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A characterization of exceptional pseudocyclic association schemes by multidimensional intersection numbers

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Abstract

Recent classification of $\frac{3}{2}$-transitive permutation groups leaves us with three infinite families of groups which are neither 2-transitive, nor Frobenius, nor one-dimensional affine. The groups of the first two families correspond to special actions of $\mathrm{PSL}(2,q)$ and $\mathrm{P\Gamma L}(2,q)$, whereas those of the third family are the affine solvable subgroups of $\mathrm{AGL}(2,q)$ found by D. Passman in 1967. The association schemes of the groups in each of these families are known to be pseudocyclic. It is proved that apart from three particular cases, each of these exceptional pseudocyclic schemes is characterized up to isomorphism by the tensor of its 3-dimensional intersection numbers.

Keywords: Association schemes, groups, coherent configurations.

Math. Subj. Class.: 05E30, 05E18

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Karakterizacija izjemnih psevdocikličnih asociativnih shem z večdimenzionalnimi presečnimi števili

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Povzetek

Nedavna klasifikacija $\frac{3}{2}$-tranzitivnih permutacijskih grup navaja tri neskončne družine grup, ki niso ne 2-tranzitivne, ne Frobeniusove, pa tudi ne enodimenzionalne afine. Grupe prvih dveh družin ustrezajo posebnim delovanjem grup $\mathrm{PSL}(2,q)$ in $\mathrm{P\Gamma L}(2,q)$, tiste iz tretje družine pa so afine rešljive podgrupe grupe $\mathrm{AGL}(2,q)$, ki jih je našel D. Passman leta 1967. Asociativne sheme grup iz vsake od teh družin so, kot je znano, psevdocikličnе. Dokažemo, da je, razen v treh posebnih primerih, vsaka od teh izjemnih psevdocikličnih shem karakterizirana do izomorfizma natančno s tenzorjem njenih 3-dimenzionalnih presečnih števil.

Ključne besede: Asociativne sheme, grupe, skladne konfiguracije.

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