

On Permutation Arrays for Hamming Distance: Improving MOLS Bounds

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In this talk we present some new results on permutation arrays. Permutation arrays with bounded Hamming distances have applications in the construction of codes for transmitting information over very noisy channels, such as power-lines. Let $M(n,d)$ denote the maximum number of permutations on n symbols with Hamming distance d . Previously, work on the number of mutually orthogonal Latin squares (MOLS) of side n , which is itself a very challenging open problem, were used to obtain lower bounds for $M(n,n-1)$. Sharply transitive groups, which exist (with a few exceptions) only for primes and prime powers, give optimum lower bounds for $M(n,n-1)$ and $M(n,n-2)$. We survey the field and describe new combinatorial methods, called *partition and extension*, including two level partition and extension, which yield improved lower bounds.