

SEMINARIO

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MRD Rank Metric Convolutional Codes. Strategies for efficient encoding and decoding

Abstract: A Rank Metric Code \mathcal{C} is a set of $n \times m$ matrices over a finite field, equipped with a distance given by the rank of $A - B$, for any two different codewords $A, B \in \mathcal{C}$. The code is called MRD when the minimum distance between different codewords reaches its upper bound (depending on m , n and the size of the code).

This kind of codes, together with an MRD construction (also known as Gabidulin Code), were introduced at the end of the 70s by Delsarte. Surprisingly, new MRD constructions were found by various authors only three years ago.

The first work on Rank Metric Convolutional Codes was also published in 2015: in this case, the codewords are (finite) sequences of $n \times m$ matrices, usually represented as polynomial matrices.

In this talk we will generalize the notion of codeword distance to the polynomial case; establish the corresponding upper bound; construct a general family of MRD Rank Metric Convolutional Codes; show how to decode a received message, detecting and correcting the errors that may have occurred; finally, we will propose strategies for an efficient implementation.

Joint work with Raquel Pinto and Diego Napp (University of Aveiro) and Joachim Rosenthal (University of Zurich).

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