Evaluation Codes and Weierstrass Semigroups

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Abstract

We report on a construction of modified evaluation codes by Dias and Neves [1]. Evaluation codes are a type of Reed-Muller code, where the code is the image of a space of polynomial functions under the evaluation map on a given set of points in affine space, cf. [2]. In their work, Dias and Neves assign weights to the coordinates, namely a finite sequence of natural numbers. The goal is to compute the parameters of the code, especially aiming at the Minimum-Distance-Separable property. Even with the simplest choice of points on which to evaluate, however, the problem is difficult, as it is related to the Frobenius problem [3]. In collaboration with Neves, we propose to establish a connection between the spaces of functions and sections of line bundles on algebraic curves when the chosen sequence generates the Weierstrass semigroup of a point on the curve. The prospective application is to compute the parameters of the code in some cases by using Riemann-Roch arguments.

Keywords

Evaluation codes, Reed-Muller codes, Weierstrass semigroup

References

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