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2-Groups that factorise as products of cyclic groups, and regular embeddings of complete bipartite graphs

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Abstract

We classify those 2-groups G which factorise as a product of two disjoint cyclic subgroups A and B , transposed by an automorphism of order 2. The case where G is metacyclic having been dealt with elsewhere, we show that for each $e \geq 3$ there are exactly three such non-metacyclic groups G with $|A| = |B| = 2^e$, and for $e = 2$ there is one. These groups appear in a classification by Berkovich and Janko of 2-groups with one non-metacyclic maximal subgroup; we enumerate these groups, give simpler presentations for them, and determine their automorphism groups.

Keywords: Regular map, complete bipartite graph, product of cyclic groups.

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2-grupe, faktorizabilne v produkte cikličnih grup, in regularne vložitve polnih dvodelnih grafov

Povzetek

Klasificiramo tiste 2-grupe G , izrazljive kot produkt dveh disjunktnih cikličnih podgrup A in B , transponiranih z avtomorfizmom reda 2. Primer, ko je grupa G metaciklična, je že obravnavan drugje. Tu pokažemo, da za vsak $e \geq 3$ obstajajo natanko tri takšne ne-metaciklične grupe G , ki zadoščajo pogoju $|A| = |B| = 2^e$, medtem ko za $e = 2$ obstaja samo ena. Te grupe se pojavijo v Berkovichevi in Jankovi klasifikaciji 2-grup z eno ne-metaciklično maksimalno podgrupo; tu preštejemo te grupe, podamo njihove enostavnejše prezentacije in določimo njihove grupe avtomorfizmov.

Ključne besede: Regularen zemljevid, polni dvodelni graf, produkt cikličnih grup.