^\infty \cap \mathcal{B}_o$. We present some examples concerning with our results. As a corollary, we have that the boundedness of $C_\varphi : H^\infty \to H^\infty \cap \mathcal{B}_o$ is equivalent to the compactness of $C_\varphi : \mathcal{B}_o \to \mathcal{B}_o$.

18　髙 橋 眞 映（山形大[★]・東邦大理）　複素数体上の連続な分数型演算の完全分類について ················ 15
　　小 林 ゆ う 治（東 邦 大 理）
　　塚 田　　真（東 邦 大 理）
<u>Sin-Ei Takahasi</u>　　　　　　　　A complete classification of continuous fraction-like operations on the
　(Yamagata Univ.[★]/ Toho Univ.)　complex field
Yuji Kobayashi　　(Toho Univ.)
Makoto Tsukada　(Toho Univ.)

概 要　This is a research report about the classification problem of continuous fraction-like binary operations on the complex field $\mathbb{C}$. We show that non-trivial continuous fraction-like binary operations on $\mathbb{C}$ can be completely classified by the ratio of two complex numbers whose pair determines such an operation. Furthermore, we mention that the set of all the equivalence classes of such operations is equipped with a natural topology and it is homeomorphic to the unit disk $\{z \in \mathbb{C} : |z| \le 1\}$.

19　阿 部 敏 一（新 潟 大 自 然）　gyrogroup に基づくノルム空間の一般化 ························ 15
Toshikazu Abe (Niigata Univ.)　　A generalization of normed space based on gyrogroup

概 要　In this talk, we consider a generalization of normed space, which addition is not necessarily a commutative group but a gyrocommutative gyrogroup.

20 B. Collins　（京　　大　　理）　　コンパクト作用素に収束するランダム行列に対する自由確率論的な解析
<u>長谷部高広</u>（北　　大　　理）　　· 15
佐久間紀佳（愛知教育大教育）

Benoit Collins　（Kyoto Univ.）
<u>Takahiro Hasebe</u>（Hokkaido Univ.）
Noriyoshi Sakuma（Aichi Univ. of Edu.）

Free probabilistic analysis of random matrices converging to compact operators

概要　In a recent preprint in 2015, Shlyakhtenko found a free probabilistic method to analyze the eigenvalues of perturbed GUEs (Gaussian Unitary Ensemble). We will strengthen Shlyakhtenko's result and then we analyze polynomials of random matrices whose eigenvalues converge to eigenvalues of a compact operator.

21 <u>遠 山 宏 明</u>（前 橋 工 科 大）　　Expanded forms of operator valued α-divergence and Petz–Bregman
伊 佐 浩 史（前 橋 工 科 大）　　divergence · 15
伊 藤 公 智（前 橋 工 科 大）
亀 井 栄 三 郎
渡 邉 雅 之（前 橋 工 科 大）

<u>Hiroaki Tohyama</u>
　　　　　（Maebashi Inst. of Tech.）
Hiroshi Isa（Maebashi Inst. of Tech.）
Masatoshi Ito（Maebashi Inst. of Tech.）
Eizaburo Kamei
Masayuki Watanabe
　　　　　（Maebashi Inst. of Tech.）

Expanded forms of operator valued α-divergence and Petz–Bregman divergence

概要　Recently, we have defined new operator divergences as the differences of relative operator entropies and have represented them by using Petz–Bregman divergence $D_0(A|B) \equiv B - A - S(A|B)$. In addition, we have discussed Ψ-Bregman divergence for several functions Ψ which relate to divergences defined by the differences of entropies. In this talk, we define expanded Petz–Bregman divergence $D_{0,r}(A|B) \equiv B - A - T_r(A|B)$ and show similar results to our former ones. Moreover, we make a report of results obtained on Ψ-Bregman divergence for several functions Ψ which relate to expanded forms of divergences defined by the differences of entropies.

22 <u>渚　　　　勝</u>（千　葉　大　理）　　行列単調関数と作用素単調関数 · 15
Albania Nugraha Imam
　　　　　（千　葉　大　理）

<u>Masaru Nagisa</u>　（Chiba Univ.）
Albania Nugraha Imam（Chiba Univ.）

Matrix monotone function and Operator monotone function

概要　We consider functions with some special forms as follows: for real numbers a, b, let $h(t) = \frac{b}{a}\frac{t^a-1}{t^b-1}$ $t \in (0, \infty)$. We decide values of a, b if and only if $h(t)$ becomes operator monotone on $(0, \infty)$. We also show that $h(t)$ is operator monotone if and only if $h(t)$ is 2-matrix monotone.
We consider the similar result for functions with the form $h(t) = \frac{ab(t-1)^2}{(t^a-1)(t^b-1)}$ $t \in (0, \infty)$. When $b = 1 - a$ and $-1 \le a \le 2$, this function is called Petz–Hasegawa's function and is known the operator monotonicity of this function.

14:15〜15:00

23 瀬 尾 祐 貴（大阪教育大教育）　　Matrix inequalities via positive multilinear maps · · · · · · · · · · · · · · · · · · 10

Yuki Seo（Osaka Kyoiku Univ.）

Matrix inequalities via positive multilinear maps

概要　Utilizing the notion of positive multilinear mappings, we present some matrix inequalities. In particular, Choi–Davis–Jensen and Kantorovich type inequalities including positive multilinear mappings are presented.

24 梶 原   毅（岡 山 大 環 境） 2次元自己相似写像に付随する C*-環の解析 ･････････････････････････ 15
    綿 谷 安 男（九 大 数 理）
Tsuyoshi Kajiwara (Okayama Univ.)   C*-algebras associated with two dimensional self-similar maps
Yasuo Watatani (Kyushu Univ.)

概 要 In this talk, we present analysis of the C*-algebras associated with two dimensional self-similar maps. We mainly consider the case of the product of the one dimensional tent map. Contrast to the one dimensional cases, there exist chains of branched points. The corresponding Pimsner C*-algebra is simple and purely infinite. By the calculation of K-groups, it coincide with Cuntz algebra $\emptyset_\infty$. We do a complete classification of finite traces on the gauge invariant subalgebra (the core), and present the matrix representation of the finite cores.

25 守 屋   創（芝 浦 工 大 工） 隠れた超対称性を持つ格子フェルミオン模型 ･････････････････････････ 15
Hajime Moriya (Shibaura Inst. of Tech.)   Hidden supersymmetries in some fermion lattice models

概 要 We study hidden supersymmetries in fermion lattice models. We consider high degeneracy of SUSY ground states for some concrete SUSY models due to H. Nicolai and by P. Fendley et al. In terms of functional analysis, we formulate these SUSY models as supersymmetric C*-dynamics on the CAR algebra avoiding known obstacles. Some part of this work is collaboration with H. Katsura and Y. Nakayama.

15:15〜16:15 特別講演

安 藤 浩 志（千 葉 大 理） 作用素環の超積の構造研究
Hiroshi Ando   (Chiba Univ.)   Ultraproducts of operator algebras

概 要 In this talk I report on some recent works on ultraproducts of von Neumann algebras and its connection to QWEP problem and C*-algebras. The talks are divided in 3 parts.
In part 1, I recall basic notions of the following notiosn: ultralimits, von Neumann algebras and tracial central sequences.
In part 2, I explain various generalizations of tracial ultraproducts and how they are related to each other, and also that how their relationships give structural results on Ocneanu ultraproduct of type III factors.
In part 3, I explain some applications of ultraproducts to (a) Kirchberg's QWEP problem, or equivalently Connes' embedding problem (b) noncommutativity of C*-central sequence algebras for a large class of separable C*-algebras.
The above works are combinations of works with Uffe Haagerup, Carl Winslow and Eberhard Kirchberg.

統 計 数 学

3月16日(水)   第Ⅱ会場

9:30〜12:00

1 道 工   勇 (埼 玉 大 教 育)   環境依存型モデル (EDM) に関する Cox–Perkins 型極限定理 · · · · · · · · · · 15
   Isamu Dôku   (Saitama Univ.)   Cox–Perkins type limit theorem for EDMs

概 要 We consider an environment-dependent model, namely, a kind of stochastic interacting system. Under suitable conditions, if the model is rescaled, then the rescaled process converges to a superprocess, i.e., a Dawson–Watanabe superprocess with spatially dependent branching rate. The result is an extension of the work done by Cox–Perkins (2005).

2 中 田 寿 夫 (福 岡 教 育 大)   無限大の期待値をもつ重みつきの独立な確率変数列に関する大数の弱法則
   · 10
   Toshio Nakata (Fukuoka Univ. of Edu.)   Weak laws of large numbers for weighted independent random variables
                                            with infinite mean

概 要 We study weak laws of large numbers for weighted independent random variables with infinite mean. In particular, this paper explores the case that the decay order of the tail probability is -1. Moreover, we extend a result concerning the Pareto–Zipf distributions given by A. Adler.

3 佃   康 司   対数的アセンブリに関する $L^2(0,1)$ 汎関数中心極限定理 · · · · · · · · · · · · · 10
   (久留米大バイオ統計センター)
   Koji Tsukuda (Kurume Univ.)   On $L^2(0,1)$ functional central limit theorems for logarithmic assemblies

概 要 Functional central limit theorems in $L^2(0,1)$ for logarithmic assemblies are presented. The results in the literature proved the weak convergences of random processes associated with logarithmic assemblies to a standard Borwnian motion $(B(u))_{u\in[0,1]}$ in the Skorokhod space. On the other hand, in this presentation, weak convergences in $L^2(0,1)$ of random processes with the standardization varying with u to $(B(u)/\sqrt{u})_{u\in(0,1)}$ are proved.

4 鄭   容 武 (広 島 大 工)   区間力学系の大偏差原理について · 15
   高 橋 博 樹 (慶 大 理 工)
   J. Rivera-Letelier (Univ. of Rochester)
   Yong Moo Chung (Hiroshima Univ.)   On the large deviation principle in one-dimensional dynamics
   Hiroki Takahasi   (Keio Univ.)
   Juan Rivera-Letelier
               (Univ. of Rochester)

概 要 We study a topologically exact smooth interval map with non-flat critical points. Assuming the map has only hyperbolic repelling periodic points and no critical relation, we establish the large deviation principle for empirical means.

5 田 中 晴 喜（和歌山県立医大） Asymptotic perturbation of graph iterated function systems ········· 15

Haruyoshi Tanaka
        （Wakayama Med. Univ.）   Asymptotic perturbation of graph iterated function systems

概 要 In this talk, we study an asymptotic perturbation of the limit set generated from a finitely family of conformal contraction maps endowed with a directed graph. We show that if those maps have asymptotic expansions under certain weak conditions, then the Hausdorff dimension of the limit set behaves asymptotically by the same order. We also prove that the Gibbs measure of a suitable potential and the measure theoretic entropy of this measure have asymptotic expansions under an additional condition. Finally, we demonstrate degeneration of graph iterated function systems.

6 長 谷 部 高 広（北　大　理） 自由レヴィ過程の単峰性について ································· 10
   佐 久 間 紀 佳（愛知教育大教育）

Takahiro Hasebe （Hokkaido Univ.）   On unimodality for free Lévy processes
Noriyoshi Sakuma （Aichi Univ. of Edu.）

概 要 We will prove that a symmetric free Lévy process is unimodal if and only if its free Lévy measure is unimodal and that Every free Lévy process with boundedly supported Lévy measure is unimodal in sufficiently large time. For the proof we will (almost) characterize the existence of atoms and the existence of continuous probability densities of marginal distributions of a free Lévy process in terms of Lévy Khintchine representation.

7 吉 川 和 宏（立命館大理工） 多次元新谷ゼータ分布の無限分解可能性と同値な指標の関係式について
                          ··· 15

Kazuhiro Yoshikawa
        （Ritsumeikan Univ.）   Some identities of characters of infinitely divisible multidimensional
                                Shintani zeta distributions

概 要 In recent years, Aoyama and Nakamura introduced multidimensional Shintani zeta functions, where a class of multidimensional discrete distributions associated with these zeta functions was definable ([2]). By applying Euler products, they showed that the class contained compound Poisson distributions enough ([1]). In this talk, we consider some conditions for multidimensional Shintani zeta distributions to be infinitely divisible. Some of the conditions have relations to identities of multiple zeta values. Our aim is to calculate probabilities for multidimensional Shintani zeta distributions by making use of their identities.

8 星 野 浄 生（阪 府 大 理） 非因果的な Wiener 汎関数の Ogawa 積分可能性 ··················· 10
   数 見 哲 也（阪 府 大 理）

Kiyoiki Hoshino （Osaka Pref. Univ.）   On the integrability of Ogawa integrals of noncausal Wiener functionals
Tetsuya Kazumi （Osaka Pref. Univ.）

概 要 In the framework of Wiener chaos, in case a noncausal function is represented by a Skorokhod integral, we are to give a sufficient condition the function is Ogawa-integrable,and to represent the Ogawa integral by Skorokhod integrals under the condition.

9　大 塚 隆 史（首都大東京理工）　A family of self-avoiding random walks interpolating the loop-erased
　　服 部 久 美 子（首都大東京理工）　random walk and a self-avoiding walk on the Sierpinski gasket ······· 15
　　大 胡 範 晃（首都大東京理工）

Takafumi Otsuka (Tokyo Metro. Univ.)　A family of self-avoiding random walks interpolating the loop-erased
Kumiko Hattori (Tokyo Metro. Univ.)　random walk and a self-avoiding walk on the Sierpinski gasket
Noriaki Ogo (Tokyo Metro. Univ.)

概 要　We show that the 'erasing-larger-loops-first' (ELLF) method, which was first introduced for erasing loops from the simple random walk on the Sierpinski gasket, does work also for non-Markov random walks, in particular, self-repelling walks to construct a new family of self-avoiding walks on the Sierpinski gasket. The one-parameter family constructed in this method continuously connects the loop-erased random walk and a self-avoiding walk which has the same asymptotic behavior as the 'standard' self-avoiding walk. We prove the existence of the scaling limit and study some path properties: The exponent ν governing the short-time behavior of the scaling limit varies continuously in u. The limit process is almost surely self-avoiding, while it path Hausdorff dimension $1/\nu$, which is strictly greater than 1.

10　原 瀬　　晋（立命館大理工）　オプション価格計算における Sobol' 列の比較 ····················· 15
　　湯 浅 智 意（立命館大理工）

Shin Harase (Ritsumeikan Univ.)　A comparison study of Sobol' sequences in option pricing
Tomooki Yuasa (Ritsumeikan Univ.)

概 要　We consider multivariate numerical integration in financial engineering by quasi-Monte Carlo methods. Sobol' sequences are typical quasi-Monte Carlo sequences with small discrepancy based on the (t, m, s)-nets. Here, there are several Sobol' sequences with distinct parameter sets. In this talk, we compare Sobol' sequences in terms of examples of option pricing.

