



Seminar

April 2023

2023.4.11 (Tue)

Geometry Seminar (15:00--16:30 [Venue: Mathematics Building 305])

Speaker : Ryosuke Takahashi (Tohoku University)

Title : supercritical deformed Hermitian-Yang-Mills方程式に対する数値的判定法

Abstract :

deformed Hermitian-Yang-Mills (dHYM)方程式はKähler多様体上の標準計量を与える方程式の1つであり、半平坦SYZミラー対称性の文脈において special Lagrangian方程式のミラー版の対応物として自然に現れる。本講演ではsupercritical条件のもとで、dHYM方程式の可解性を数値的に判定する方法を紹介する。これはJ. Chu氏 (Peking University)とM. C. Lee氏 (Chinese University of Hong Kong)との共同研究に基づく。

2023.4.13 (Thu)

Applied Mathematical Analysis Seminar
(16:30--18:00 [Venue: Science Complex A 801 (and Online)])

Speaker : Norisuke Ioku (Tohoku University)

Title : Non-uniqueness for a critical heat equation in two dimensions with singular data

Abstract :

We consider non-uniqueness for nonlinear heat equations in two dimensions. For higher dimensions, uniqueness and non-uniqueness is well understood by Brezis-Cazenave and Ni-Sacks. In this talk we focus on exponential nonlinearities as a critical growth in two dimensions and reveal that non-uniqueness result arises from the singular stationary solution.

2023.4.14 (Fri)

Logic Seminar (16:00-- [Venue: Science Complex A 801 (and Online)])

Speaker : Hitoshi Omori (Tohoku University)

Title : Negation and modality in view of non-deterministic semantics

Abstract :

Non-deterministic semantics is a semantic framework systematically developed by Arnon Avron and Iddo Lev. One way of describing this semantics is that it generalizes a many-valued semantics. Generalization lies in the fact that the value of a complex formula is not determined uniquely by its subformulas, but instead there are several values that can be assigned. The aim of the talk is twofold. First we introduce the non-deterministic semantics without assuming any familiarity on the topic. Second, we discuss two related topics: (i) non-deterministic semantics for systems with *very* weak negation, and (ii) modal semantics *without* possible worlds.

2023.4.18 (Tue)

Geometry Seminar (15:00--16:30 [Venue: Online])

Speaker : 船野 敬 (Tohoku University)

Title : A 'domain monotonicity' for Neumann eigenvalues of the Laplacian

Abstract :

ノイマン境界条件下におけるラプラシアン固有値の単調性について議論する。またノイマン固有値の上界に関するポリヤ予想についても触れてみたい。

2023.4.20 (Thu)

Applied Mathematical Analysis Seminar
(16:30--18:00 [Venue: Science Complex A 801 (and Online)])

Speaker : Ryo Muramatsu (Tohoku University)

Title : Estimates on modulation spaces for solutions to Schrödinger equations with magnetic fields

Abstract :

本研究ではよく知られた磁場中のシュレーディンガー方程式の解に対する、モジュレーション空間における初期値による評価を考察する。自由及びスカラーポテンシャル付きのシュレーディンガー方程式に対しては、解のモジュレーション空間における評価が得られている (Bényi-Gröchenig-Okoudjou-Rogers(2007), Cordero-Gröchenig-Nicola-Rodino(2013), Kato-Kobayashi-Ito(2014)など)。磁場中のシュレーディンガー方程式に対しては、磁場特有の一階微分項からくる周波数成分の増大のために従来の方法では解を評価することができなかった。本発表では、空間減衰磁場および空間一様磁場の場合に、解の $M^{p,p}$ ノルムを初期値の $M^{p,p}$ ノルムで評価する評価式とその証明方法について述べる。また、磁場がある意味で短距離型の場合の結果についても紹介する。なお本発表は、加藤 圭一 教授(東京理科大学)との共同研究に基づく。

2023.4.21 (Fri)**Probability Seminar (15:30--17:00 [Venue: Mathematics Building 209])****Speaker :** Yuto Nakagawa (Tohoku University)**Title :** Left Regular Band を用いた推移確率行列の固有値と重複度について**Abstract :**

あるマルコフ連鎖は、Left Regular Band と呼ばれる半群 を用いて表現することができる。Brown (2000) によってLeft Regular Band を用いて表現されるマルコフ連鎖の、推移確率行列の固有値と重複度が求められることが示された。本講演では、Left Regular Bandを用いて表現可能なマルコフ連鎖の紹介及びその推移確率行列の固有値と重複度について述べる。

2023.4.21 (Fri)**Logic Seminar (16:00-- [Venue: Science Complex A 801 (and Online)])****Speaker :** Makoto Fujiwara (Tokyo University of Science)**Title :** On the embedding of Kripke models into Beth models**Abstract :**

Kripke showed in [1] that first-order Kripke models can be embedded into first-order Beth models with constant domains by a sophisticated transformation. Following [2, Chapter 13], we revisit the embedding from modern perspectives.

