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*Perfect 1-Factorisations*

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 $\Delta$-regular graph of even order then we can ask whether $G$ admits a 1-factorisation, namely a partition of its edge set into $\Delta$ 1-factors.

Suppose that $F_1, F_2, \ldots, F_\Delta$ are the 1-factors of a 1-factorisation $\mathcal{F}$ of a $\Delta$-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 $K_{56}$.