Abstract

Neighbour-transitive codes in generalised quadrangles

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A code C in an arbitrary graph Γ is a subset of the vertex set of Γ. The minimum distance δ of a code C is the smallest distance between a pair of distinct elements of C and the graph metric gives rise to the distance partition $\{C, C_1, \ldots, C_\rho\}$, where ρ is the maximum distance between any vertex of Γ and its nearest element in C. In this talk we consider the case where Γ is the point-line incidence graph of a generalised quadrangle $\mathcal{Q}$ and we say that C is a code in the generalised quadrangle $\mathcal{Q}$. Since the diameter of Γ is 4, both ρ and δ are at most 4. If $\delta = 4$ then C is a partial ovoid or partial spread of $\mathcal{Q}$, and if, additionally, $\rho = 2$ then C is an ovoid or a spread. A code C in $\mathcal{Q}$ is neighbour-transitive if its automorphism group acts transitively on each of the sets C and C_1. Our main results i) classify all neighbour-transitive codes admitting an insoluble group of automorphisms in thick classical generalised quadrangles that correspond to ovoids or spreads, and ii) give two infinite families and six sporadic examples of neighbour-transitive codes with minimum distance $\delta = 4$ in the classical generalised quadrangle $\mathsf{W}_3(q)$ that are not ovoids or spreads.

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