14:30〜15:30　特別講演

山 崎 和 俊（関西大システム理工）　屈折反射レヴィー過程

Kazutoshi Yamazaki (Kansai Univ.)　Refracted-reflected Lévy processes

概 要　We study a combination of the refracted and reflected Lévy processes. Given a spectrally one-sided Lévy process and two boundaries, it is reflected at the lower boundary while, whenever it is above the upper boundary, a linear drift at a constant rate is subtracted from the increments of the process. Using the scale functions, we compute the resolvent measure, the Laplace transform of the occupation times as well as other fluctuation identities that will be useful in applied probability including insurance, queues, and inventory management. This talk is based on a joint work with José Luis Pérez (CIMAT).

15:45〜16:45　特別講演

楠 岡 誠 一 郎（岡 山 大 自 然）　確率解析を用いた非発散放物型方程式の解と基本解へのアプローチ

Seiichiro Kusuoka (Okayama Univ.)　An approach to the solutions and the fundamental solutions to non-divergence form parabolic equations by stochastic analysis

概 要　We consider the solutions and the fundamental solutions to time-inhomogeneous non-divergence form parabolic partial differential equations with low-regular coefficients by stochastic analysis. If the coefficients are Hölder continuous, there is a well-known result by the parametrix method. In this talk, we consider the case of less regular coefficients. Precisely speaking, we treat the case that the coefficient of the second-order derivative is continuous in the spacial component uniformly in time and the coefficients of the first-order derivative and of the multiplication are bounded measurable, and obtain the modulus of the continuity of the solutions and the fundamental solutions. We also consider the probabilistic aspect of the perturbation of equations, and obtain the existence and the two-sided bounds of the fundamental solution to the perturbed equations. As an application of the probabilistic representation of the perturbation we concern stochastic differential equations with path-dependent drift terms.

3月17日（木）   第Ⅱ会場

9:45～11:30

11 中 嶋 文 雄（岩 手 大 教 育）   Statistical approach to the form of Mt. Fuji through its contour map
.... 15

Fumio Nakajima （Iwate Univ.）   Statistical approach to the form of Mt. Fuji through its contour map

概 要 We shall investigate the form of Mt. Fuji through its contour map from mean value and standard deviation of their data.

12 前 園 宜 彦（九 大 数 理）   ハザード関数のカーネル型直接推定量の漸近的性質について ·········· 10
森 山　　卓（九 大 数 理）

Yoshihiko Maesono （Kyushu Univ.）   Direct kernel type estimator of a hazard ratio and its asymptotic prop-
Taku Moriyama （Kyushu Univ.）   erties

概 要 In this talk, we propose a direct kernel type estimator of a hazard ratio and discuss asymptotic properties of them. We obtain asymptotic mean squared errors and compare them with a natural estimator, which is constituted of two kernel type estimators of density and distribution functions. Mean squared errors of the natural estimator are already obtained. Comparing these mean squared errors, we show that the direct estimator is superior than the in-direct estimator in many cases.

13 五 十 嵐 岳（筑波大システム情報）   多変量対数正規カーネルを用いた境界バイアスのない密度推定について
.... 15

Gaku Igarashi （Univ. of Tsukuba）   Boundary-bias-free density estimation using multivariate log-normal ker-
nel

概 要 In the recent fifteen years, in order to avoid the boundary bias problem, several univariate asymmetric kernel (AK) estimators of a density with support $[0, \infty)$ or $[0, 1]$ have been suggested. Also, a few multivariate AK estimators were discussed. The log-normal kernel estimator is one of the univariate AK estimators. In this talk, we report the asymptotic properties of the multivariate AK estimator using multivariate log-normal kernel.

14 安 芸 重 雄（関西大システム理工）   連に関連した分布の期待値の単調性について ······················· 10
平 野 勝 臣（城 西 大 理）

Sigeo Aki　　　（Kansai Univ.）   On monotonicity of expected values of some run-related distributions
Katuomi Hirano （Josai Univ.）

概 要 We show that the expectation of the binomial distribution of order k with success probability p is monotonically increasing with respect to p for all n and k. The result is extended to the problems on exchangeable random sequences and expectations of distributions of mixtures of binomial distributions of order k are studied. If the mixing measure is stochastically increasing with respect to its parameter, the expectation of the mixture of binomial distributions of order k becomes nondecreasing. As examples of mixing measures submodels of beta distributions are examined and the resulting expectation of the mixture distribution is monotonically strictly increasing. Further, we show some properties on the expectation of the ℓ-overlapping 1-runs.

15 高 山 信 毅 (神 戸 大 理)
後 藤 良 彰 (神 戸 大 理)
橘   義 仁 (神 戸 大 理)
Nobuki Takayama (Kobe Univ.)
Yoshiaki Goto   (Kobe Univ.)
Yoshihito Tachibana (Kobe Univ.)

概要 We give a complexity analysis of the holonomic gradient method (HGM) to evaluate numerically and exactly the conditional probability of a given two way contingency table. A modular method is applied to evaluate efficiently the probability.

16 小 山 民 雄 (東大情報理工)

Tamio Koyama (Univ. of Tokyo)

概要 We utilize the holonomic gradient method for the numerical calculation of the probability content of a simplex with a multivariate normal distribution. For this purpose, we calculate the derivatives of the function associated with the probability content of a polyhedron in general position. And we show that these derivatives can be written as integrals on the faces of the polyhedron.

17 福 山 克 司 (神 戸 大 理)
山 下 麻 衣 (大阪桐蔭中高)
Katusi Fukuyama (Kobe Univ.)
Mai Yamashita
(Osaka Toin Junior and Senior High School)

概要 For geometric progressions with common ratios greater than 4, the law of the iterated logarithm for discrepancies is proved and the speed of convergence to the uniform distribution is determined for almost all initial values.

18 磯 崎 泰 樹 (京都工繊大工芸)
Yasuki Isozaki (Kyoto Inst. Tech.)

概要 For one-dimensional Brownian motion, the exit time from an interval has finite exponential moments and its probability density is expanded in exponential terms. In this note we establish its counterpart for certain symmetric Lévy processes. We obtain the partial fraction expansion for the Laplace transform of the first hitting time of the integer lattice and by inversion the expansion of the density in exponential terms. Intermediate results such as finite exponential moments are also obtained for a class of nonsymmetric Lévy processes.

11:30〜12:00　統計数学分科会総会

<div align="center">

3月18日(金)　　第Ⅱ会場

</div>

9:45〜12:00

19　岩 本 誠 一 (九　　　　大⋆)　Dual least squares method —some variants— ····················· 15
Seiichi Iwamoto (Kyushu Univ.⋆)　Dual least squares method —some variants—

概 要　This talk presents some variants of dual least squares method. Four models – (1) linear perturbation,
(2) quadratic-convexity, (3) x-quadratic y-linearity, and (4) y-quadratic x-linearity – are introduced with its
closed form of primal and dual optimal solutions. The linear perturbation model is completely solved. The
others also have the same structure in optimal solution. The dual (maximization) problem is derived from
the primal (minimization) problem through three – (a) dynamic, (b) plus-minus, (c) inequality – approaches.

20　木 村　　寛　　　　Is Golden path optimal? ·· 15
　(秋田県立大システム科学技術)
　岩 本 誠 一 (九　　　　大⋆)
Yutaka Kimura (Akita Pref. Univ.)　Is Golden path optimal?
Seiichi Iwamoto (Kyushu Univ.⋆)

概 要　It is shown that Golden path is optimal for two quadratic programming problems (maximization and
minimization) under semi-Fibonacci constraints. Some relations to reversed problem and dual problem are
discussed. It turns out that both the problems are dual to each other and have an identical optimal solution
(point and value). The optimal solution is characterized by the Golden number.

21　谷 川 明 夫 (大阪工大情報)　A generalized class of pseudomeasurements for identifying unknown pa-
　　　　　　　　　　　　　　rameters of linear stochastic systems ··························· 10
Akio Tanikawa (Osaka Inst. of Tech.)　A generalized class of pseudomeasurements for identifying unknown pa-
　　　　　　　　　　　　　　rameters of linear stochastic systems

概 要　A new class of pseudomeasurements for discrete-time stochastic systems are derived from continuous-
time linear stochastic systems with unknown parameters by applying time-discretization and Taylor expan-
sion. Utilizing these pseudomeasurements, we propose new iterative methods which estimate the states of
the discrete-time stochastic systems and identify the unknown parameters simultaneously.

22　堀 口 正 之 (神 奈 川 大 理)　Optimal stopping problem in uncertain Markov decision processes ···· 15
　A. B. Piunovskiy (Univ. of Liverpool)
Masayuki Horiguchi (Kanagawa Univ.)　Optimal stopping problem in uncertain Markov decision processes
A. B. Piunovskiy (Univ. of Liverpool)

概 要　This note is concerned with the optimal stopping problem under Markov decision processes with the
total expected cost criterion. The state of the system is observable, but the transition matrices are unknown.
Under the general formulation, the problem is solved by combining dynamic programming and Bayesian
approach and the optimal stopping rule of a threshold type is derived.

23　阪 口 昌 彦 (高 知 大 病 院)　S. W. Golomb による指数関数の最大化のための極小埋め込み ······· 10
Masahiko Sakaguchi (Kochi Univ.)　A minimal imbedding for maximization the S. W. Golomb exponential
　　　　　　　　　　　　　　function

概 要　We maximize the the exponential function by S. W. Golomb (Amer. Math. Monthly 75, 1968). The
original problems are equivalent to the maximizing problem with a multiplicative reward function with real
numbers. Therefore we give a minimal imbedding for the maximizing multiplicative reward problem and
the optimal recursive equation.

24 松 原 和 樹 (中央学院大商)   Some existence of cyclic splitting BIB designs · 15
    景 山 三 平 (東 京 理 大)

Kazuki Matsubara (ChuoGakuin Univ.)   Some existence of cyclic splitting BIB designs
Sanpei Kageyama (Tokyo Univ. of Sci.)

概 要 The concept of splitting balanced incomplete block (BIB) designs B$(v, u \times k, \lambda)$ has been defined with some applications for authentication codes in Ogata et al. (2004). In this talk, some fundamental combinatorial properties of splitting BIB designs with cyclic automorphism are given and some direct methods of constructing such designs are provided. Finally, the complete existence of a cyclic splitting B$(v, 2 \times 2, \lambda)$ for any v and λ, and non-existence of a cyclic splitting B$(k^2 t + 1, 2 \times k, 1)$ for any odd integers $k \geq 3$ and $t \geq 1$ are shown.

25 盧   曉 南 (名 大 情 報)   A construction of cyclic 3×3 grid-block designs and its application · · 15
    神 保 雅 一 (中部大現代教育)

Xiao-Nan Lu   (Nagoya Univ.)   A construction of cyclic 3×3 grid-block designs and its application
Masakazu Jimbo (Chubu Univ.)

概 要 The notion of grid-block designs originated from the experimental designs for DNA library screening as follows: For a v-set V, let $\mathcal{B}$ be a collection of $r \times k$ arrays with rk different entries in V. A pair $(V, \mathcal{B})$ is called an $r \times k$ grid-block design if every pair of distinct points in V occurs exactly once in the same row or in the same column of a grid-block of $\mathcal{B}$. Moreover, $(V, \mathcal{B})$ is cyclic, if $\mathcal{B}$ admits a cyclic group of order v as its automorphism. In this talk, by utilizing cyclotomic methods, we investigate a construction of cyclic 3×3 grid-block designs and apply the resultant designs to construct resolvable 3×3 grid-block designs.

26 弓 場   弘 (国 際 自 然 研)   Characteristics of balanced fractional 3^m factorial designs of resolution
    兵 頭 義 史   R$^*(\{10, 01\} | \{00, 10, 01, 20, 11\})$ with $N < \nu(m)$ · · · · · · · · · · · · · · · · · · · 15
    (岡山理大総合情報研・国際自然研)
    桑 田 正 秀 (国 際 自 然 研)

Hiromu Yumiba (Int. Inst. for Nat. Sci.)   Characteristics of balanced fractional 3^m factorial designs of resolution
Yoshifumi Hyodo   R$^*(\{10, 01\} | \{00, 10, 01, 20, 11\})$ with $N < \nu(m)$
(Okayama Univ. of Sci./Int. Inst. for Nat. Sci.)
Masahide Kuwada
        (Int. Inst. for Nat. Sci.)

概 要 Consider a fractional 3^m factorial design with m factors each at three levels, which is derived from a simple array (SA) of three symbols, where $m \geq 4$, and the non-negligible factorial effects are the general mean, the linear components and the quadratic ones of the main effect, and the linear by linear ones and the linear by quadratic ones of the two-factor interaction. Under these situations, if all the main effects are estimable, and the remaining non-negligible factorial effects may or may not be estimable, then a design is said to be of resolution R$^*(\{10, 01\} | \Omega)$, where $\Omega = \{00, 10, 01, 20, 11\}$. Then by using the properties of some algebra, we give the existence conditions of a 3^m-BFF design of resolution R$^*(\{10, 01\} | \Omega)$ derived from an SA, where the number of assemblies is less than the number of non-negligible factorial effects.

27　<u>澤　　正　憲</u>（神戸大システム情報）　超八面体の辺の等分点を用いた D 最適実験計画の構成法について ····· 15
　　平 尾 将 剛（愛知県立大情報）
　　山 本 裕 貴（神 戸 大 工）

<u>Masanori Sawa</u>　（Kobe Univ.）　A generalization of the corner-vector method for constructing D-optimal
Masatake Hirao (Aichi Pref. Univ.)　designs on the hyperballs
Hirotaka Yamamoto (Kobe Univ.)

概 要　Many publications have been devoted to the constructions of D-optimal designs on the hyperballs, most of which are however for regression models for polynomials of degree at most 3. In this talk we propose a geometric construction of D-optimal designs and thereby find such designs of degree at least 4. The proposed method is not only of statistical interest but also a natural generalization of a classical construction of Euclidean designs using the corner vectors for the hyperoctahedoral group in algebraic combinatorics.

14:15〜15:15　特別講演

　　種 市 信 裕（鹿 児 島 大 理）　多項分布の適合度検定統計量の分布の近似と離散統計モデルへの応用

Nobuhiro Taneichi (Kagoshima Univ.)　An approximation for the distribution of the multinomial goodness-of-fit
　　　　　　　　　　　　　　　　　statistic and its application to discrete statistical model

概 要　On the goodness-of-fit test for the multinomial distribution, an approximation based on an asymptotic expansion for the distribution of a test statistic under simple null hypothesis has been developed (Ranga Rao (1961), Yarnold (1972), Siotani & Fujikoshi (1984), Read (1984)). First, we summarize the theory of the approximation and show a difficulty to extend the theory. Second, we consider the approximation for the distribution of a test statistic under alternative hypotheses. Third, we apply the approximation to some discrete statistical models (e.g., contingency table, generalized linear model with binary response).

