Excessive factorizations

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(joint work with Prof. H.-L. Fu)

Abstract

Bonisoli and Cariolaro [1] introduced the concept of *excessive factorization* of a graph. An excessive factorization of a graph G is a minimum set $\mathcal{F}$ of 1-factors (perfect matchings) of G with the property that their union is $E(G)$. The number of 1-factors in an excessive factorization is denoted by $\chi'_e(G)$ and called the *excessive index*. Not much is known about the excessive index in general, except that $\chi'_e(G) \geq \chi'(G)$, and that the difference $\chi'_e(G) - \chi'(G)$ can be arbitrarily large [1]. Cariolaro and Fu [2] have determined the excessive index for all complete multipartite graphs. Recently, Cariolaro and Fu [3] have extended the concept of excessive factorization in the following way. Let m be a fixed positive integer. An *excessive [m]-factorization* of a graph G is a minimum set $\mathcal{F}$ of matchings of G, all of size exactly m, whose union is $E(G)$. The corresponding parameter is denoted by $\chi'_{[m]}(G)$ and called *excessive [m]-index*. In this talk we shall review the current status of knowledge and the main open questions related to excessive factorizations and excessive [m]-factorizations.

References

[1] A. Bonisoli and D. Cariolaro, *Excessive factorizations of regular graphs,* in: A. Bondy et al. (Eds.), Graph Theory in Paris, Birkäuser, Basel, 2007, pp. 73–84.

[2] D. Cariolaro and H.-L. Fu, *On minimum sets of 1-factors covering a complete multipartite graph,* to appear in Journal of Graph Theory.

[3] D. Cariolaro and H.-L. Fu, *Covering graphs with matchings of fixed size,* Proceedings 21st British Combinatorial Conference (July 2007), to appear.