[1] S. A. Kripke, Semantical Analysis of Intuitionistic Logic I, Studies in Logic and the Foundations of Mathematics, Vol.40, pp. 92-130, 1965.

[2] A. S. Troelstra and D. van Dalen, Constructivism in Mathematics, Vol 2, Elsevier, 1988.

2023.4.25 (Tue)**Geometry Seminar (15:00--16:30 [Venue: Mathematics Building 305])****Speaker :** 宮武 夏雄 (Tohoku University)**Title :** 巡回Higgs束のHermitian-Einstein方程式の劣調和関数を用いた拡張について**Abstract :**

巡回Higgs束の対角形の調和計量に対するHermitian-Einstein方程式とは、Riemann面の標準束の r 乗の正則切断を用いて定義される、Riemann面上の r 個の正則直線束のHermite計量を解に持つ二階の楕円型偏微分方程式です。方程式の解から、そのRiemann面の基本群の表現とRiemann面の普遍被覆空間から正定値エルミート行列全体がなす空間への基本群の作用に対して同変な調和写像が構成されます。本講演では、標準束の r 乗の正則切断の多価性を許した上でその零点の個数を無限に増やす極限でHermitian-Einstein方程式の解や、解からwell-definedに構成される調和写像のエネルギー密度関数などの量は漸近的にどのように振舞うだろうかという問題を提起し、その問題を動機・背景として、巡回Higgs束のHermitian-Einstein方程式の劣調和関数を用いた拡張、というものを導入します。さらに、熱方程式の時間大域解の存在と一意性及び収束やDirichlet問題の解の存在と一意性、解に対する不等式評価などのHiggs束のHermitian-Einstein方程式に関する基本的かつ重要な結果を、劣調和関数に関して仮定を付けた上で、拡張された方程式に拡張します。

2023.4.27 (Thu)**Applied Mathematical Analysis Seminar
(16:30--18:00 [Venue: Science Complex A 801 (and Online)])****Speaker :** 李 浩光 (Tohoku Univ. / South Central University for Nationalities)**Title :** Analytic Gelfand-Shilov smoothing effect of the spatially homogeneous Landau equation in hard potential**Abstract :**

In this work, we study the spatially homogeneous Landau equation with hard potential in a close-to-equilibrium framework, we show that the smooth solution to the Cauchy problem with a small $L^2(\mathbb{R}^3)$ initial datum enjoys an analytic Gelfand-Shilov regularizing effect in the class $S_1^1(\mathbb{R}^3)$, meaning that the solution of the Cauchy problem and its Fourier transformation are analytic for any positive time. The evolution of analytic radius is similar to the heat equation.

2023.4.28 (Fri)

Logic Seminar (15:00-- [Venue: Science Complex A 801 (and Online)])

Speaker : Masaya Taniguchi (Tohoku University)

Title : Proof-theoretic linguistics: the formal approach to natural language.

Abstract :

If we consider a sentence of our language as a sequence of symbols, we can see that this sequence is non-commutative, non-associative, and does not allow duplicates; which is a very weak system for manipulating symbol sequences. In this talk, we will treat formal languages as a substructural logic and clarify the relationship between structural rules and linguistic structure. Further, we also introduce recent research on the incremental processing of natural language in this field.

2023.4.28 (Fri)

Algebra Seminar (15:30--17:00 [Venue: Mathematics Building 305])

Speaker : 足利 正 (Tohoku Gakuin University)

Title : Universal degeneration of Riemann surfaces and fibered complex surfaces

Abstract :

2023.4.28 (Fri)

Probability Seminar (16:00--17:30 [Venue: Online])

Speaker : Xiaolin Zeng (Strasbourg)

Title : Four Facets of the Supersymmetric Hyperbolic Sigma Model

Abstract :

The supersymmetric hyperbolic sigma model is a model in mathematical physics that has found relations in a variety of areas, including statistical mechanics, reinforced random walk, Anderson localization, and stochastic calculus. In this talk, we will explore the model from these four different angles, or facets, and discuss recent results in each of these facets.

Throughout the talk, we will highlight the relations between these different facets and explain how they were discovered. We will also present some proofs of key results and discuss open questions and directions for future research.

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