15:30〜16:30　2015 年度（第 14 回）日本数学会解析学賞受賞特別講演

　　竹 村 彰 通（東大情報理工）　ホロノミック勾配法に関する研究

Akimichi Takemura (Univ. of Tokyo)　Studies on holonomic gradient method

概 要　We give a review talk on holonomic gradient method, from its origin to recent developments. The holonomic gradient method combines algebraic algorithms for the module of differential operators and numerical solvers for ordinary differential equations. The method is found to be very useful for evaluation of the normalizing constants of many probability distributions in statistics and the computation of the maximum likelihood estimators.

3月19日(土)   第Ⅱ会場

9:50～12:00

28 明 石 郁 哉 (早 大 理 工)   LAD-based empirical likelihood method for linear hypothesis and its
    Xiaofeng Shao   local asymptotic power ··· 15
    (Univ. of Illinois at Urbana-Champaign)

    Fumiya Akashi (Waseda Univ.)   LAD-based empirical likelihood method for linear hypothesis and its
    Xiaofeng Shao   local asymptotic power
    (Univ. of Illinois at Urbana-Champaign)

概要 In this talk, we construct the least absolute deviation (LAD)-based empirical likelihood (EL) test
statistic for a linear hypothesis on unknown parameters of linear regression models. As a noteworthy result,
LAD-based EL test statistic is shown to converge to the standard chi-square distribution. Since the limit
distribution is pivotal, we can construct a testing procedure without estimating any unknown quantities
of the model. In addition, the limit distribution of LAD-based EL test statistic under local contiguous
alternatives is elucidated, and the asymptotic local power of the proposed test is derived. Finally, we
investigate finite sample performance of the proposed test by simulation experiments, and it is shown that
our approach has advantages in many senses compared with classical one.

29 明 石 郁 哉 (早 大 理 工)   自己加重経験尤度による安定 ARMA 過程のパラメータ検定 ·········· 15
    Fumiya Akashi (Waseda Univ.)   Self-weighted empirical likelihood method for hypothesis testing of sta-
    ble ARMA models

概要 This talk applies the empirical likelihood method to the testing problem for a linear hypothesis of
stable ARMA models, which is one of infinite variance processes. In particular, by using the method called
self-weighting, we construct self-weighted least absolute deviation-based empirical likelihood (SWLAD-EL)
test statistic. Remarkably, it is shown that the limit distribution of the proposed test statistic becomes
a standard chi-square distribution, and hence we can carry out hypothesis testing without estimating any
unknown quantities of the underlying model. We also compare the finite sample performance of the proposed
test with that of classical LAD-based test by simulation experiments. It is also reported that the proposed
test is applicable to the real data analysis such as variable selection or testing serial correlations.

30 劉   言 (早 大 理 工)   Box–Cox transformation for variance stabilization of dependent obser-
    vations ··· 15

    Yan Liu   (Waseda Univ.)   Box–Cox transformation for variance stabilization of dependent obser-
    vations

概要 Box–Cox transformation is one of the most famous transformations to stabilize the variance of
estimators. In this talk, we focus on the dependent random variables with the multivariate Tweedie
distributions to derive the optimal power coefficient in Box–Cox transformation for stabilizing variance of
dependent random variables. Under a new condition between dispersion parameters, we show the formula
for power parameter in the Box–Cox transformation for variance stabilization of dependent observations.
The result shows that even in the dependent case, the same formula as that in the case of identically and
independent distributed random variables holds. The proof and numerical simulation will also be given.

31 <u>Yujie Xue</u>   （早 大 理 工）   Minimax extrapolation error of predictors · 10
    劉　　　言（早 大 理 工）
    谷 口 正 信（早 大 理 工）

<u>Yujie Xue</u>   (Waseda Univ.)   Minimax extrapolation error of predictors
Yan Liu   (Waseda Univ.)
Masanobu Taniguchi (Waseda Univ.)

概 要 In characterizing time series, an important representation is of frequency domain because of the periodic nature of the trigonometric functions. As we know, for a weakly stationary process $\{X_t : t \in Z\}$ with mean 0 and spectral distribution function $F(\lambda)$, the linear prediction problem can be transferred into a minimization problem of the distance from 1 to a subspace of $L^2(dF)$. In this paper, we give the structure of optimal predictor of l-step prediction problem when $L^2(\cdot)$ is extended to the cases of $p > 1$ i.e., $L^p(\cdot)$, and the minimax extrapolation error of predictors is discussed.

32 長 幡 英 明（早 大 理 工）   Analysis of variance for multivariate time series · · · · · · · · · · · · · · · · · · · 10
    谷 口 正 信（早大基幹理工）

<u>Hideaki Nagahata</u> (Waseda Univ.)   Analysis of variance for multivariate time series
Masanobu Taniguchi (Waseda Univ.)

概 要 An asymptotic distribution about three test statistics (likelihood ratio, Lawely–Hotelling, Bartlett–Nanda–Pillai) under MANOVA model with an independently and identically distributed innovation term is well-known. In practice, we often need to analyze multivariate time series data (for example real financial data). For this, under MANOVA model with dependent error processes we drive the asymptotic distribution about the three test statistics. We give a sufficient condition for the tests to have the χ^2-asymptotic distribution. It is shown that the CHARN models satisfy this condition, which leads to a lot of applications in financial analysis. Also some interesting numerical studies will be given.

33 須 藤 慶 大（早 大 理 工）   定常過程の誤特定補間子の縮小推定 · 10

Yoshihiro Suto (Waseda Univ.)   Shrinkage estimation for the misspecified pseudo interpotator of a stationary process

概 要 We consider a misspecified interpolation problem, and propose a shrinkage estimator of the usual pseudo interpolator. We evaluate the mean squared interpolation error (MSIE) of the pseudo shrinkage interpolator. Then we provide a condition when the pseudo shrinkage interpolator improves the usual pseudo interpolator. Next we propose the practical shrinkage interpolator, and evaluate MSIE. Under the appropriate conditions, we see that the practical shrinkage estimator improves the usual pseudo interpolator asymptotically. We also give some numerical examples which show an interesting feature of the pseudo shrinkage interpolator.

34 柿 沢 佳 秀（北 大 経 済）   Generalized Birnbaum–Saunders kernel density estimator · · · · · · · · · · · 15

Yoshihide Kakizawa (Hokkaido Univ.)   Generalized Birnbaum–Saunders kernel density estimator

概 要 We consider estimation of the probability density for nonnegative data. In that case, the standard kernel density estimator is, in general, inconsistent near the boundary, due to the so-called boundary bias. Many authors have suggested some remedies, on the basis of renormalization, reflection, and generalized jackknifing (see Jones (1993)). On the other hand, over the last decade, there has been growing interest in the use of asymmetric kernel (AK), whose support matches the support of the density to be estimated. We propose AK density estimator using a generalized BS kernel.

35 柿 沢 佳 秀 (北 大 経 済)   Some integrals involving multivariate Hermite polynomials ·········· 10
    Yoshihide Kakizawa (Hokkaido Univ.)   Some integrals involving multivariate Hermite polynomials

概 要 We present the formula for a certain integral with respect to multivariate Hermite polynomials. Such integrals are used for deriving higher-order local power functions of asymptotically chi-squared tests. Our argument for the proof of main theorem is very simple, except for the use of an unfamiliar derivative of composite function $f(g(t))$, where f is a scalar-valued function of a real variable and g is a scalar-valued function of a vector variable $t = (t_1, \ldots, t_p)'$.

36 矢 田 和 善 (筑波大数理物質)   Estimation of a signal matrix for high-dimensional data ············· 15
    青 嶋   誠 (筑波大数理物質)
    Kazuyoshi Yata (Univ. of Tsukuba)   Estimation of a signal matrix for high-dimensional data
    Makoto Aoshima (Univ. of Tsukuba)

概 要 In this talk, we consider the problem of recovering a signal (low-rank) matrix in high-dimension, low-sample-size (HDLSS) situations. We first consider the conventional PCA to recover the signal matrix and show that the estimation of the signal matrix holds consistency properties under severe conditions. The conventional PCA is heavily subjected to a noise. In order to reduce the noise, we apply the noise-reduction (NR) methodology and propose a new estimation of the signal matrix. We show that the proposed estimation by the NR method holds the consistency properties under mild conditions and improves the error rate of the conventional PCA effectively.

14:15〜16:10

37 石 井   晶 (筑波大数理物質)   Note on two-sample tests for high-dimension, low-sample-size data ··· 15
    Aki Ishii   (Univ. of Tsukuba)   Note on two-sample tests for high-dimension, low-sample-size data

概 要 A common feature of high-dimensional data is the data dimension is high, however, the sample size is relatively low. We call such data HDLSS data. Ishii et al. (2015) gave asymptotic properties of the first principal component by using the noise-reduction (NR) methodology that was created by Yata and Aoshima (2012). In this talk, we consider two-sample tests for high-dimensional data when the data dimension goes to infinity while the sample-size is fixed. We propose a new test statistic by applying the NR estimator of the largest eigenvalue.

38 八 木 文 香 (東 京 理 大 理)   単調欠測データをもつ平均ベクトルの検定における尤度比検定統計量に
    瀬 尾   隆 (東 京 理 大 理)   ついて ··· 15
    M. Srivastava (Univ. of Toronto)
    Ayaka Yagi (Tokyo Univ. of Sci.)   On likelihood ratio test statistic for test of mean vector with monotone
    Takashi Seo (Tokyo Univ. of Sci.)   missing data
    Muni Srivastava (Univ. of Toronto)

概 要 We consider the likelihood ratio test (LRT) for testing of mean vector when the data have a monotone pattern of missing observations. In order to obtain the modified LRT statistic, we express the LRT statistic as the combining independent LRT statistics, and we derive an asymptotic expansion for the distribution of each independent LRT statistic. As a result, we propose a new modified LRT statistic using the correction factors of the LRT statistics. Finally, we investigate the asymptotic behavior of these LRT statistics for chi-squared distribution and the numerical powers using Monte Carlo simulation.

39 相 澤 愛 奈 (東京理大理工) Measure of departure from sum-symmetry model for square contingency
    山 本 紘 司 (阪　大　医) tables having ordered categories ·································· 10
    富 澤 貞 男 (東京理大理工)
    Mana Aizawa (Tokyo Univ. of Sci.) Measure of departure from sum-symmetry model for square contingency
    Kouji Yamamoto (Osaka Univ.) tables having ordered categories
    Sadao Tomizawa (Tokyo Univ. of Sci.)

概要 For the analysis of square contingency tables, Yamamoto et al. (2013, 2015) considered the sum-symmetry (SS) model. We propose a measure to represent the degree of departure from the SS model, which is expressed by using Cressie and Read's (1984) power-divergence.

40 三 枝 祐 輔 (東京理大理工) A measure of departure from second-order marginal symmetry for multi-
    田 畑 耕 治 (東京理大理工) way contingency tables ··· 15
    富 澤 貞 男 (東京理大理工)
    Yusuke Saigusa (Tokyo Univ. of Sci.) A measure of departure from second-order marginal symmetry for multi-
    Kouji Tahata (Tokyo Univ. of Sci.) way contingency tables
    Sadao Tomizawa (Tokyo Univ. of Sci.)

概要 For multi-way contingency tables, Bhapkar and Darroch (1990) considered the second-order marginal homogeneity model. We shall propose the measure to represent degree of departure from second-order marginal homogeneity. Also we shall give the approximate confidence interval of the proposed measure.

41 渋 谷 　 明 (東京理大理工) 順序カテゴリ正方分割表における対角指数条件付き対称モデル ········ 10
    生 亀 清 貴 (東京理大理工)
    富 澤 貞 男 (東京理大理工)
    Akira Shibuya (Tokyo Univ. of Sci.) Diagonal exponent conditional symmetry model for square contingency
    Kiyotaka Iki (Tokyo Univ. of Sci.) tables with ordered categories
    Sadao Tomizawa (Tokyo Univ. of Sci.)

概要 For square contingency tables with ordered categories, Tomizawa (1992) proposed the diagonal exponent symmetry (DES) model which indicates that in addition to the structure of symmetry of the probabilities with respect to the main diagonal of the table, the expected frequency has an exponential form along every subdiagonal of the table. In this paper, we propose new model which indicate that in addition to the structure of asymmetry of the probabilities with respect to the main diagonal of the table, the expected frequency has an exponential form along every subdiagonal of the table. Also this paper gives the three kinds of decompositions of the DES model.

42 前 田 良 太 朗 (東京理大理工) 順序カテゴリ正方分割表における拡張二重線形対角パラメータ対称モデ
    田 畑 耕 治 (東京理大理工) ルを用いた二重対称性の分解 ·································· 15
    富 澤 貞 男 (東京理大理工)
    Ryotaro Maeda (Tokyo Univ. of Sci.) Extended double linear diagonals-parameter symmetry model and de-
    Kouji Tahata (Tokyo Univ. of Sci.) composition of double symmetry for square tables with ordered cate-
    Sadao Tomizawa (Tokyo Univ. of Sci.) gories

概要 For square contingency tables with ordered categories, we consider the extended double linear diagonals-parameter symmetry model, and show that the double symmetry model is separated into the proposed model and the moment equality model. Also, the relationship between test statistics is given.

43 鈴 木   讓（阪   大   理） スパースな状況 $(n << p)$ で、モデル選択の計算効率を向上するには $\cdots$ 15
    Jo Suzuki   (Osaka Univ.)   Efficient computation of model selection under $n << p$

概 要 We consider the problem of finding the parent set of variables on which a variable depends using the
MDL principle. It is known that the parent set can be efficiently found using branch and bound (Suzuki
1996). In this paper, we show that the optimal parent set has at most $L = O(\log n)$ variables and the total
computation is at most $O(p^L)$ for the method.

44 高 田 佳 和（熊 本 大 自 然） 母数制限のもとでの最良不変予測量の改良 $\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 10
    Yoshikazu Takada (Kumamoto Univ.)   Improving on the best equivariant predictor under restricted parameters

概 要 We consider a prediction problem regarding the location and scale families with restricted parameters.
It is shown that the best equivariant predictors, which are constructed under unrestricted parameters, are
minimax, but are improved. Unlike the location and scale families, it seems difficult to generally show that
there exists a predictor which dominates the best equivariant predictor in the location-scale family. Instead,
we shall give an example in which the best equivariant predictor is improved.

