

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： 2026 年 6 月 22 日 (月) 13:30 より 14:30 まで

場 所： 東北大学大学院情報科学研究科棟 2 階中講義室

講演者： Paul Tricot 氏 (東北大学)

題 目： Johnson graphs, combinatorial designs and biangular lines

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] A biangular line system is a set of lines in Euclidean space with one of two angles between the lines. The largest possible biangular line systems up to dimension 6 have been classified, and the largest known biangular line systems in dimension 7 to 20 have angles $\arccos(1/5)$ and $\arccos(3/5)$. A biangular line system with this pair of angles is nicely connected to an integral lattice. We use the classification of root lattices to find the largest possible biangular line systems with these angles in dimension 7 to 10. Additionally, the connection between integral lattices and biangular lines allows us to find a new biangular line system of the largest known size in dimension 15.

The group $PGL(2, q)$ is 3-homogeneous on the projective line $GF(q) \cup \{\infty\}$, so orbits of k -subsets form combinatorial 3-designs. We compute the last parameter λ of some of these designs.

Perfect 2-colorings (or equitable bipartitions) of famous families of graphs, like Johnson graphs, are being classified. We consider one of the last cases, the perfect 2-colorings of the Johnson graph $J(10, 3)$ associated with the third largest eigenvalue and symmetric quotient matrix.

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