

特任助教 (Project Research Associate)  
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#### A. 研究概要

本年度は昨年度より本研究科の小林俊行教授と Université de Reims-Champagne-Ardenne (フランス) の Michael Pevzner 氏と共同で始めた旗多様体上のある同変等質ベクトル束間の covariant differential operator に関する研究を推し進めた。特に本研究結果の一部を論文としてまとめたものが Lie Theory and Its Applications in Physics: Xth International Workshop, Springer Proceedings in Mathematics & Statistics に掲載予定である ([1])。また次の研究結果を preprint として近々まとめる予定である。

In this year I mainly worked on a project on the study of covariant differential operators between certain equivariant homogeneous vector bundles over flag varieties with Prof. Toshiyuki Kobayashi from this department and Prof. Michael Pevzner from Université de Reims-Champagne-Ardenne, France. From the project a paper will be published in Lie Theory and Its Applications in Physics: Xth International Workshop, Springer Proceedings in Mathematics & Statistics. We are planning to write another paper from the project in the near future.

#### B. 発表論文

##### Peer-reviewed articles

- [1] T. Kobayashi, T. Kubo and M. Pevzner, “Vector-valued covariant differential operators for the Mobius transformation.” (to appear in In V. Dovrev, editor, Lie Theory and Its Applications in Physics: Xth International Workshop, Springer Proceedings in Mathematics & Statistics)
  - [2] T. Kubo, “Special values for conformally invariant systems associated to maximal parabolics of quasi-Heisenberg type.” Trans. Amer. Math. Soc. **366** (2014), 4649-4696.
  - [3] T. Kubo, “The Dynkin index and conformally invariant systems associated to parabolic subalgebras of Heisenberg type.” Osaka J. Math, **51** (2014), no. 2, 359-373.
  - [4] T. Kubo, “Systems of differential operators and generalized Verma modules.” SIGMA Symmetry Integrability Geom. Methods Appl., **10** (2014), no. 008, 35 pages.
  - [5] T. Kubo, “On the homomorphisms between the generalized Verma modules arising from conformally invariant systems.” J. Lie Theory, **23** (2013), no. 3, 847-883.
  - [6] T. Kubo, “Conformally invariant systems of differential operators associated to maximal parabolics of quasi-Heisenberg type.” Proc. Japan Acad. Ser. A Math. Sci., **89** (2013), no. 3, 41-46. (Announcement)
- ##### Non-peer-reviewed articles
- [7] T. Kubo, “The Dynkin index and parabolic subalgebra of Heisenberg type (Japanese).” RIMS conference 2014, New Developments of Representation Theory and Harmonic Analysis. RIMS Kôkyûroku, no. 1925 (2014), 73-77.
  - [8] T. Kobayashi, T. Kubo and M. Pevzner, “Covariant differential operators and the Rankin-Cohen bracket (Japanese).” In J. Matsuzawa and N. Shimeno, editors, Proceedings of Symposium on Representation Theory 2014, (2014) pp. 75-86.
  - [9] T. Kubo, “On the F-method for constructing intertwining differential operators between homogeneous vector bundles.” In M. Izumisawa and T. Kajiwara, editors, Real Analysis – Functional Analysis Joint Symposium 2014, (2014) pp. 85-95.
  - [10] T. Kubo, “On constructing explicit homomorphisms between generalized Verma modules.” RIMS conference 2013, Development of Representation Theory and its Related Fields, RIMS Kôkyûroku, no. 1877 (2014), 142-151.

#### C. 口頭発表

- [1] Covariant differential operators and the Rankin–Cohen bracket, 2015 East Asian Core Doctoral Forum on Mathematics, National Taiwan University, 台湾、2015年1月
- [2] Covariant differential operators and the Rankin-Cohen bracket, 表現論シンポジウム 2014、兵庫、2014年11月
- [3] On the F-method for constructing intertwining differential operators between homogeneous vector bundles, 第53回実函数論・函数解析学会合同シンポジウム、学習院大学、2014年9月
- [4] Systems of differential operators and generalized Verma modules, Algebraic Methods in Quantum Field Theory, a mini-symposium in the International Conference "Mathematics Days in Sofia," the Institute of Mathematics and Informatics, ブルガリア、2014年7月
- [5] The Dynkin index and parabolic subalgebras of Heisenberg type, 2014年RIMS研究集会「表現論と調和解析の新たな進展」、京都大学 数理解析研究所、2014年6月
- [6] The Dynkin index and parabolic subalgebras of Heisenberg type, 日本数学会 2014年度年会、学習院大学、2014年3月
- [7] The Dynkin index and parabolic subalgebras of Heisenberg type, Winter school 2014 in representation theory of reductive groups, 東京大学、2014年2月
- [8] The Dynkin index and parabolic subalgebras of Heisenberg type, Conference in celebration of 60th birthday of Prof. Matsuki, 鳥取、2014年2月
- [9] On  $\mathfrak{g}$ -manifolds,  $\mathfrak{g}$ -bundles, and conformally invariant systems, 青山学院大学、2013年8月
- [10] Construction of explicit homomorphisms between generalized Verma modules, Harmonic Analysis Seminar, Louisiana State

University, USA, 2013年6月

#### D. 講義

- [1] 数学 IA 演習 ①・②：微分積分学に関する演習問題に取り組みさせた。  
(教養学部前期課程講義)
- [2] 数学 II 演習 ①・②：線形代数に関する演習問題に取り組みさせた。  
(教養学部前期課程講義)

#### E. 修士・博士論文

#### F. 対外研究サービス

Review (Zentralblatt MATH)

- Milev, Todor; Somberg, Petr, The branching problem for generalized Verma modules, with application to the pair  $(\mathfrak{so}(7), \text{Lie } G_2)$ . (English) Zbl 06327975 J. Algebra Appl. 13, No. 7, Article ID 1450034, 32 p. (2014).

#### G. 受賞

Journal of Mathematical Physics

- Outstanding Referee (2014)

#### H. 海外からのビジター

連携併任講座