応 用 数 学

3月16日(水)　　第VII会場

10:30〜12:00

1　潮　　和 彦　　　　　　　　Balanced C_9-foil designs and related designs ···················· 15

　　Kazuhiko Ushio　　　　　　Balanced C_9-foil designs and related designs

概 要　In graph theory, the decomposition problem of graphs is a very important topic. Various type of decomposition of many graphs can be seen in the literature of graph theory. This paper gives balanced C_9-foil designs and related designs.

2　土 屋 翔 一
　　　　　　（専修大ネットワーク情報）
　　古 谷 倫 貴（東 京 理 大 理）　　　連結 P_6-free graph の最大 HIT について ························· 15

　　Shoichi Tsuchiya (Senshu Univ.)　　On maximum HIT in P_6-free graph
　　Michitaka Furuya (Tokyo Univ. of Sci.)

概 要　It is known that every 3-connected P_5-free graph of order at least 8 has a HIST. On the other hand, we found an infinite family of k-connected P_6-free graphs without HISTs. In this talk, we introduce a result on maximum HIT in a P_6-free graph.

3　野 口 健 太（東京電機大情報）　　平面四角形分割の medial graph の彩色 ························· 15

　　Kenta Noguchi (Tokyo Denki Univ.)　　Colorings of a medial graph of plane quadrangulations

概 要　In this talk, we discuss colorings of a medial graph of plane quadrangulaions. The main theorem is the following: every medial graph of a plane quadrangulation G has a proper vertex-3-coloring if the dual of G is C-simple.

4　松 本 直 己（成 蹊 大 理 工）　　Graph-grabbing game on bipartite graphs ···················· 15

　　Naoki Matsumoto (Seikei Univ.)　　Graph-grabbing game on bipartite graphs

概 要　A *graph-grabbing game* is a two-players game on weighted connected graphs. In the game, they alternately remove a non-cut vertex from the graph and get the weight assigned to the vertex. Both players' aim is to maximize their outcomes, when all vertices have been taken. Seacrest and seacrest proved that Alice can obtain at least half of the total weight of every weighted tree with even order, and conjectured that the same statement holds for connected bipartite graphs with even order. In this talk, we prove that Alice can obtain at least $\frac{1}{4}$ of the total weight of every weighted connected bipartite graph with even order.

5　佐 竹 翔 平（名 大 情 報）　　Asymmetry of oriented graphs and some related results ·············· 15
　　澤　　正 憲（神戸大システム情報）
　　神 保 雅 一（中部大現代教育）

　　Shohei Satake　(Nagoya Univ.)　　Asymmetry of oriented graphs and some related results
　　Masanori Sawa　(Kobe Univ.)
　　Masakazu Jimbo (Chubu Univ.)

概 要　In this talk, we deal with oriented graphs and hereafter, "graph" means oriented graph. First, we define the asymmetry number of graphs with n vertices and show an upper bound. And we also introduce the result which shows this bound is asymptotically best possible by using probabilistic methods. Moreover we show some results about the symmetry of the random oriented graph RO. Next, we consider finite graphs with n vertices and N edges and show an upper bound of the asymmetry number for such graphs and we will also discuss the asymptotically best possibility.

14:30～16:00

6 高 橋   正（甲南大知能情報） 自動証明ソフトウェアを用いた推論過程 ·························· 10
   Tadashi Takahashi (Konan Univ.)   The Inference Process using Automated Theorem Prover

概要 Theorema system allows you to organize mathematical knowledge as hierarchies of interdependent theories. We present a case study using the theorema system to explore for inference process.

7 金 子 真 隆（東 邦 大 薬） TeX 描画と描画データの数学的処理との有機的連携 ················ 15
   大 島 利 雄（城 西 大 理）
   高 遠 節 夫（東 邦 大 理）
   Masataka Kaneko (Toho Univ.)   Effective linkage between TeX drawing and handling of graphical data
   Toshio Oshima   (Josai Univ.)
   Setsuo Takato   (Toho Univ.)

概要 In this presentation, we introduce the KETCindy system which is a plug-in of dynamic geometry software to convert its graphical data into TeX graphics code. Throgh the example of drawing Bezier curves and its application to the calculation of the areas surrounded by those curves, it will be demonstrated that the effective linkage between TeX drawing and the handling of its graphical data can be realized by KETCindy system. It is expected that these features of KETCindy system might serve a powerful tool in wide range of mathematical science.

8 宮 寺 良 平（関 西 学 院 高） 石とりゲームの変種 —Grundy 数がニム和に等しくなるための必要十分
   中 屋 悠 資（関 西 学 院 高） 条件— ·· 15
   Ryohei Miyadera   A Variant of Nim —A necessary and sufficient condition for the Grundy
     (Kwansei Gakuin High School)   number of this game to be the Nim-sum—
   Yushi Nakaya
     (Kwansei Gakuin High School)

概要 Chocolate bar games are variants of Nim (or CHOMP) in which the goal is to leave your opponent with the single bitter part of the chocolate. Here, we investigate step chocolate bars whose widths are determined by a fixed function of the horizontal distance from the bitter square. We present a necessary and sufficient condition for a chocolate bar to have Grundy number $G(\{y,z\}) = y \oplus z$. We also present a necessary and sufficient condition for a chocolate bar to have Grundy number $G(\{y,z\}) = (y \oplus (z+s)) - s$.

9 東 谷 章 弘（京 都 産 大 理） 整単体の分類と二元シンプレックス符号 ························· 15
   Akihiro Higashitani   Classification of lattice simplices and binary simplex codes
     (Kyoto Sangyo Univ.)

概要 It was proven that for a lattice simplex of dimension d with degree k which is not a lattice pyramid over a lower-dimensional simplex, the inequality $d \leq 4k - 2$ holds. In this talk, we classify all the lattice simplices of dimension $4k - 2$ with degree k which are not lattice pyramids up to unimodular equivalence. Actually, such a lattice simplex is uniquely determined by its degree and arises from a binary simplex code.

10 八 森 正 泰（筑波大システム情報） 単体的複体の分割、h-triangle と hereditary property ··············· 15
   Masahiro Hachimori   Partitionability of simplicial complexes, h-triangles and hereditary prop-
     (Univ. of Tsukuba)   erties

概要 Shellability of simplicial complexes implies sequential Cohen–Macaulayness and partitionability. While sequentail Cohen–Macaulayness implies the nonnegativity of h-triangles, h-triangles of partitionable simplicial complexes can have negative entries. We, however, observe that partitionability implies somewhat weaker nonnegativity property of h-triangles (i.e., property SNNDH). We then proced to show that hereditary-shellability, hereditary-sequential Cohen–Macaulayness, hereditary-partitionability and hereditary-SNNDH are all equivalent for dimensions upto 2.

16:10〜17:10　特別講演

佐 久 間 雅（山形大地域教育）　ブロッキング型及びアンチブロッキング型整数多面体の類似性について
Tadashi Sakuma (Yamagata Univ.)　Similarities and dissimilarities between the blocking and anti-blocking polyhedra

概 要　The study of similarities and dissimilarities between the blocking and anti-blocking polyhedra began with a series of celebrated papers by Fulkerson (1970, 1971, 1972), and it has grown up a mature theory by significant contributions of Lehman, Lovász, Padberg, and others in 1970s and 1980s. Even today, this theory still shows a big progression such as the perfect graph theorem of Seymour et al. (2006). In this paper, we survey the current status of this research field with a focus on the conjecture of Conforti & Cornuéjols and the conjecuture of Grinstead.

3月17日（木）　　第VII会場

10:00〜11:30

11　佐 藤　　巖（小 山 工 高 専）　単体的複体のゼータ関数 ···································· 15
瀬 川 悦 生（東 北 大 情 報）
松 江　　要（統 計 数 理 研）
Iwao Sato (Oyama Nat. Coll. of Tech.)　Zeta function of a simplicial complex
Etsuo Segawa　(Tohoku Univ.)
Kaname Matsue (Inst. of Stat. Math.)

概 要　We define a zeta function for a 2-dimensional simplicial complex of a maximal planar graph, and present its determinant expression. Furthermore, we generalize it to a 2-dimensional cell complex of a planar graph. Next, we define a zeta function for a skeleton of the clique complex of a graph, and give its determinant expression. Finally, we give a determinant expression for the zeta function of the 2-dimensional skeleton of the clique complex of a complete graph.

12　三 橋 秀 生（宇都宮大教育）　有限グラフの四元数重み付きゼータ関数 ························ 15
今 野 紀 雄（横浜国大理工）
佐 藤　　巖（小 山 工 高 専）
Hideo Mitsuhashi (Utsunomiya Univ.)　Quaternionic weighted zeta functions of finite graphs
Norio Konno (Yokohama Nat. Univ.)
Iwao Sato (Oyama Nat. Coll. of Tech.)

概 要　We establish the quaternionic weighted zeta function of a graph and its study determinant expressions. For a graph with quaternionic weights on arcs, we define a zeta function by using an infinite product which is regarded as the Euler product. This is a quaternionic extension of the square of the Ihara zeta function. We show that the new zeta function can be expressed as the exponential of a generating function and that it has two study determinant expressions, which are important for the theory of zeta functions of graphs.

13　鈴 木 章 斗（信 州 大 工）　量子ウォーカーの漸近挙動と弱収束定理 ························ 15
Akito Suzuki　(Shinshu Univ.)　Asymptotic behavior of a quantum walker and the weak limit theorem

概 要　We consider the discrete time quantum walk on the line with a position dependent coin. We construct the asymptotic velocity operator of the quantum walk. As a consequence, we obtain the weak limit theorem.

14 土 屋 拓 也（早 大 理 工） 離散変分法による Maxwell 方程式の数値シミュレーション ·········· 15
　　米 田　　元（早 大 理 工）

Takuya Tsuchiya (Waseda Univ.) Numerical simulations of Maxwell's equations by discrete variational
Gen Yoneda　(Waseda Univ.) derivative method

概 要 In this talk, the discretized Maxwell's equations using the discrete variational derivative method (DVDM) are considered. It is well known the discretized equations are not unique and that the results of simulations depend on the discretized equations used. However, this is difficult because the discretization scheme depends on the continuous equations. Using the DVDM, the discretized equations are derived appropriately. We derive the discretized evolution equation of the constraint equation using the DVDM and the iterated Crank–Nicolson scheme (ICNS), show the equation by the DVDM is superior to that by the ICNS in analytical. Then we perform some simulations using the discretized equations using the DVDM and the ICNS, confirm that the numerical results are consistent with analytical ones.

15 中 村 文 彦（北　大　理） Asymptotic periodicity of non-expanding piecewise linear maps with
　　　　　　　　　　　　　　random small noises ··· 10

Fumihiko Nakamura (Hokkaido Univ.) Asymptotic periodicity of non-expanding piecewise linear maps with
　　　　　　　　　　　　random small noises

概 要 The non-expanding piecewise linear map $S_{\alpha,\beta}(x) = \alpha x + \beta \pmod 1$ for $(\alpha, \beta) \in (0,1)^2$ is known as the Nagumo–Sato model which describes simplified dynamics of a single neuron. We first consider parameter regions of (α, β) in which $S_{\alpha,\beta}$ has a periodic point with period n for an arbitrary integer n. We then describe these regions explicitly and show these complicated structure associated with the Farey series. Next we consider the random dynamical system of NS model with random small noises. We discuss that the Markov operator of this system is either asymptotically periodic or asymptotically stable depending on a noise level.

13:10～14:00

16 藤 田 慎 也（横浜市大国際総合） Some results on properly colored cycles in edge-colored graphs ······· 10
Shinya Fujita (Yokohama City Univ.) Some results on properly colored cycles in edge-colored graphs

概 要 Some recent results on properly colored cycles in edge-colored graphs will be reviewed. We present a new result on this topic.

17 斎 藤　　明（日 大 文 理） The Chvátal–Erdős condition and a 2-factor with two components in a
　　善 本　　潔（日 大 理 工） graph ··· 15
Akira Saito　　(Nihon Univ.) The Chvátal–Erdős condition and a 2-factor with two components in a
kiyoshi Yoshimoto (Nihon Univ.) graph

概 要 A graph G is said to satisfy the Chvátal–Erdős condition if $\alpha(G) \le \kappa(G)$ holds, where $\alpha(G)$ and $\kappa(G)$ are the independence number and the connectivity of G, respectively. Chen et al. (2007) have proved that a graph G of order at least 128 satisfying the Chvátal–Erdős condition contains a 2-factor with two components. Their proof uses the Ramsey theorem. By a different approach which does not use the Ramsey theorem, we have proved that a graph of order at least 31 satisfying the Chvátal–Erdős condition contains a 2-factor with two components.

18 安 藤   清   A condition on $G[V_5(G)]$ for a 5-connected graph G to have a con-
    （国立情報学研・JST ERATO）   tractible edge ··· 15
Kiyoshi Ando   A condition on $G[V_5(G)]$ for a 5-connected graph G to have a con-
(Nat. Inst. of Information/JST ERATO)   tractible edge

概 要 An edge of a 5-connected graph is said to be contractible if the contraction of it results in a 5-connected graph. Let K_4^- stand for the graph obtained from K_4 by deleting one edge. Let G be a 5-connected graph. Let $V_5(G)$ denote the set of degree 5 vertices of G. We show that if $G[V_5(G)]$ has a component H such that $|H| \leq 4$ and $H \not\cong K_4^-$, then G has a contractible edge.

14:00〜14:15   2015 年度日本数学会応用数学研究奨励賞授賞式

<h2 style="text-align:center">3 月 18 日（金）   第 VII 会場</h2>

9:15〜11:55   特別セッション「位相的データ解析とパーシステントホモロジー」
平 岡 裕 章（東北大 AIMR） 位相的データ解析とパーシステントホモロジー ····················· 35
Yasuaki Hiraoka (Tohoku Univ.)   Topological data analysis and persistent homology

概 要 In this talk, I survey recent progresses on topological data analysis, especially persistent homology, and applications to materials science. On mathematical side, after a brief introduction, several connections to quiver representations are explained in detail. I show that Gabriel's theorem, the Auslander–Reiten theory, and matrix problems studied in quiver representations are useful for generalizing persistent homology. Then, these generalizations are applied to geometric analysis on soft-matters such as amorphous structures and polymers. I show that persistent homology is a powerful language for describing order in disorder.

大 林 一 平（東北大 AIMR） Inverse problem from persistence diagrams to point clouds ········· 35
Ippei Obayashi (Tohoku Univ.)   Inverse problem from persistence diagrams to point clouds

概 要 Persistent homology is the main tool of Topological data analysis (TDA), a mathematical framework to analyze data from the viewpoint of topology. In this talk, our data is a point cloud, a finite set of point in euclidean space. A persistence diagram is a visualization tool for persistence homology and it encodes the ℓ-dimensional topological features of given data.
We already know the efficient way to compute a persistence diagram from a point cloud and there are many applications of persistence diagrams. In this talk, we consider the inverse problem from a persistence diagram to a point cloud. In other words, we study how to find the point cloud whose persistence diagram is a given target diagram. Since the solution of this problem is not unique, we need an additional constraints. In our method, for a given point cloud (called an initial point cloud), we try to find the point cloud closest to the initial point cloud and whose persistence diagram is the given target diagram. The Newton–Raphson method with pseudo inverse matrices is used to compute the solution. The key is the differentiability of the persistence map, the map from the space of point clouds to the space of persistence diagrams.
In this talk, I will show the mathematical framework of the method and some numerical examples.
This study is a joint work with Marcio Gameiro (Universidade de São Paulo) and Yasuaki Hiraoka (Tohoku University).

