

What is the rank-metric equivalent of a binary code?

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In the Hamming metric, binary codes play a special role. From a coding theory perspective, this is because computers work with zeros and ones, and from a combinatorial perspective this is because the incidence matrix of a combinatorial object (graph, block design, incidence geometry, et cetera) consists of zeros and ones. This project asks: what is the rank-metric equivalent (or: q -analogue) of a binary code? One way to approach this is to consider how the incidence matrix of a q -analogue of a combinatorial object (q -ary graph, subspace design, whatever the q -analogue of an incidence geometry is) should look like. Another approach is to consider various equivalent definitions of binary matroids and see if they have a feasible q -analogue.