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Note on Petrie and Hamiltonian cycles in cubic polyhedral graphs

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Abstract: In this note we show that deciding the existence of a Hamiltonian cycle in a cubic plane graph is equivalent to the problem of the existence of an associated cubic plane multi-3-gonal graph with a Hamiltonian cycle which takes alternately left and right edges at each successive vertex, i.e. it is also a Petrie cycle. The Petrie Hamiltonian cycle in an n -vertex plane cubic graph can be recognized by an $O(n)$ -algorithm.

Keywords: Hamiltonian cycles, Petrie cycles, cubic polyhedral graphs

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