白 井 朋 之（九 大 Ｉ Ｍ Ｉ）　ランダム複体とパーシステントホモロジー ························· 35
Tomoyuki Shirai（Kyushu Univ.）　Random complex and persistent homology

概 要 In the beginning of this century persistent homology theory appears as a tool of topological data analysis for point cloud data, protein data, image data, material sciences, and so on. It describes birth and death of homology classes as persistence diagram by providing an increasing sequence of simplicial complexes. We are interested in the topological feasture of random object, in particular, random persistence diagram obtained from random input. The Erdős–Renyi graph process is such a typical example of increasing stochastic process and we can see its random persistence diagram as an output. In this talk, we focus on simplicial complex versions of the Erdős–Renyi graph process and discuss the mean lifetime of its homology classes by emphasizing the relationship between mean lifetime of persistent homology and minimum spanning acycle.

草 野 元 紀（東 北 大 理）　パーシステントホモロジーのカーネル法と位相的データ解析 ········· 35
Genki Kusano（Tohoku Univ.）　Kernel methods for persistent homology and topological data analysis

概 要 In this talk, we will establish a kernel based framework of statistics for "shapes of data". In topological data analysis, shapes of data are algebraically encoded and expressed as a persistence diagram (PD). It gives us novel applications in a wide variety of fields, such as biology, information technology, material science, and image analysis, and these scientific rapid developments create new industrial movements in data analysis. The statistical discussions for PDs, however, have not been developed until recently, and are strongly desired by many researchers. Our results answer to this demand. The main theoretical contribution is to ensure that perturbation of data does not drastically affect the results of kernel methods. Moreover, the numerical experiments show the effectiveness of our presented method in physics and material science.

14:30～16:00

19　渡 辺 雅 二（岡 山 大 環 境）　Study on inverse problems from modeling of exogenous type microbial
　　河 合 富 佐 子　depolymerization processes ······································· 15
　　（京都工繊大ナノ材料・デバイス研究センター）

Masaji Watanabe（Okayama Univ.）　Study on inverse problems from modeling of exogenous type microbial
Fusako Kawai（Kyoto Inst. Tech.）　depolymerization processes

概 要 A mathematical model for exogenous type depolymerization processes is described. Inverse problems are formulated for a time factor and a molecular factor of degradation rate. Techniques for inverse problems are illustrated.

20　中 嶋 文 雄（岩 手 大 教 育）　A mathematical approach to the economy of atomic power generation
　　·· 15

Fumio Nakajima（Iwate Univ.）　A mathematical approach to the economy of atomic power generation

概 要 We shall construct a mathematical model for the economy of the atomic power generation, and show its ultimate state, which means the abolition of this generation.

89   応用数学

21 松 江   要（統 計 数 理 研） Covering-exchange for fast-slow systems with multi-dimensional slow
variables ·· 15

Kaname Matsue (Inst. of Stat. Math.) Covering-exchange for fast-slow systems with multi-dimensional slow
variables

概要 We provide a methodology of validating rigorous trajectories of the fast-slow system with multi-dimensional slow variables

$$x' = f(x, y, \epsilon), \quad y' = \epsilon g(x, y, \epsilon),$$

which are near slow manifolds for the time interval $O(1/\epsilon)$ within an explicit scale parameter range $(0, \epsilon_0]$, which will be applicable to rigorous numerics. Main tools of our procedure are a topological tool called covering relation and the rigorous estimate of normal hyperbolicity for invariant manifolds via cone estimates. The local product structure of covering relation and normal hyperbolicity of invariant manifolds enable us to construct trajectories which shadow slow manifolds even for systems with multi-dimensional slow variables.

22 穴 田 浩 一（早大高等学院） ある準線形放物型偏微分方程式の Type II 爆発解に対する爆発集合と爆
石 渡 哲 哉   発レート ·· 15
　　　（芝浦工大システム理工）

Koichi Anada   Blow-up sets and rates for Type II blow-up solutions to a quasi-linear
(Waseda Univ. Senior High School) parabolic partial differential equation
Tetsuya Ishiwata
　　　(Shibaura Inst. of Tech.)

概要 In this talk, we consider a quasi-linear parabolic partial differential equations that solutions blow up regionally and has blow-up rates of Type II. Our purpose is to specify their blow-up sets and blow-up rates.

23 國 谷 紀 良（神戸大システム情報） 情報伝播の数理モデルの大域的挙動 ····························· 15
Toshikazu Kuniya (Kobe Univ.) Global dynamics of a mathematical model for the spread of information

概要 In this study, a mathematical model for the spread of information is formulated as a system of partial differential equations. The basic reproduction number Ro is obtained in the sense of reproduction of new information spreaders by an information spreader invading into the information-free population. It is proven that the information-free equilibrium is globally asymptotically stable if Ro is less than or equal to 1, and the information-endemic equilibrium is so if Ro is greater than 1. In the numerical simulation, the occurrence of traveling waves is observed.

16:15〜17:15　特別講演

小 磯 深 幸（九 大 Ｉ Ｍ Ｉ） 曲面に対する非等方的エネルギーの幾何
Miyuki Koiso　(Kyushu Univ.) Geometry of anisotropic surface energy

概要 An anisotropic surface energy is one that depends on the direction of a surface at each point. It was introduced by Josiah Willard Gibbs (1839–1903) to model the equilibrium shape of a crystal. Whereas the surface energy of a liquid drop is isotropic, the ordered arrangement of molecules in a crystal means that its interfacial energy depends on the surface direction. This causes that, while the closed surface with the minimum area (isotropic surface energy) among closed surfaces enclosing a given volume is a sphere, the closed surface with the minimum anisotropic surface energy is in general non-spherical. In this talk, we discuss existence, stability, and uniqueness of equilibrium surfaces for anisotropic surface energy and their geometric properties.

3月19日(土)　　第VII会場

10:00〜12:00

24　堀 口 俊 二（新潟産大経済）　Halley 法と第 3 拡張 Halley 法の収束比較実験 ····················· 15

Shunzi Horiguchi　　　　　　　Experiments to compare the convergences of third extended Halley
　　　　（Niigata Sangyo Univ.）　method with Halley method

概要 We can not obtain the degree of convergence of third extended Halley method. So, we do the experiments to compare the convergences of third extended Halley method with Halley method.

25　緒 方 秀 教（電通大情報理工）　佐藤超函数論に基づく数値積分法 ································ 15
平 山　　弘（神 奈 川 工 大）

Hidenori Ogata　　　　　　　　Numerical integration method based on the hyperfunction theory
　　　　（Univ. of Electro-Comm.）
Hiroshi Hirayama
　　　　（Kanagawa Inst. of Tech.）

概要 In this speech, we propose a numerical integration method based on Sato's hyperfunction theory. In our method, we transform a desired integral into a complex loop integral and approximate it by the trapezoidal rule. A theoretical error estimate shows exponential convergence of this method if the integrand is a real analytic function, and numerical examples show that this method works very well especially for integrals with strong endpoint singularities. We also remark that this method is closely related to the hyperfunction theory in the sense that, in this method, we approximate the complex integral which defines the desired integral as a hyperfunction integral.

26　谷 口 隆 晴（神戸大システム情報）　散逸型構造保存型数値解法の多層パーセプトロン学習法への応用 ······ 15
石 川 歩 惟（神戸大システム情報）

Takaharu Yaguchi（Kobe Univ.）　Application to a learning algorithm for multilayer perceptrons of dissi-
Ai Ishikawa　　　　（Kobe Univ.）　pative structure-preserving numerical methods

概要 This talk is about application to a learning algorithm for multilayer perceptrons of structure-preserving numerical methods for the differential equations that stem from the Caldirolla–Kanai variational principle. This principle is a variation of Hamilton's principle of least action. Whereas Hamilton's principle considers an extremum of the integral of a given Lagrangian in the Caldirolla–Kanai variational principle that of the weighted integral is considered. The differential equations that are derived from this principle always have the energy-dissipation property. In this talk, some numerical schemes that preserve the property of the differential equation are derived and then applied to a learning algorithm for multilayer perceptrons.

27　伊 藤 直 治（奈良教育大教育）　単位円周上にスペクトルをもつ自己反転作用素多項式に関する一考察 ·· 15
Naoharu Ito（Nara Univ. of Edu.）　A study on self-inversive operator polynomials with spectrum on the
　　　　　　　　　　　　　　　　　unit circle

概要 Self-inversive operator polynomials with spectrum on the unit circle are studied. If the inner numerical radius of an associated polynomial is not less than one, the spectrum lies on the unit circle and consists of normal approximate characteristic values.

28 Patrick van Meurs   Discrete-to-continuum limits of interacting dislocations · · · · · · · · · · · · · 15
        （金 沢 大 理 工）

Patrick van Meurs (Kanazawa Univ.)   Discrete-to-continuum limits of interacting dislocations

概 要 Plasticity of metals is facilitated by the collective behaviour of many dislocations, which are represented by point particles if we consider a two dimensional scenario. Currently, there exist *several different* models in the engineering literature for the dislocation density by means of a PDE. We aim ultimately to quantify the accuracy of these models by establishing a precise connection between the 'continuum' description (i.e. a continuity equation for the density) and the 'discrete' description (i.e. the movement of the particles described by a non-linearly coupled system of ODEs). To connect these two descriptions, we establish the many-particle limit by relying on variational techniques such as Γ-convergence.

29 坂 口 文 則（福 井 大 工） ベクトルの準直交化を用いた線型偏微分方程式の整数型解法の実装 · · · · 15

Fuminori Sakaguchi (Univ. of Fukui)   Implementation of an integer-type algorithm for linear partial differential equations using quasi-orthogonalization

概 要 In this study, a practical method is proposed for implementing an integer-type algorithm for solving linear higher-order partial differential equations which utilizes quasi-orthogonalization of integer vectors. This algorithm is a direct extension of an integer-type algorithm for linear ordinary differential equations proposed by the author and M. Hayashi several years ago. However, this extension requires some complicated techniques based on discrete mathematics. In this presentation, the details of these techniques are explained.

14:15～15:45

30 野 津 裕 史（早 大 高 等 研） Oseen 型拡散 Peterlin モデルのための安定化 Lagrange–Galerkin スキー
    田 端 正 久（早 大 理 工） ムの誤差評価 · 15
    M. Lukáčová-Medvid'ová
                （Univ. of Mainz）
    H. Mizerová   （Univ. of Mainz）

Hirofumi Notsu (Waseda Univ.)   Error estimates of a stabilized Lagrange–Galerkin scheme for an Oseen-
Masahisa Tabata (Waseda Univ.)   type diffusive Peterlin model
Mária Lukáčová-Medvid'ová
                (Univ. of Mainz)
Hana Mizerová (Univ. of Mainz)

概 要 A stabilized Lagrange–Galerkin scheme for an Oseen-type diffusive Peterlin model is presented. It employs a semi-implicit approximation for the time integration, which yields a nonlinear scheme. Existence, uniqueness, (essentially) unconditional stability and error estimates are proved for the scheme. Numerical results are shown in order to see the theoretical convergence order.

31 東 森 信 就（京 大 CPIER） Banach scale 上の Cauchy 問題に対する抽象的差分解の収束について · · 15
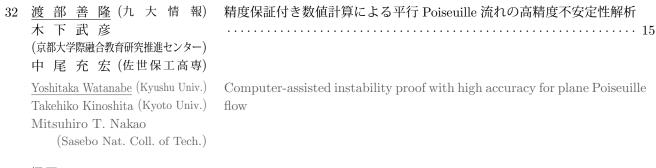   藤 原 宏 志（京 大 情 報）
    磯   祐 介（京 大 情 報）

Nobuyuki Higashimori (Kyoto Univ.)   Convergence of an abstract finite difference scheme for the Cauchy prob-
Hiroshi Fujiwara (Kyoto Univ.)   lem on a Banach scale
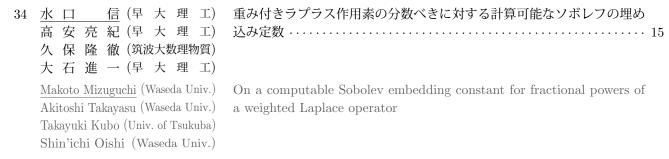Yuusuke Iso   (Kyoto Univ.)

概 要 We show a sufficient condition for convergence of an abstract finite difference scheme to solve the Cauchy problem on a Banach scale. As an application we obtain a result of convergence of a finite difference scheme to solve the Cauchy problem for a partial difference equation of normal form whose coefficients are assumed to be real analytic in space variables but not so in the time variable. Moreover we do not require that the equation is hyperbolic or that the Courant–Friedrichs–Lewy condition (CFL condition) is satisfied for the case of hyperbolic equation.

32 渡 部 善 隆 (九 大 情 報)   精度保証付き数値計算による平行 Poiseuille 流れの高精度不安定性解析
    木 下 武 彦   ·· 15
    (京都大学際融合教育研究推進センター)
    中 尾 充 宏 (佐世保工高専)

Yoshitaka Watanabe (Kyushu Univ.)   Computer-assisted instability proof with high accuracy for plane Poiseuille
Takehiko Kinoshita (Kyoto Univ.)   flow
Mitsuhiro T. Nakao
    (Sasebo Nat. Coll. of Tech.)

概要 This talk shows a numerical verification method for computing eigenpair enclosures of the Orr–Sommerfeld equation describing hydrodynamic stability of Poiseuille flow. By using spectral Galerkin approximate solutions bounding its small defect and the Banach fixed-point theorem, an eigenpair is enclosed with guaranteed accurate error and locally unique bounds in computer. Some verification results confirm the effectiveness of the method, and, to the best of the authors' knowledge, they give the best upper bound of the critical Reynolds number.

33 高 安 亮 紀 (早 大 理 工)   正値作用素の分数冪と発展作用素を用いる非線形熱方程式に対する解の
    水 口   信 (早 大 理 工)   精度保証付き数値計算法 ······································· 15
    久 保 隆 徹 (筑波大数理物質)
    大 石 進 一 (早 大 理 工)

Akitoshi Takayasu (Waseda Univ.)   Verified computations for solutions to nonlinear heat equations based
Makoto Mizuguchi (Waseda Univ.)   on fractional powers of a positive operator and the evolution operator
Kubo Takayuki (Univ. of Tsukuba)
Shin'ichi Oishi (Waseda Univ.)

