Local codes in rank metric

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Résumé

Locality is a notion that appears in various definitions for error correcting codes in Hamming metric.
Locally testable codes (LTCs) are codes satisfying the property that we can probabilistically decide whether a vector is a codeword or not by inspecting only a small part of its coordinates.
Locally decodable codes (LDCs) (resp. locally correctable (LCCs)) are codes satisfying the property that we can probabilistically recover coordinates of a message (resp. of a codeword) using a few coordinates of a corrupted codeword.
All these definition rely on the notion of query. One query on a vector is the value of one coordinate of this vector. We aim to extend this notion to the rank metric, a well-known alternative to the Hamming metric in coding theory.
In this framework we revise the notion of query. In Hamming metric, using only a few coordinates means using information of low Hamming weight. We adapt the notion of query to the rank metric by adapting notion of "part of the information" to rank metric.

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