World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:18, No:06, 2024

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

Authors : Amin Saeidi

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
Conference Title : ICRTGRCT 2024 : International Conference on Representation Theory, Group Rings, and Coding Theory
Conference Location : Paris, France
Conference Dates : June 20-21, 2024