概要 In this talk we consider a numerical method for verifying existence and local uniqueness of a solution for an initial-boundary value problem of nonlinear heat equations. This method is based on a fixed-point formulation using the evolution operator introduced by Tanabe–Sobolevskii. Using fractional powers of a positive operator, we derive a sufficient condition for enclosing the solution in a neighborhood of an approximate solution.

34 水 口   信 (早 大 理 工)   重み付きラプラス作用素の分数べきに対する計算可能なソボレフの埋め
    高 安 亮 紀 (早 大 理 工)   込み定数 ··· 15
    久 保 隆 徹 (筑波大数理物質)
    大 石 進 一 (早 大 理 工)

Makoto Mizuguchi (Waseda Univ.)   On a computable Sobolev embedding constant for fractional powers of
Akitoshi Takayasu (Waseda Univ.)   a weighted Laplace operator
Takayuki Kubo (Univ. of Tsukuba)
Shin'ichi Oishi (Waseda Univ.)

概要 This talk is concerned with a computable Sobolev embedding constant for fractional powers of a weighted Laplace operator on a domain $\Omega \subseteq \mathbb{R}^N$. The constant is explicitly described using the analytic semigroup over $L^2(\Omega)$ and the infimum value of spectrum of the weighted Laplace operator. Each value of the constants for some domains will be presented.

16:00～17:00 　特別講演

池 田 幸 太（明大総合数理）　興奮系反応拡散方程式におけるパルスの渋滞現象

Kota Ikeda 　　　　（Meiji Univ.）　Congestion flow of pulses in an excitable reaction-diffusion system

概 要 Self-driven motion is observed in several fields, e.g., biology, chemistry, and nonlinear physics. Organisms move spontaneously to aggregate and form self-organized structures. As a spatiotemporal collective motion, congestion flow is observed in a system with animal and in animal organisms. For example, camphor boats constitute a system for changing the number of particles and with simple interaction and generate congestion flow as reported by Suematsu et al in 2010. The mechanism of the congestion dynamics of camphor boats has been investigated theoretically. As stated in our previous works, a traveling wave solution in a model with an inhomogeneity plays an important role. Recently it was reported that traveling wave solutions with a pulse shape, simply called traveling pulses, could generate congestion flow in a reaction-diffusion system with excitability. It is well-known that a traveling pulse is formed spontaneously in an excitable system like the FitzHugh–Nagumo model. This fact seems to imply that the same mechanism as in a system with camphor boats works in the congestion flow of an excitable system. However, it is not true because the reaction-diffusion system has no inhomogeneity. In this talk, we focus on studying the traveling pulse and consider what is different between the congestion flow in the model of camphor boats and the excitable system.

ト ポ ロ ジ ー

3月16日(水)　　第VI会場

10:00～11:55

1　瀧 村 祐 介 (学 習 院 中)　　Thirty-two equivalence relations on knot projections ················ 10
　　伊 藤　　　昇 (早 大 高 等 研)

Yusuke Takimura　　　　　　Thirty-two equivalence relations on knot projections
(Gakushuin Boys' Junior High School)
Noboru Ito　　　(Waseda Univ.)

概 要 For the set of the knot projections, we define 32 homotopy equivalence relations, each of which is generated by some of the five types of Reidemeister moves. We show that 32 cases correspond to 8 trivial cases and 20 non-trivial cases reduced from 24 cases. The 20 non-trivial cases are mutually different. To show the statement, we introduce new invariants of knot projections.

2　伊 藤　　　昇 (早 大 高 等 研)　　Triply-graded knot projections under (1, 3) homotopy ·············· 15
　　瀧 村 祐 介 (学 習 院 中)

Noboru Ito　　　(Waseda Univ.)　　Triply-graded knot projections under (1, 3) homotopy
Yusuke Takimura
(Gakushuin Boys' Junior High School)

概 要 In 2001, Oestlund conjectured that Reidemeister moves RI and RIII are sufficient to describe a homotopy from any generic immersion of a circle into the plane to the simple closed curve. In 2014, Hagge and Yazinski obtained a counterexample (having at least 16 double points) of this conjecture. In this study, we obtain a counterexample of Oestlund conjecture where the minimum number of double points is 15. We show that for any integer k more than 14, there exists a knot projection where the minimum number of double points is k. We also discuss the minimum number of Type RII Reidemeister moves required to obtain the simple closed curve under the equivalence relation generated by Reidemeister moves RI and RIII.

3　松 崎 尚 作 (早 大 教 育)　　Minors of multibranched surfaces ····························· 10
　　小 沢　　　誠 (駒 澤 大 総 合)

Shosaku Matsuzaki (Waseda Univ.)　　Minors of multibranched surfaces
Makoto Ozawa (Komazawa Univ.)

概 要 We say that a 2-dimensional CW complex is a *multibranched surface* if we remove all points whose open neighborhoods are homeomorphic to $\mathbb{R}^2$, then we obtain a 1-dimensional complex which is homeomorphic to a disjoint union of some S^1's. A multibranched surface is a generalization of graphs. So we can define "minors" of multibranchd surfaces analogously. We study various properties of the minors of multibranched surfaces.

4　小 沢　　　誠 (駒 澤 大 総 合)　　Genera of multibranched surfaces ····························· 10
　　松 崎 尚 作 (早 大 教 育)

Makoto Ozawa (Komazawa Univ.)　　Genera of multibranched surfaces
Shosaku Matsuzaki (Waseda Univ.)

概 要 We say that a 2-dimensional CW complex is a *multibranched surface* if we remove all points whose open neighborhoods are homeomorphic to $\mathbb{R}^2$, then we obtain a 1-dimensional complex which is homeomorphic to a disjoint union of some S^1's. We define the (minimal) genus of a multibranched surface X as the minimal number of genera of 3-manifold into which X can be embedded. In this talk, we state some inequalities which give an upper bound for the genus of a multibranched surface.

5　岡 崎 真 也 (阪市大数学研)　An invariant comes from the Alexander polynomial of a handlebody-knot $\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 10

Shinya Okazaki (Osaka City Univ.)　An invariant comes from the Alexander polynomial of a handlebody-knot

概要 A handlebody-knot is a handlebody embedded in the 3-sphere. In this talk, we introduce an invariant of a handlebody-knot which is represented by a vertex-weighted graph. This invariant comes from the Alexander polynomial of a handlebody-knot.

6　水 澤 篤 彦 (早 大 理 工)　絡み数が消えた3成分ハンドル体絡み目の HBL-homotopy 類の不変量について $\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 10
　　小 鳥 居 祐 香 (東 大 数 理)

Atsuhiko Mizusawa (Waseda Univ.)　On invariants of HBL-homotopy classes of 3-component handlebody-links with vanishing linking numbers
Yuka Kotorii　(Univ. of Tokyo)

概要 A handlebody-link is an embedding of handlebodys into the 3-sphere. A handlebody-link is represented by its spine (a spatial graph). Two spatial graphs which represent the same handlebody-link are transformed to each other by a sequence of contraction moves. Two handlebody-links are HBL-homotopic if their representing spatial graphs are transformed to each other by a sequence of contraction moves and self-crossing changes. In this talk, we give a bijection between HBL-homotopy classes of 3-component handlebody-links with vanishing linking numbers and 3-dimensional hyper matrices up to elementary transformations. Through this map, we give some invariants of the HBL-homotopy classes.

7　和 田 康 載 (早 大 教 育)　クローバー絡み目のミルナー不変量 $\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 10
　　安 原　　晃 (東京学大教育)

Kodai Wada　　(Waseda Univ.)　Milnor invariants of clover links
Akira Yasuhara (Tokyo Gakugei Univ.)

概要 J. P. Levine introduced a clover link to investigate the indeterminacy of Milnor invariants of a link. It is shown that for a clover link, Milnor numbers of length at most $2k+1$ are well-defined if those of length at most k vanish, and that Milnor numbers of length at least $2k+2$ are not well-defined if those of length $k+1$ survive. For a clover link c with Milnor numbers of length at most k vanishing, we show that the Milnor number $\mu_c(I)$ for a sequence I is well-defined up to the greatest common devisor of $\mu_c(J)'s$, where J is a subsequence of I obtained by removing at least $k+1$ indices. Moreover, if I is a non-repeated sequence with length $2k+2$, the possible range of $\mu_c(I)$ is given explicitly. As an application, we give an edge-homotopy classification of 4-clover links.

8　市 原 一 裕 (日 大 文 理)　結び目に沿った矯飾的手術予想について $\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 15
　　斎 藤 敏 夫 (上 越 教 育 大)
　　鄭　　仁 大 (近 畿 大 理 工)

Kazuhiro Ichihara (Nihon Univ.)　On cosmetic surgery conjecture on knots
Toshio Saito (Joetsu Univ. of Edu.)
In Dae Jong　　(Kinki Univ.)

概要 The cosmetic surgery conjecture saids that no pair of Dehn surgeries along inequivalent slopes yield orientation preservingly homeomorphic 3-manifolds. First I will tlak about a recent result on this conjecture for certain two-bridge knots. Next I will present a new example of a hyperbolic knot admitting a pair of of Dehn surgeries along inequivalent slopes yield orientation reversingly homeomorphic hyperbolic 3-manifolds.

9 市 原 一 裕（日 大 文 理）   ランダム絡み目の最頻成分数と双曲性 · 15
Jiming Ma   （ Fudan Univ. ）
吉 田 健 一（日 大 文 理）

Kazuhiro Ichihara (Nihon Univ.)   Hyperbolicity and the number of components for random link
Jiming Ma   (Fudan Univ.)
Ken-ichi Yoshida (Nihon Univ.)

概 要 From a probabilistic point of view, Jiming Ma introduced and studied two models of random links. One model is given as the closure of a braid obtained from a random walk on the braid group. For such a random link, the expected value for the number of components was calculated by Jiming Ma. We first report on the most expected number of components for a random link, and further, the most expected partition of the number of strings for a random braid. Another model is given by considering random bridge decomposition for links. We next show that a random link via random bridge position is hyperbolic with asymptotic probability 1.

14:15〜15:15   特別講演

松 本 幸 夫   モジュライ空間のコンパクト化と結晶群
（学習院大理・中大理工・東大⋆）

Yukio Matsumoto   On the compactification of moduli spaces and crystallographic groups
(Gakushuin Univ./Chuo Univ./Univ. of Tokyo⋆)

概 要 The purpose of this talk is to give a natural orbifold-chart system on the Deligne–Mumford compactification of moduli space of Riemann surfaces of genus $g \geq 3$. The charts are indexed by simplices of the curve complex associated with the underlying topological surface. We will point out that certain crystallographic group on $\mathbb{E}^{3g-3}$ arises from the orbifold-chart around each maximally degenerated ideal point.

15:30〜17:10

10 寺 垣 内 政 一（広 島 大 教 育）   ツイスト結び目の結び目群に含まれる共役ねじれ元 · · · · · · · · · · · · · · · · · 10
Masakazu Teragaito (Hiroshima Univ.)   Generalized torsion elements in the knot groups of twist knots

概 要 It is well known that any knot group is torsion-free, but it may admit a generalized torsion element. We show that the knot group of any negative twist knot admits a generalized torsion element. This is a generalization of the same claim for the knot 5_2, which is the (-2)-twist knot, by Naylor and Rolfsen.

11 野 崎 雄 太（東 大 数 理）   The preimage of a knot under the covering map from S^3 to $\mathbb{R}P^3$ · · · · · 15
Yuta Nozaki   (Univ. of Tokyo)   The preimage of a knot under the covering map from S^3 to $\mathbb{R}P^3$

概 要 When a knot K in S^3 is the preimage of a knot K' in $\mathbb{R}P^3$, we describe the fundamental group $\pi_1(S^3 \setminus K)$ in terms of $\pi_1(\mathbb{R}P^3 \setminus K')$. Using this description, we give a necessary condition for K being the preimage of a knot K' in $\mathbb{R}P^3$.

12 志 摩 亜 希 子（東 海 大 理）   CS-minimal chart の性質について · 15
永 瀬 輝 男（東 海 大⋆）

Akiko Shima   (Tokai Univ.)   Properties of CS-minimal charts
Teruo Nagase   (Tokai Univ.⋆)

概 要 Two charts are said to be CS-equivalent if one deforms to the other by a finite sequence of C-moves, conjugations, stabilizations and destabilizations. Let Γ be an n-chart, $w(\Gamma)$ the number of white vertices in Γ, and $f(\Gamma)$ the number of free edges in Γ. The pair $(w(\Gamma), n - f(\Gamma))$ is called the CS-complexity of Γ. A chart Γ is CS-minimal if its CS-complexity is minimal among the set of charts CS-equivalent to Γ with respect to the lexicographical order of the pair of integers. In this talk, we prove that if Γ is a CS-minimal chart with $w(\Gamma) = 6$, then Γ is CS-equivalent to the product of a ribbon chart and a 'chart' representing a 2-twist spun trefoil.

13 濵 田 法 行 (東 大 数 理)   Finite covers of Lefschetz fibrations ······························ 15
    早 野 健 太 (北   大   理)

Noriyuki Hamada (Univ. of Tokyo)   Finite covers of Lefschetz fibrations
Kenta Hayano (Hokkaido Univ.)

概 要 We will talk about the simple fact that taking an unbranched finite cover of a Lefschetz fibration or pencil gives a new Lefschetz fibration/pencil. We will give a general recipe to imply the monodromy factorization of such a fibration and then show several examples with (very) neat monodromies. Other associated new fibrations will also be presented.

14 久 野 恵 理 香 (東 工 大 理 工)   ハンドル体群の right-angled Artin subgroup と円板グラフ ··········· 10

Erika Kuno   (Tokyo Tech)   Disk graphs and right-angled Artin subgroups in handlebody groups

概 要 Koberda proved that if a graph Γ is a full subgraph of a curve graph $\mathcal{C}(S)$ of an orientable surface S, then the right-angled Artin group $A(\Gamma)$ on Γ is a subgroup of the mapping class group $\mathrm{Mod}(S)$ of S. On the other hand, for a sufficiently complicated surface S, Kim–Koberda gave a graph Γ which is not contained in $\mathcal{C}(S)$, but $A(\Gamma)$ is a subgroup of $\mathrm{Mod}(S)$. In this talk, we prove that if Γ is a full subgraph of a disk graph $\mathcal{D}(H)$ of a handlebody H, then $A(\Gamma)$ is a subgroup of the handlebody group $\mathrm{Mod}(H)$ of H. Further, we show that there is a graph Γ which is not contained in some disk graphs, but $A(\Gamma)$ is a subgroup of the corresponding handlebody groups.

