

Bridges between rank 3 primitive permutation groups and binary self-dual codes

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One of the questions of current interest in coding theory is the following: given a finite non-solvable permutation group G acting transitively on a set Ω , under what conditions on G are self-dual codes invariant under G existent or nonexistent? In this talk, this problem is investigated under the hypothesis that the group is primitive rank 3 of almost simple type. We will prove that if G is a primitive rank 3 group of almost simple type acting transitively on the coordinate positions of a binary self-dual code C then G is one of $\text{PSp}(2m, q)$ of degree $\frac{q^{2m}-1}{q-1}$, $m \geq 2$ and $q \equiv -1 \pmod{8}$, Hall-Janko group HJ and $\text{Aut}(\text{HJ})$ of degrees 100, or the Rudvalis group of degree 4060.