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Relating the total domination number and the annihilation number of cactus graphs and block graphs*

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Abstract

The total domination number $\gamma_t(G)$ of a graph G is the order of a smallest set $D \subseteq V(G)$ such that each vertex of G is adjacent to some vertex in D. The annihilation number $a(G)$ of G is the largest integer k such that there exist k different vertices in G with degree sum of at most $|E(G)|$. It is conjectured that $\gamma_t(G) \leq a(G) + 1$ holds for every nontrivial connected graph G. The conjecture was proved for graphs with minimum degree at least 3, and remains unresolved for graphs with minimum degree 1 or 2. In this paper we establish the conjecture for cactus graphs and block graphs.

Keywords: Total domination number, annihilation number, cactus graph, block graph.

Math. Subj. Class.: 05C69

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Primerjava indeksov popolne prevlade in uničenja pri kaktusnih grafih in bločnih grafih*

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Povzetek

Indeks popolne prevlade $\gamma_t(G)$ grafa G je red najmanjše množice $D \subseteq V(G)$, za katero velja, da je vsako vozlišče grafa G sosedno kakšnemu vozlišču grafa D. Indeks uničenja $a(G)$ grafa G je največje celo število k, za katerega obstaja k različnih vozlišč v G, ki ustrezajo pogoju, da je vsota njihovih stopenj največ $|E(G)|$. Domneva se, da neenakost $\gamma_t(G) \leq a(G) + 1$ velja za vsak netrivialen povezan graf G. Ta domneva je bila dokazana za grafe, pri katerih je minimalna stopnja njihovih vozlišč najmanj 3, njen status pa ostaja nerazrešen za grafe, pri katerih je minimalna stopnja njihovih vozlišč 1 ali 2. V tem članku potrdimo njeno veljavnost za kaktusne grafe in bločne grafe.

Ključne besede: Indeks popolne prevlade, indeks uničenja, kaktusni graf, bločni graf.

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