15 大 森 源 城 (東 工 大 理 工)   非有向曲面の写像類群の単純な無限表示 ························ 15

Genki Omori   (Tokyo Tech)   A simple infinite presentation for the mapping class group of a non-orientable surface

概 要 We obtain a simple infinite presentation for the mapping class group of a non-orientable surface. The generating set consists of Dehn twists and crosscap pushing maps. We use the Stukow's finite presentation for the mapping class group of a non-orientable surface and apply the Gervais's discuccion in the orientable case to obtain the presentation.

16 大 森 源 城 (東 工 大 理 工)   非有向曲面の単純閉曲線と写像類群のツイスト部分群 ··············· 10

Genki Omori   (Tokyo Tech)   Simple closed curves on a non-orientable surface and the twist subgroup of the mapping class group

概 要 The twist subgroup $\mathcal{T}(N)$ of the mapping class group $\mathcal{M}(N)$ of a non-orientable surface N is the subgroup of $\mathcal{M}(N)$ generated by all Dehn twists. $\mathcal{M}(N)$ is not generated by Dehn twists and when N is compact, $\mathcal{T}(N)$ is an index 2 subgroup of $\mathcal{M}(N)$. We consider the following problem: for simple closed curves c_1, c_2 on N whose complements are diffeomorphic, what is a condition to satisfy that there exists an element f of $\mathcal{T}(N)$ such that $f(c_1) = c_2$. We answer the problem partially.

3月17日(木)   第Ⅵ会場

10:00〜11:40

17 菰 田 智 恵 子 (久留米工高専)   C 空間と有限 C 空間に対する有限ファイバーをもつ開写像定理 ······· 10

Chieko Komoda   Open mapping theorems with finite fibers for C-spaces and finite C-
    (Kurume Nat. Coll. of Tech.)   spaces

概 要 This is a joint work with Takashi Kimura. We assume that all spaces are normal and all mappings are continuous.
In this talk we study open mapping theorems with finite fibers for C-spaces and finite C-spaces.

18 越 野 克 久（神 奈 川 大 工）   Topological types of hyperspaces of finite sets in metrizable spaces $\cdots$ 10

Katsuhisa Koshino (Kanagawa Univ.)   Topological types of hyperspaces of finite sets in metrizable spaces

概要 Let $\mathrm{Fin}(X)$ be the hyperspace consisting of non-empty finite subsets of a space X with the Vietoris topology. In this talk, we characterize a metrizable space X whose hyperspace $\mathrm{Fin}(X)$ is homeomorphic to a pre-Hilbert space spanned by the canonical orthonormal basis of a non-separable Hilbert space.

19 石 田 智 彦（京   大   理）   Calabi 準同型の対称共役類の擬等長型について $\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 10

Tomohiko Ishida (Kyoto Univ.)   Quasi-isometry type of the metric space derived from the kernel of the Calabi homomorphism

概要 We prove that the set of symmetrized conjugacy classes of the kernel of the Calabi homomorphism on the group of area-preserving diffeomorphisms of the 2-disk is not quasi-isometric to the half line.

20 韓   呼 和（横浜国大環境情報）   Strictly convex Wulff shapes and C^1 convex integrands $\cdots\cdots\cdots\cdots$ 15
    西 村 尚 史（横浜国大環境情報）

Huhe Han (Yokohama Nat. Univ.)   Strictly convex Wulff shapes and C^1 convex integrands
Takashi Nishimura
        (Yokohama Nat. Univ.)

概要 In this talk, it is shown that a Wulff shape is strictly convex if and only if its convex integrand is of class C^1. Moreover, applications of this result are given.

21 山 本 卓 宏（九 州 産 大 工）   境界付き 3 次元多様体から平面への安定写像の B_2 特異点の解消について
        $\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ 15

Takahiro Yamamoto
        (Kyushu Sangyo Univ.)   Elimination of B_2-singularities

概要 For a stable map $f\colon N \to P$ of a 3-manifold with one boundary component into a surface without boundary, we show that f is homotopic to a stable map which have no B_2 points.

22 新 海 健 一 郎（信州大総合工）   Matrix Toda bracket と小圏の 3 次のコホモロジー群について $\cdots\cdots\cdots$ 15
    百 瀬 康 弘（信州大総合工）

Kenichirou Shinkai (Shinshu Univ.)   On the matrix Toda brackets and 3-rd cohomology groups of small cat-
Yasuhiro Momose (Shinshu Univ.)   egories

概要 Hardie–Kamps–Marcum have given a categorical treatment of matrix Toda brackets introduced Barratt in the category of topological spaces. Baues–Dreckmann shawed that there exists a class in Baues–Wirsching cohomology of a small category which represents all classical Toda brackets. Our aim is to generalize such a relationship to that between the cohomology of a 2-category and matrix Toda brackets.

23 畑 中 美 帆（阪 市 大 理）   ある単純グラフに対応するトーリック多様体のコホモロジー環の表現 $\cdots$ 15

Miho Hatanaka (Osaka City Univ.)   Cohomology representations of toric manifolds associated to some sim-
        ple graphs

概要 We can construct toric manifolds from simple graphs. The automorphism group of a simple graph induces a representation on the cohomology ring of the toric manifold associated to the simple graph. The automorphism group of a complete graph is a symmetric group. Procesi described the cohomology representation when the simple graph is a complete graph. In this talk we take a graph obtained by removing an edge from a complete graph and describe the associated cohomology representation.

13:30〜14:30　特別講演

入 江　　慶（京 大 数 理 研）　A C^∞ closing lemma for three-dimensional Reeb flows via embedded contact homology

Kei Irie　　　　　（Kyoto Univ.）　A C^∞ closing lemma for three-dimensional Reeb flows via embedded contact homology

概 要　We prove a C^∞ closing lemma for three-dimensional Reeb flows, and deduce that for any closed contact three-manifold with a C^∞ generic contact form the union of all periodic Reeb orbits is dense. The proof uses recent developments in quantitative aspects of embedded contact homology, which is an invariant of contact three-manifolds defined by holomorphic curve techniques in symplectic geometry. Applications to closed geodesics and area-preserving diffeomorphisms on surfaces will be also presented.

3月18日（金）　　第Ⅵ会場

10:00〜11:45

24　今 野 北 斗（東 大 数 理）　Bounds on genus and configurations of embedded surfaces in 4-manifolds
· 15

Hokuto Konno（Univ. of Tokyo）　Bounds on genus and configurations of embedded surfaces in 4-manifolds

概 要　For finitely many surfaces with zero self-intersection number embedded in a 4-manifold with $b_1 = 0$, we show a lower bound on genus for at least one of the surfaces under some conditions on the surfaces. As an application we derive a constraint for a pair of genera of two embedded surfaces and we also give an alternative proof of the adjunction-type inequality by Strle for configurations of surfaces with positive self-intersection numbers.

25　A. J. Di Scala（Politecnico di Torino）　$\mathbb{R}^4$ 上のケーラーでない複素構造 II · 15
　　粕 谷 直 彦（青学大社会情報）
　　D. Zuddas　　（　　KIAS　　）

Antonio J. Di Scala　　　　　Non-Kähler complex structures on $\mathbb{R}^4$ II
　　　　　（Politecnico di Torino）
Naohiko Kasuya
　　　　　（Aoyama Gakuin Univ.）
Daniele Zuddas　　　　（KIAS）

概 要　We already constructed uncountably many non-Kähler complex manifolds diffeomorphic to $\mathbb{R}^4$, and I talked about the construction at the last meeting of MSJ. This time, I will talk about various properties of our complex manifolds. For example, they have nontrivial Picard groups and cannot be holomorphically embedded in any compact complex surface. This is a joint work with Antonio J. Di Scala and Daniele Zuddas.

26　三 松 佳 彦（中 大 理 工）　4 次元多様体上の 2 次元葉層構造の turbulization · · · · · · · · · · · · · · · · · · · 15
　　E. Vogt　　（ベルリン自由大）

Yoshihiko Mitsumatsu（Chuo Univ.）　Turbulization of 2-dimensional foliations on 4-manifolds
Elmar Vogt（Freie Univ. Berlin）

概 要　The notion of turbulization is formulated for higher codimensional foliations. It has been well-known for foliations of codimension one since long ago but in higher codimension case, it is not only not-trivial to formulate but also complicated to a certain degree to realize it geometrically. In the case of 2-dimensional foliations on 4-manifolds it is done, where 3-dimensional geodesic Ansov foliations play an important role. Under this dimension setting, some other modifications which are similar to turbulization are also introduced. The motivation from and the relation with the h-principle due to Thurston are also explained.

27　三 松 佳 彦（中 大 理 工）　Symplectic end の凸性と 5 次元球面上の葉向 symplectic 葉層, 4 次元
strange symplectic 多様体 ··· 15

Yoshihiko Mitsumatsu (Chuo Univ.)　Convexity of symplectic ends, leafwise symplectic foliations on 5-sphere,
and strange symplectic 4-manifolds

概要 The construction of leafwise symplectic foliations of codimension one on the 5-sphere from the simple
elliptic singularities and cusp singuralities of complex three variables is reviewed, with an emphasis on the
topological flexibility of convexity of the end of open symplectic manifolds.

The method enables us to construct some b-symplectic structures on closed 4-manifolds and some strange
closed symplectic 4-manifolds as well.

28　大 場 貴 裕（東 工 大 理 工）　Open book decompositions of unit cotangent bundles of orientable closed
B. Ozbagci　　（　Koç Univ.　）　surfaces ·· 15

Takahiro Oba　　（Tokyo Tech）　Open book decompositions of unit cotangent bundles of orientable closed
Burak Ozbagci　　（Koç Univ.）　surfaces

概要 Thanks to a result of Giroux, we can make use of open book decompositions to study contact
structures. The unit cotangent bundle $ST^*\Sigma_g$ of an orientable closed surface Σ_g admits the canonical
contact structure ξ_{can}. For $g = 0, 1$, an explicit description of a supporting open book decomposition of ξ_{can}
is known. For $g \geq 2$, J. Johns gave an abstract description of a Lefschetz fibration on the unit disk bundle
$DT^*\Sigma_g$. It follows one of a supporting open book decomposition of ξ_{can}. In this talk, we will present an
explicit description of a supporting open book decomposition of ξ_{can} for any g. As a corollary of this result,
we will also give one of a Lefschetz fibration on $DT^*\Sigma_g$.

29　安 井 弘 一（広 島 大 理）　Nonexistence of Stein structures on 4-manifolds and maximal Thurston–
Bennequin numbers ··· 10

Kouichi Yasui (Hiroshima Univ.)　Nonexistence of Stein structures on 4-manifolds and maximal Thurston–
Bennequin numbers

概要 For a 4-manifold represented by a framed knot in S^3, it has been well known that the 4-manifold
admits a Stein structure if the framing is less than the maximal Thurston–Bennequin number of the knot.
In this paper, we prove either the converse of this fact is false or there exists a compact contractible oriented
smooth 4-manifold (with Stein fillable boundary) admitting no Stein structure. Note that an exotic smooth
structure on S^4 exists if and only if there exists a compact contractible oriented smooth 4-manifold with S^3
boundary admitting no Stein structure.

30　安 井 弘 一（広 島 大 理）　Maximal Thurston–Bennequin number and reducible Legendrian surgery
·· 10

Kouichi Yasui (Hiroshima Univ.)　Maximal Thurston–Bennequin number and reducible Legendrian surgery

概要 We give a method for constructing a Legendrian representative of a knot in S^3 which realizes
its maximal Thurston–Bennequin number under a certain condition. The method utilizes Stein handle
decompositions of D^4, and the resulting Legendrian representative is often very complicated. As an
application, we construct infinitely many knots in S^3 each of which yields a reducible 3-manifold by a
Legendrian surgery in the standard tight contact structure. This disproves a conjecture of Lidman and
Sivek.

14:15〜15:30

31　丹 下 基 生（筑波大数理物質）　有限位数コルクについて ·· 15
Motoo Tange (Univ. of Tsukuba)　On finite order corks

概 要 We construct examples of finite order cork. The point is to prove that the contractible 4-manifold admits Stein structure. We realize it by describing some Legendrian link on $\#^n S^2 \times S^1$.

32　丹 下 基 生（筑波大数理物質）　ある Whitehead double の二重分岐被覆を境界とする有理 4 球体 ······ 15
Motoo Tange (Univ. of Tsukuba)　Branched double covers and rational homology 4-balls

概 要 We give examples of non-slice knot whose branched cover bounds rational homology 4-ball. The knots are Whitehead double of a torus knot. To find the examples, Heegaard Floer d-invariant is useful. Further, we consider a way to compute $CFK^\infty(\#^2 T_{p,q})$.

33　佐 藤 光 樹（東 工 大 理 工）　有理ホモロジー 3 球面の 1 連結有理充填 ··························· 15
Kouki Sato　　　　(Tokyo Tech)　1-connected rational filling of rational homology 3-spheres

概 要 For a rational homology 3-sphere Y, a 1-connected rational filling W for Y is a rational homology 4-ball with boundary Y such that the induced map from the inclusion $i_* : \pi_1(Y) \to \pi_1(W)$ is surjective.
In this talk, we consider which rational homology 3-spheres have 1-connected rational filings. In particular, we give characterizations of such rational homology 3-spheres from different two view points; cyclic branched covers of S^3 branched over knots, and Dehn surgeries on links in S^3.

34　安 部 哲 哉（　OCAMI　）　Ribbon disks via handle decompositions of B^4 ···················· 15
　　丹 下 基 生（筑波大数理物質）
Tetsuya Abe　　　　(OCAMI)　Ribbon disks via handle decompositions of B^4
Motoo Tange (Univ. of Tsukuba)

概 要 We recall Hudson–Sumners' construction of ribbon disks. Using this construction, we give ribbon disks with the same exterior.

35　清 水 達 郎（京 大 数 理 研）　非自明な接続における Chern–Simons 摂動論と Morse homotopy ······ 10
Tatsuro Shimizu (Kyoto Univ.)　Chern–Simons perturbation theory around a non-tirvial flat connection and Morse homotopy

概 要 We give a Morse homotopy theoretic description of the degree 1 part of the Chern–Simons perturbation theory around a non-trivial flat connection.

