Abstract

Enumeration of the semi-isometry classes of linear codes.

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We describe the group of semi-linear isometries of $\mathbb{F}_q^n$ as a generalized wreath product. A generalization of Lehmann's Lemma shows how to enumerate the semi-isometry classes of linear codes by applying methods similar to those used for the enumeration of the isometry classes of linear codes. Wheras the numbers of nonisometric (n, k)-codes could be determined from the cycle index of the natural action of $\mathrm{PGL}_k(q)$ on $\mathrm{PG}_{k-1}(q)$, now we have to compute the cycle index of the natural action of $\mathrm{P\Gamma L}_k(q)$ on $\mathrm{PG}_{k-1}(q)$. Finally, for $q = 4, 8, 9$ the numbers of isometry classes and semi-isometry classes of (n, k)-codes over $\mathbb{F}_q$ are compared.