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A. 研究概要

今年は主に論文 [4] で構成した Ω_2 system と呼んでいる共形不変系から誘導される一般 Verma 加群間の準同型の分類について取り組んだ。([1]) 共形不変系とは、リー環の作用に対して equivariant なある微分作用素の系のことであるが、その様な系はある一般 Verma 加群間の準同型を引き起こす。一般 Verma 加群間の準同型のうち、対応する Verma 加群間のそれから誘導されるものを standard、そうでないものを non-standard と言う。ここで一般 Verma 加群間の準同型の分類とは、与えられた準同型を standard、non-standard の場合に分類することを指す。さてその分類の結果だが、 Ω_2 system から引き起こされた準同型は非常に多くの場合に non-standard であることが得られた。またその分類の帰結として、準同型の standardness と Ω_2 system の特殊値 (special value) との間に非常に興味深い対応があることも合わせて得られた。Standard な準同型の研究に対し、non-standard な準同型のそれはあまり行われていない。この対応の理論的な意味を理解し、non-standard な準同型の系統的な構成というものに今後取り組みたい。

This year I mainly worked on the classification of the homomorphisms between generalized Verma modules, that arise from the conformally invariant systems, which are called Ω_2 systems, constructed in [4]. Conformally invariant systems are systems of differential operators that are equivariant under an action of a Lie algebra. It is known that such systems of operators induce homomorphisms between certain generalized Verma modules. A homomorphism between generalized Verma modules is called *standard* if it comes from a homomorphism between the corresponding (ordinary) Verma modules, and called *non-standard* otherwise. Here it means by the classification of homomorphisms that we classify homomorphisms in the sense of standard or non-standard. The classification result shows that conformally invariant Ω_2 systems yield non-standard homomorphisms in quite many cases. It was also obtained as a consequence that there is an interesting relationship between the standardness

of the homomorphisms and the “special values” of the Ω_2 systems. These results are in [1]. While the standard maps are well-understood, the classification of non-standard maps is still an open problem. I would like to understand the interesting relationship so that one may give a systematic construction of non-standard maps in the future.

B. 発表論文

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2. 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. (Summary)
3. T. Kubo: “A System of Third-Order Differential Operators Conformally Invariant under $\mathfrak{sl}(3, \mathbb{C})$ and $\mathfrak{so}(8, \mathbb{C})$.” Pacific J. Math. **253** (2011), no. 2, 439-453.
4. T. Kubo: “Special Values for Conformally Invariant Systems Associated to Maximal Parabolics of Quasi-Heisenberg Type.” (submitted to a peer-reviewed journal)
5. T. Kubo: “The Dynkin Index and the Conformally Invariant Systems of Differential Operators for the Heisenberg Parabolics.” (submitted to a peer-reviewed journal)

C. 口頭発表

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2. “On conformally invariant systems of third order differential operators of Heisenberg type”、表現論セミナー、九州大学、2013年1月

3. “On conformally invariant systems of third order differential operators of Heisenberg type”、表現論セミナー、北海道大学、2012年12月
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