

東北大学大学院情報科学研究科  
純粋・応用数学研究センター

情報数理談話会のお知らせ

日 時： 2021年7月1日(木) 16:00 より 17:00 まで

場 所： Google Meet によりオンラインで開催

※参加方法はホームページをご覧ください

講演者： Md. Shafiul Alam 氏 (東北大学大学院情報科学研究科)

題 目： A Geometric Study on Ramanujan's Modular Equations and  
Hecke Groups

備 考： この情報数理談話会は課程博士予備審査会を兼ねています

[概要] Srinivasa Ramanujan recorded many remarkable formulae for the solutions to the generalized modular equation without proofs. Many decades later, proofs of the formulae were provided by making use of highly nontrivial identities for theta series and hypergeometric functions. There is an intimate relation between Hecke groups and the generalized modular equation. Based on the relation, we offer a geometric approach to the proof of those formulae. We emphasize that our approach does not need any knowledge about the identities for theta series and hypergeometric functions. Without prior knowledge about Ramanujan's formulae, we can derive those formulae through our approach. We prove that the solution to the generalized modular equation satisfies a polynomial equation, and we determine the degree of the polynomial explicitly in terms of the indices of Hecke subgroups. In this talk, we will discuss some basic facts of Hecke groups, quotient Riemann surfaces and modular equations. We will also focus on some results related to Hecke groups and Ramanujan's modular equations in the theories of signature 2, 3 and 4. Furthermore, we will present some applications of our results by deriving geometrically some known modular equations.

ホームページ： <https://www.math.is.tohoku.ac.jp/research/colloquium.html>