15:45〜16:45　特別講演

　　玉 木　　大（信 州 大 理）　Configuration spaces and homotopy theory
Dai Tamaki　　(Shinshu Univ.)　Configuration spaces and homotopy theory

無 限 可 積 分 系

3月18日（金）　第Ⅷ会場

10:00〜12:00

1 伊 藤 雅 彦（東京電機大未来）　A 型 Jackson 積分と Ramanujan $_1\psi_1$ 和公式, Slater $_r\psi_r$ 変換公式の一般化
　野 海 正 俊（神 戸 大 理）　· 15

Masahiko Ito (Tokyo Denki Univ.)　The Jackson integral of A type and a generalization of Ramanujan's $_1\psi_1$
Masatoshi Noumi (Kobe Univ.)　summation and Slater's $_r\psi_r$ transformation

概 要　We will talk about a connection formula for the Jackson integrals of A type. The connection formula gives a generalization of Slater's transformation formula for a basic hypergeometric series $_r\psi_r$. As an application of the connection formula, we obtain a determinant formula as the Wronskian of the q-difference system for the Jackson integrals of A type. The determinant formula includes Ramanujan's summation formula for a basic hypergeometric series $_1\psi_1$.

2 伊 藤 雅 彦（東京電機大未来）　A 型楕円 Lagrange 補間函数の構成法 · 15
　野 海 正 俊（神 戸 大 理）

Masahiko Ito (Tokyo Denki Univ.)　A construction of the elliptic Lagrange interpolation functions of type A
Masatoshi Noumi (Kobe Univ.)

概 要　In the connection formula for the Jackson integral of A type, the elliptic Lagrange interpolation functions appear naturally as the connection coefficients. We will explain a construction of the elliptic Lagrange interpolation functions of type A. As a consequence, we will show the explicit expression of the elliptic Lagrange interpolation functions.

3 上 岡 修 平（京 大 情 報）　A generalization of the q-Chu–Vandermonde sum for basic hypergeo-
　　　　　　　　　　　　　metric series · 15

Shuhei Kamioka (Kyoto Univ.)　A generalization of the q-Chu–Vandermonde sum for basic hypergeo-
metric series

概 要　A generalization of a q-Chu–Vandermonde sum for basic hypergeometric series, which involves multiple parameters substituting for the base q, is exhibited. Generalizations of the little q-Laguerre (Wall) polynomials, that are classical orthogonal polynomials in the Askey scheme, are also shown. The orthogonality of the generalized little q-Laguerre polynomials is proven by means of the generalized q-Chu–Vandermonde sum.

4 渋 川 元 樹（阪 大 情 報）　Pseudo Wilson polynomials · 15

Genki Shibukawa (Osaka Univ.)　Pseudo Wilson polynomials

概 要　By considering the image of the Jacobi transformation of a finite type orthogonal system constructed by the Jacobi polynomials, we obtain new finite type orthogonal polynomials, which we call "pseudo Wilson polynomials", and their properties.

5 長 尾 秀 人（明 石 工 高 専）　パデ法と q 差分ガルニエ系 · 15
　山 田 泰 彦（神 戸 大 理）

Hidehito Nagao (Akashi Coll. of Tech.)　Padé method and the q-Garnier system
Yasuhiko Yamada (Kobe Univ.)

概 要　We study some Padé problem of the differential grid, related to the q-Garnier system. Solving the problem, we derive the evolution equation, the scalar Lax pair and the determinant formulae of special solutions for the corresponding q-Garnier system.

6 　鈴 木 貴 雄（近 畿 大 理 工）　q-超幾何関数 $_3\phi_2$ を解に持つ 4 階 q-パンルヴェ方程式 ·············· 15
Takao Suzuki 　　（Kinki Univ.）　Fourth order q-Painlevé system containing q-hypergeometric function $_3\phi_2$

概 要 　We proposed the hyper order q-Painlevé system containing q-hypergeometric function $_n\phi_{n-1}$ in March 2012. In this talk, we give a new expression of that q-difference system.

14:15〜15:15

7 　近 内 翔 太 郎（神 戸 大 理）　大久保型方程式を保つ畳み込みの解析 ··························· 15
Shotaro Konnai 　(Kobe Univ.)　Analysis of the Katz operations stabilizing the class of Okubo systems

概 要 　In this talk we investigate certain Katz operations (additions and middle convolutions) which stabilize the class of Okubo systems of ordinary differential equations. We also dicuss some applications to the connection problem for the fundamental solution matrices of Okubo systems.

8 　廣 惠 一 希（城 西 大 理）　Stokes 現象と絡み目について ······································· 15
Kazuki Hiroe 　　(Josai Univ.)　Stokes structure and links

概 要 　Some similarities between ramified irregular singularities of linear ordinary differential equations and singularities of plane curve germs are found, for instance in transformations: local Fourier transform and blowing up, in invariants: Komatsu–Malgrange irregularity and Milnor number, and so on. In this talk we shall define links from linear ODEs with ramified irregular singularities as an analogy of links of singular plane curve germs. Some relations between link invariants and invariants of ODEs shall be explained. Furthermore, it shall be discussed that isomonodromic deformation of ODEs induces link isotopy of the corresponding links as an analogy of the fact that equisingularity of plane curve singularities induces link isotopy.

9 　上 野 喜 三 雄（早 大 理 工）　KZ 方程式に付随したモノドロミー保存変形の正則解について ········ 15
Kimio Ueno 　　(Waseda Univ.)　Monodromy preserving deformation associated to KZ equation

概 要 　We consder the monodromy preserving deformation associated to the KZ equation of three variables and holomorphic solutions to the deformation equations.

10 　原 岡 喜 重（熊 本 大 理）[♭]　複素鏡映群に関する braid 群の表現について ······················ 15
Yoshishige Haraoka (Kumamoto Univ.)　On representations of braid groups associated with complex reflection groups

概 要 　We classify three dimensional irreducible representations of braid groups associated with primitive finite irreducible complex reflection groups in $\mathrm{GL}(3,\mathbb{C})$. Spectral types of the local monodromies play a substantial role. The representations give monodromy representations for some uniformization equations.

15:30〜16:30　特別講演
　山 川 大 亮（東 工 大 理 工）　Twisted wild character varieties
　Daisuke Yamakawa (Tokyo Tech)　Twisted wild character varieties

概 要 　This is joint work with Philip Boalch. The wild character varieties are Poisson algebraic varieties related to the moduli spaces of unramified meromorphic connections on compact Riemann surfaces with fixed irregular type at each singularity under the Riemann–Hilbert–Birkhoff correspondence. We will extend the construction of the wild character varieties to the case of ramified connections. In the unramified case, the formal monodromy of meromorphic connections can be interpreted as a group-valued moment map in the sense of Alekseev–Malkin–Meinrenken. In order to extend that interpretation to the ramified case, we introduce the moment maps taking values in "twisted groups".

3月19日（土）　　第Ⅷ会場

9:30〜12:00

11　竹 山 美 宏（筑波大数理物質）　Algebraic construction of multi-species q-Boson system ·············· 15

Yoshihiro Takeyama
　　　　　　　(Univ. of Tsukuba)

概 要　We construct a stochastic particle system which is a multi-species version of the q-Boson system due to Sasamoto and Wadati. Its transition rate matrix is obtained from a representation of a deformation of the affine Hecke algebra of type GL.

12　尾 角 正 人（阪 市 大 理）　多状態 TAZRP ·· 15
　　国 場 敦 夫（東大総合文化）
　　丸 山 翔 也（東大総合文化）

Masato Okado (Osaka City Univ.)　Multispecies TAZRP
Atsuo Kuniba (Univ. of Tokyo)
Shouya Maruyama (Univ. of Tokyo)

概 要　We introduce an n-species asymmetric zero range process (n-TAZRP) on the periodic chain of L sites. It is a continuous time Markov process, and obtained as the image of a projection from another stochastic system called n-line process. By using a combinatorial R of the quantum affine algebra $U_q(\widehat{sl}_L)$, we establish a matrix product formula of the steady state probability of the n-TAZRP in terms of corner transfer matrices of a $q = 0$-oscillator valued vertex model. It is also derived from the commutativity of a layer-to-layer transfer matrix of a 3D lattice model constructed from a distinguished solution to the tetrahedron equation.

13　筧　　三 郎（立 教 大 理）　箱玉系の線形化に対する初等的アプローチ ························· 15
　　J. J. C. Nimmo（Univ. of Glasgow）
　　辻 本　　諭（京 大 情 報）
　　R. Willox　　（東 大 数 理）

Saburo Kakei　　(Rikkyo Univ.)　Linearization of the box-ball system: an elementary approach
Jonathan J. C. Nimmo
　　　　　　　　(Univ. of Glasgow)
Satoshi Tsujimoto (Kyoto Univ.)
Ralph Willox　(Univ. of Tokyo)

概 要　Kuniba, Okado, Takagi, and Yamada found that the time-evolution of the Takahashi–Satsuma box-ball system (BBS) can be linearized by considering rigged configurations associated with states of the BBS. We introduce a simple way to understand the rigged configuration of $A_1^{(1)}$-type, and give an elementary proof of the linearization property.

14　太 田 泰 広（神 戸 大 理）　離散空間曲線の運動に対する行列式解と Pfaffian 解 ················· 15
　　廣 瀬 三 平
　　（芝浦工大教育イノベーション推進センター）
　　井 ノ 口 順 一（筑波大数理物質）
　　梶 原 健 司（九 大 Ｉ Ｍ Ｉ）
　　松 浦　　望（福 岡 大 理）

Yasuhiro Ohta　　(Kobe Univ.)　Determinant and Pfaffian solutions for motion of discrete space curve
Sampei Hirose (Shibaura Inst. of Tech.)
Jun-ichi Inoguchi (Univ. of Tsukuba)
Kenji Kajiwara (Kyushu Univ.)
Nozomu Matsuura (Fukuoka Univ.)

概 要　Determinant and Pfaffian solutions for motion of discrete space curve are given.

15 執 行 洋 子 (津田塾大学芸)　BKP 階層の解の展開について ···································· 15

　　Yoko Shigyo　　(Tsuda Coll.)　Expansion coefficients of a solution of the BKP hierarchy

概要 In this talk we study the degenerate Giambelli type formulae in the BKP hierarchy. It is known that a formal power series $\tau(x)$ expanded as Schur's Q-function is a solution of the BKP hierarchy if and only if the coefficients of this expansion satisfy Giambelli type formulae. We proved this statement with a condition $\tau(0) \neq 0$. Here we prove this result with a condition $\tau(0) = 0$.

16 綾 野 孝 則 (阪市大数学研)　A generalization of Jacobi inversion formulae to telescopic curves on all the strata ··· 15

　　Takanori Ayano (Osaka City Univ.)　A generalization of Jacobi inversion formulae to telescopic curves on all the strata

概要 For a hyperelliptic curve, it is well-known that an element of the k-th symmetric product is expressed in terms of its Abel–Jacobi image by the hyperelliptic sigma functions on all the strata (Jacobi inversion formulae). Matsutani and Previato extended the Jacobi inversion formulae to the more general plane algebraic curves defined by $y^r = f(x)$, which are special cases of the (n, s) curves, and derived a property of the vanishing of the sigma functions as a corollary. In this talk, we extend the formulae to telescopic curves proposed by Miura, which contain the (n, s) curves as special cases, and remark that the vanishing property of the sigma functions is also satisfied for the telescopic curves.

17 齋 藤 洋 介 (阪市大数学研)　Ruijsenaars 作用素の双対 Cauchy 型核関数の関数等式および特殊な場合における固有関数 ··· 15

　　Yosuke Saito (Osaka City Univ.)　Eigenfunctions of Ruijsenaars operator arising from the functional equation of the dual Cauchy type kernel function

概要 We show that eigenfunctions of Ruijsenaars operator are obtained from the functional equation of the dual Cauchy type kernel function in a special case.

18 Diogo Kendy Matsumoto　Generalized pre-semiring 上の Yang–Baxter 写像 ··················· 15
　　　　　　(早大基幹理工)

　　Diogo Kendy Matsumoto　Yang–Baxter maps on the Generalized pre-semiring
　　　　　　(Waseda Univ.)

概要 In this talk, we introduce a generalized pre-semiring as a generalization of ring, and consider Yang–Baxter maps on the generalized pre-semiring. These Yang–Baxter maps including many well-known examples of the Yang–Baxter maps.

14:15～15:15

19 池 田 　 岳 (岡 山 理 大 理)　階乗型 P 関数の構造定数について ····························· 15

　　Takeshi Ikeda (Okayama Univ. of Sci.)　Littlewood-Richardson rule for factorial P-functions

概要 We give a combinatorial description for the multiplicative structure constants of the factorial P-functions.

20 金 久 保 有 輝 (上 智 大 理 工)   古典群の double Bruhat cell 上のクラスター変数と結晶基底 ········· 15
    中 島 俊 樹 (上 智 大 理 工)

Yuki Kanakubo (Sophia Univ.)   Cluster variables on double Bruhat cell of classical group and cystal base
Toshiki Nakashima (Sophia Univ.)

概 要 Coordinate rings of certain subgroups or cells of algebraic group G have the structures of cluster algebra, and generalized minors are their cluster variables. In the case $G = SL_{r+1}(\mathbb{C})$, generalized minors are coincide with ordinary minors. Last year, we had shown a relation between minors on double Bruhat cell of $SL_{r+1}(\mathbb{C})$ and crystal bases. Using coordinate transformation, the minors become polynomials whose terms are equal to the monomial realization of some crystal bases. In this talk, we will extend these results to other classical groups.

21 木 村 嘉 之 (神 戸 大 理)   Remarks on quantum unipotent subgroup and dual canonical basis ··· 15

Yoshiyuki Kimura (Kobe Univ.)   Remarks on quantum unipotent subgroup and dual canonical basis

概 要 In this talk, we show the tensor product decomposition of the half of quantized universal enveloping algebra associated with a Weyl group element that was conjectured by Berenstein and Greenstein using the theory of the dual canonical basis.

22 土 岡 俊 介 (東 大 数 理)   アフィン・リー環の極大ウェイト重複度に現れる pattern avoidance につ
    渡 部 正 樹 (東 大 数 理)   いて ·· 15

Shunsuke Tsuchioka (Univ. of Tokyo)   Pattern avoidance seen in multiplicities of maximal weights of affine Lie
Masaki Watanabe (Univ. of Tokyo)   algebra representations

概 要 We prove that the multiplicities of certain maximal weights of $\mathfrak{g}(A_n^{(1)})$-modules are counted by pattern avoidance on words. This proves and generalizes a conjecture of Misra–Rebecca. We also prove similar phenomena in types $A_{2n}^{(2)}$ and $D_{n+1}^{(2)}$. Both proofs are applications of Kashiwara's crystal theory.

15:30～16:30   特別講演

山 根 宏 之 (富 山 大 理 工)   Weyl groupoids and representation theory of generalized quantum groups

Hiroyuki Yamane (Univ. of Toyama)   Weyl groupoids and representation theory of generalized quantum groups

概 要 In this talk, I introduce Weyl groupoids, and Matsumoto–Tits type theorem of them, and explain how they can be used to study representation theory of generalized quantum groups U. We have got a Shapovalov determinant formula for U and classification of finite dimensional simple U-modules.