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3-pyramidal Steiner triple systems*

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Abstract: A design is said to be f-pyramidal when it has an automorphism group which fixes f points and acts sharply transitively on all the others. The problem of establishing the set of values of v for which there exists an f-pyramidal Steiner triple system of order v has been deeply investigated in the case $f = 1$ but it remains open for a special class of values of v. The same problem for the next possible f, which is $f = 3$, is here completely solved: there exists a 3-pyramidal Steiner triple system of order v if and only if $v \equiv 7, 9, 15 \pmod{24}$ or $v \equiv 3, 19 \pmod{48}$.

Keywords: Steiner triple system, group action, difference family, Skolem sequence, Langford sequence.

Math. Subj. Class.: 51E10, 20B25, 05B07, 05B10

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3-piramidalni Steinerjevi sistemi trojic*

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Povzetek: Načrt se imenuje f-piramidalen, če ima grupo avtomorfizmov, ki fiksira f točk in deluje ostro tranzitivno na vseh drugih. Problem določitve množice vrednosti v, za katere obstaja f-piramidalen Steinerjev sistem trojic reda v, je bil poglobljeno raziskan v primeru $f = 1$, ostaja pa odprt za poseben razred vrednosti v. Isti problem za naslednji možni f, tj. $f = 3$, je tu popolnoma rešen: 3-piramidalni Steinerjev sistem trojic reda v obstaja natanko tedaj ko je $v \equiv 7, 9, 15 \pmod{24}$ ali $v \equiv 3, 19 \pmod{48}$.

Ključne besede: Steinerjev sistem trojic, delovanje grupe, diferenčna družina, Skolemovo zaporedje, Langfordovo zaporedje.

Math. Subj. Class.: 51E10, 20B25, 05B07, 05B10

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