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Hamiltonian cycles in subdivided doubles

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Abstract

The subdivided double construction on 4-regular graphs was used by Potočnik and Wilson to explore semi-symmetric (edge-transitive but not vertex-transitive) graphs, and can be used to construct every semi-symmetric 4-regular graph that contains a pair of twin vertices. We show that (regardless of symmetry) subdivided doubles have another curious property: they have exponentially many Hamiltonian cycles each of which is complementary to another Hamiltonian cycle.

Keywords: Hamiltonian cycle, Hamiltonian decomposition, subdivided double, tetravalent graph.
Math. Subj. Class. (2020): 05C76, 05C45

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Hamiltonovi cikli v subdividiranih dvojnikih

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Povzetek

Konstrukcijo subdividiranega dvojnika na 4-regularnih grafih sta Potočnik in Wilson uporabila pri raziskovanju polsimetričnih grafov (povezavno tranzitivnih, vendar ne vozliščno tranzitivnih grafov), z njo pa je mogoče konstruirati vsak polsimetričen 4-regularen graf, ki vsebuje par dvojnih vozlišč. Pokažemo, da imajo subdividirani dvojniki, ne glede na simetrijo, še eno zanimivo lastnost: imajo eksponentno mnogo Hamiltonovih ciklov, pri čemer je vsak izmed njih komplementaren nekemu drugemu Hamiltonovemu ciklu.

Ključne besede: Hamiltonov cikel, Hamiltonova dekompozicija, subdividirani dvojnik, 4-valentni graf.

Math. Subj. Class. (2020): 05C76, 05C45

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