

On the Etzion-Silberstein Conjecture

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Ferrers diagram rank-metric codes were first studied in 2009 by Etzion and Silberstein [1], motivated by the application of subspace codes in network coding, and arise from subspace codes in a fixed Schubert cell. In their paper, they proposed a conjecture on the largest dimension of a space of matrices over a finite field whose nonzero elements are supported on a given Ferrers diagram and have all rank lower bounded by a fixed positive integer d . Over the last 14 years, their conjecture has been proved only in some cases, mostly including an assumption on the field size being large enough, or some restriction on the minimum rank d depending on the Ferrers diagram. As of today, this conjecture still remains widely open. In this talk we give a brief overview on the main features of Ferrers diagram rank-metric codes and on the state of art on the celebrated Etzion-Silberstein conjecture. Afterwards, we illustrate a constructive proof of this conjecture for the class of strictly monotone Ferrers diagrams, which does not depend on the minimum rank d and holds over every finite field.

References

- [1] T. Etzion, N. Silberstein. *Error-correcting codes in projective spaces via rank-metric codes and Ferrers diagrams*. IEEE Transactions on Information Theory, **55.7**(2009):2909–2919.

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