

Extending perfect matchings to Hamiltonian cycles

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Abstract

A graph admitting a perfect matching has the *Perfect-Matching-Hamiltonian property* (for short the *PMH-property*) if each of its perfect matchings can be extended to a Hamiltonian cycle. In this talk we show some sufficient conditions for a graph G that guarantee that its line graph $L(G)$ has the *PMH-property*. In particular, we prove that this happens when G is (i) a Hamiltonian graph with maximum degree at most 3, (ii) a complete graph, (iii) an arbitrarily traceable graph, or (iv) a balanced complete bipartite graph. When G is a complete bipartite graph K_{m_1, m_2} its line graph is a rook graph (also the cartesian product $K_{m_1} \square K_{m_2}$) and we show for which values of m_1 and m_2 has the *PMH-property* and actually a stronger one called *Pairing Hamiltonian property*.