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Fast recognition of direct and strong products

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Abstract: This note describes fast algorithms for computing the prime factors of connected, nonbipartite graphs with respect to the direct product, and of connected graphs with respect to the strong product. The complexities are $O(m \min(n^2; \Delta^3))$ for the direct product, and $O(m a(G) \Delta)$ for the strong, where n is the order of the graph G to be factored, m its size, $a(G)$ its arboricity, and Δ its maximum degree. That is, the complexities are linear in m for fixed Δ .

Math. Subj. Class.: 05C85, 05C75, 05C12

Keywords: Graph products, algorithms.

Hitro prepoznavanje direktnih in krepkih produktov

Povzetek: Ta članek opisuje hitre algoritme za računanje prafaktorjev povezanih, nedvodelnih grafov glede na direktni produkt, in povezanih grafov glede na krepki produkt. Kompleksnosti teh algoritmov so reda $O(m \min(n^2; \Delta^3))$ za direktni produkt, in reda $O(m a(G) \Delta)$ za krepki produkt, kjer je n red grafa G , ki ga faktoriziramo, m njegova velikost, $a(G)$

njegova razvejanost, Δ pa njegova maksimalna stopnja. Torej so, pri fiksnem Δ , kompleksnosti linearno odvisne od m .

Ključne besede: Produkti grafov, algoritmi.