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Congruent triangles in arrangements of lines

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Abstract: We study the maximum number of congruent triangles in finite arrangements of ℓ lines in the Euclidean plane. Denote this number by $f(\ell)$. We show that $f(5) = 5$ and that the construction realizing this maximum is unique, $f(6) = 8$, and $f(7) = 14$. We also discuss for which integers c there exist arrangements on ℓ lines with exactly c congruent triangles. In parallel, we treat the case when the triangles are faces of the plane graph associated to the arrangement (i.e. the interior of the triangle has empty intersection with every line in the arrangement). Lastly, we formulate four conjectures.

Keywords: Arrangement, congruent triangles

Math. Subj. Class.: 52C10, 52C30

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Kongruentni trikotniki v sestavih premic

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Povzetek: Raziskujemo maksimalno število kongruentnih trikotnikov v končnih sestavih ℓ premic v evklidski ravnini. Označimo to število z $f(\ell)$. Pokažemo, da je $f(5) = 5$ in da je konstrukcija, ki realizira ta maksimum, enolična, ter da je $f(6) = 8$ in $f(7) = 14$. Obravnavamo tudi vprašanje, za katera cela števila c obstajajo sestavi ℓ premic z natanko c kongruentnimi trikotniki. Poleg tega obravnavamo primer, ko so trikotniki lica ravninskega grafa, pridruženega sestavu (tj. notranjost trikotnika ima prazen presek z vsako premico sestava). Nazadnje formuliramo štiri domneve.

Ključne besede: Sestav, kongruentni trikotniki.

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