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Palindromic products*

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Abstract

A graph G on n vertices is said to be *palindromic* if there is a vertex-labeling bijection $f : V(G) \to \{1, 2, \ldots, n\}$ with the property that for any edge $vw \in E(G)$ there is an edge $xy \in E(G)$ for which $f(x) = n - f(v) + 1$ and $f(y) = n - f(w) + 1$.

This notion was defined and explored in a recent paper [R. Beeler, Palindromic graphs, *Bulletin of the ICA*, **85** (2019) 85–100]. The paper gives sufficient conditions on the factors of a Cartesian product of graphs that ensure the product is palindromic, but states that it is unknown whether the conditions are necessary. We prove that the conditions are indeed necessary. Further, we prove a parallel result for the strong product of graphs.

Keywords: Palindromic graphs, cartesian product of graphs, strong product of graphs.

Math. Subj. Class.: 05C76, 05C78

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Palindromski produkti*

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Povzetek

Graf G na n točkah se imenuje *palindromski*, če obstaja številčenje točk oz. bijekcija $f : V(G) \to \{1, 2, \ldots, n\}$ z lastnostjo, da za vsako povezavo $vw \in E(G)$ obstaja povezava $xy \in E(G)$, za katero je $f(x) = n - f(v) + 1$ in $f(y) = n - f(w) + 1$.

Ta pojem je bil definiran in raziskan v nedavnem članku [R. Beeler, Palindromic graphs, *Bulletin of the ICA*, **85** (2019) 85–100]. V tem članku so bili predstavljeni zadostni pogoji za faktorje kartezičnega produkta, ki zagotavljajo, da je produkt palindromski, vendar z opozorilom, da ni znano, ali so ti pogoji tudi potrebni. Dokaževa, da so ti pogoji dejansko potrebni. Nadalje, dokaževa podoben rezultat za krepki produkt grafov.

Ključne besede: Palindromski grafi, kartezični produkt grafov, krepki produkt grafov.

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