

Linear Codes Afforded by the Permutation Representations of Finite Simple Groups and Their Support Designs

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Abstract : Using a representation-theoretic approach and considering G to be a finite primitive permutation group of degree n , our aim is to determine linear codes of length n that admit G as a permutation automorphism group. We can show that in some cases, every binary linear code admitting G as a permutation automorphism group is a submodule of a permutation module defined by a primitive action of G . As an illustration of the method, we consider the sporadic simple group M_{11} and the unitary group $U(3,3)$. We also construct some point- and block-primitive 1-designs from the supports of some codewords of the codes in the discussion.

Keywords : linear code, permutation representation, support design, simple group

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