

Bipartite edge-transitive bi- p -metacirculants*

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Abstract

A graph is a bi-Cayley graph over a group if the group acts semiregularly on the vertex set of the graph with two orbits. Let G be a non-abelian metacyclic p -group for an odd prime p . In this paper, we prove that if G is a Sylow p -subgroup in the full automorphism group $\text{Aut}(\Gamma)$ of a graph Γ , then G is normal in $\text{Aut}(\Gamma)$. As an application, we classify the half-arc-transitive bipartite bi-Cayley graphs over G of valency less than $2p$, while the case for valency 4 was given by Zhang and Zhou in 2019. It is further shown that there are no semisymmetric or arc-transitive bipartite bi-Cayley graphs over G of valency less than p .

Keywords: Bi-Cayley graph, half-arc-transitive graph, metacyclic group.

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Dvodelni povezavno tranzitivni bi- p -metacirkulanti*

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Povzetek

Graf je bi-Cayleyjev graf nad neko grupo, če ta grupa na množici vozlišč grafa deluje semiregularno z dvema orbitama. Naj bo G nekomutativna metaciklična p -grupa za liho praštevilo p . V tem članku dokažemo, da če je G p -podgrupa Sylowa polne grupe avtomorfizmov $\text{Aut}(\Gamma)$ grafa Γ , potem je G podgrupa edinka grupe $\text{Aut}(\Gamma)$. Na podlagi tega rezultata klasificiramo pol-ločno tranzitivne dvodelne bi-Cayleyjeve grafe nad G z valenco manj kot $2p$. Klasifikacijo takšnih grafov z valenco 4 sta podala Zhang in Zhou leta 2019. Nadalje pokažemo, da ni nobenih semisimetričnih ali ločno tranzitivnih dvodelnih bi-Cayleyjevih grafov nad G , ki bi imeli valenco manjšo od p .

Ključne besede: Bi-Cayleyjev graf, pol-ločno tranzitiven graf, metaciklična grupa.

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