Abstract

Perfect 1-Factorisations

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A matching in a graph G is a subset $M \subseteq E(G)$ of the edge set of G such that no two edges of M share a vertex. A 1-factor of a graph G is a matching F in which every vertex of G is in one of the edges of F. If G is a Δ-regular graph of even order then we can ask whether G admits a 1-factorisation, namely a partition of its edge set into Δ 1-factors.

Suppose that $F_1, F_2, \ldots, F_\Delta$ are the 1-factors of a 1-factorisation $\mathcal{F}$ of a Δ-regular graph G. If, for each $1 \leq i < j \leq \Delta$, the union $F_i \cup F_j$ is the edge set of a Hamilton cycle in G, then we say that $\mathcal{F}$ is a perfect 1-factorisation of G. We will discuss some of the history and properties of 1-factorisations, including the recent discovery of a perfect 1-factorisation of K_{56}.