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Quasi-configurations: Building blocks for point-line configurations

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Abstract: We study point-line incidence structures and their properties in the projective plane. Our motivation is the problem of the existence of (n_4) configurations, still open for few remaining values of n . Our approach is based on quasi-configurations: point-line incidence structures where each point is incident to at least 3 lines and each line is incident to at least 3 points. We investigate the existence problem for these quasi-configurations, with a particular attention to $3|4$ -configurations where each element is 3- or 4-valent. We use these quasi-configurations to construct the first (37_4) and (43_4) configurations. The existence problem of finding (22_4) , (23_4) , and (26_4) configurations remains open.

Keywords: Projective arrangements, point-line incidence structure, (n_k) configurations.

Math. Subj. Class.: 52C30

Kvazi-konfiguracije: gradniki konfiguracij točk in premic

Povzetek: Preučujemo incidenčne strukture točk in premic ter njihove lastnosti na projektivni ravnini. Naša motivacija je problem obstoja (n_4) konfiguracij, ki je še vedno odprt za nekaj vrednosti n . Naš pristop temelji na kvazi-konfiguracijah: to so incidenčne strukture točk in premic, pri katerih je vsaka točka incidentna vsaj 3 premicam, vsaka premica pa je incidentna vsaj 3 točkam. Raziskujemo eksistenčni problem teh kvazi-konfiguracij, pri čemer posebno pozornost posvečamo 3|4-konfiguracijam, kjer je vsak element 3- ali 4-valenten. Te kvazi-konfiguracije uporabimo za to, da konstruiramo prve (37_4) in (43_4) konfiguracije. Eksistenčni problem oziroma problem iskanja konfiguracij (22_4) , (23_4) in (26_4) ostaja odprt.

Ključne besede: Projektivne razporeditve, incidenčne strukture točk in premic, (n_k) konfiguracije.