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Ordering and Reording: Using Heffter Arrays to Biembed Complete Graphs

Abstract for the Combinatorics Seminar 2015 September 29

In this talk I extend the study of Heffter arrays and the biembedding of graphs on orientable surfaces, first discussed by D. Archdeacon in 2014. I begin with the definitions of Heffter systems and Heffter arrays and their relationship to orientable biembeddings through current graphs. I then focus on two specific cases. I first prove the existence of embeddings for every complete graph K_{6n+1} in which every edge is on a face of size 3 and a face of size n. I next present partial results for biembedding K_{10n+1} with every edge on a face of size 5 and a face of size n. Finally, I address the more general question of ordering subsets of $Z_n \setminus \{0\}$. I conclude with some open conjectures and further explorations.

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Last update: **2020/01/29 19:03**