Weight distributions of simplex and MacDonald codes over finite chain rings[1]

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a joint work

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Abstract

A linear code of length n over a finite chain ring R with residue field $\mathbb{F}_q$ is a R-submodule of R^n. A R-linear code is a code over $\mathbb{F}_q$ (not necessarily linear) which is the generalized Gray map image of a linear code over R. In this work, we present the construction of R-linear simplex and MacDonald codes of type α and β. These codes can be seen as a generalization of the linear simplex and MacDonald codes over $\mathbb{Z}_{p^s}$, with p prime and $s \geq 1$ [2, 3]. Moreover, we show the fundamental parameters of these codes, including their minimim Hamming distance, as well as their complete weight distributions. When $R = \mathbb{Z}_{p^s}$, these codes are related to the $\mathbb{Z}_{p^s}$-linear generalized Hadamard codes [1].

Keywords

Homogeneous weight, simplex codes, MacDonald codes, finite chain rings.

References

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[1]This work has been partially supported by the Spanish MICINN grant PID2022-137924NB-I00, and by the Catalan AGAUR grant 2021 SGR 00643.