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On The Directed Hamilton-Waterloo Problem

Sibel Özkan
Gebze Technical University

Graph decomposition problems use the tools of both graph theory and combinatorial design theory. There are two well-known resolvable cycle decomposition problems where cycles can be partitioned into parallel classes, namely, 2-factors. One problem is the Oberwolfach problem where each 2-factor in the decomposition is isomorphic to a given 2-factor. Another problem is the Hamilton-Waterloo problem where each 2-factor can be isomorphic to one of the given two 2-factors. Both Oberwolfach and the Hamilton-Waterloo problems are mostly studied for uniform cycle factors. I will first give a brief introduction to such 2-factorization problems.

Directed version of the Oberwolfach problem has started to gain more interest recently. Here, the decomposed graph is the complete symmetric directed graph K_v^*. Factors with uniform -directed- cycle size 3, with uniform cycle size 4, and with uniform cycle size m where $v \equiv 0(\mathrm{mod} 2m)$, m is odd with $5 \leqslant m \leqslant 49$ are among the results on this version of the problem (see [1]. In [2], and [3] respectively). Here we carry this directed generalization to the Hamilton-Waterloo problem and present our first results on small cycle sizes.

If time permits, I will also briefly talk about other research problems I have worked on such as equimatchable graphs and also some domination problems.

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[1] Bermond J. C., Germa A., and Sotteau D. 1979, Resolvable decomposition of K_n^*, Journal of Combinatorial Theory, Series A, 26(2), 179-185.

[2] Bennett F. E., Zhang X., 1990, Resolvable Mendelsohn designs with block size 4, aequationes mathematicae, 40(1), 248-260.

[3] Burgess A., Francetic N., Sajna M., 2018, On the directed Oberwolfach Problem with equal cycle lengths: the odd case. Australas. J. Combin., 71(2), 272-292.