

小沢 登高 (OZAWA Narutaka)

A. 研究概要

昨年度に引き続き, von Neumann 環 (以下, vN 環と略す) の研究を行った. 離散群 Γ の群環 $\mathbb{C}\Gamma$ を適当な位相のもと完備化することによって, 群 vN 環 $\mathcal{L}\Gamma$ を得ることができる. von Neumann により群 vN 環 $\mathcal{L}\Gamma$ の分類問題が提起されて以来, 自由群 vN 環 $\mathcal{L}\mathbb{F}_r$ の同型類が自由群 $\mathbb{F}_r$ の階数 r に依存するかどうかはこの分野における最大の未解決問題である. 私は, 論文 [7,8] で開発した手法をさらに発展させ, 論文 [10] において, この問題の肯定的解答に肉薄する結果を得た. 即ち, 組み合わせ群論の基本定理である Kurosh の定理の vN 環版を (弱い形ながら) 証明した. 特にこの定理の系として, 無限対称群 S_∞ に対し, 多重自由積群 vN 環 $\mathcal{L}(\mathbb{F}_2 \times S_\infty)^{*r}$ が互いに非同型であることが従う. ついでに, エルゴード理論の軌道同型分類に関する Adams の定理の一般化も証明した.

In the academic year 2003, Ozawa studied the classification of group von Neumann algebras. Since von Neumann initiated the study of the group von Neumann algebras $\mathcal{L}\Gamma$ associated with discrete groups Γ , the problem whether $\mathcal{L}\mathbb{F}_m \not\cong \mathcal{L}\mathbb{F}_n$ for the free groups of different ranks $m \neq n$ has been a major open problem in the classification theory. Ozawa obtained a result which is closely related to the affirmative answer to this problem. Namely, he proved a von Neumann algebra analogue of the Kurosh theorem on free product decomposition of discrete groups. Although it is not as precise as the Kurosh theorem, it shows, for instance, that the group von Neumann algebras $\mathcal{L}(\mathbb{F}_2 \times S_\infty)^{*r}$ are pairwise non-isomorphic, where S_∞ is the group of finite permutations on a countably infinite set. He also obtained an extension of Adams' theorem in ergodic theory on indecomposability of orbit equivalence relations of word hyperbolic groups.

B. 発表論文

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C. 口頭発表

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G. 受賞

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