On Decoding of Maximum Rank Distance codes[*]

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Abstract

Rank metric codes have gained steady attention in the past due to their applications in a variety of areas, such as space-time coding , random network coding and cryptography. Many important properties of rank metric codes were independently established in the pioneering works, in which the rank metric Singleton bound was established and the *maximum rank distance* (MRD) codes that attain the bound with equality were constructed. The Gabidulin codes, the rank analogues of Reed-Solomon codes, are the most famous linear MRD codes and the decoding of such codes have been extensively studied.

In the last few years, significant progresses have been made in the construction of MRD codes that are inequivalent to the Gabidulin codes and their generalized variants. The first non-(generalized) Gabidulin MRD codes were introduced independently by Sheekey in and by Otal and Özbudak where the latter presented a particular case of the former. Sheekey defined the codes by adding an extra monomial to the polynomial representation of the original Gabidulin codes with certain restriction on its coefficient and called them the *twisted Gabidulin (TG)* codes. The generalized twisted Gabidulin (GTG) codes were intensively investigated later; and it was further extended by Otal and Özbudak, where they proposed additive (but not linear) MRD codes and non-additive partition codes, respectively.

In this talk we will review recent advances of the construction of MRD codes and discuss the decoding algorithms for those newly constructed MRD codes.

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