CIRCULANT RANK CODES IN COMMUNICATION CHANNELS

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We define a new type of codes on the space of circulant matrices over GF(2). Consider the Galois field GF(2^N) where N > 1. An element \( \alpha \in GF(2^N) \) is denoted by a N-tuple \((\alpha_0, \alpha_1, \ldots, \alpha_{N-1})\). We define a tool called circulant transpose \( T_c \) of \( \alpha = (\alpha_0, \alpha_1, \ldots, \alpha_{N-1}) \) and associate with each \( \alpha \in GF(2^N) \) a circulant matrix whose \( i^{th} \) column is \( \alpha_i c \) for \( i = 0 \) to \( N - 1 \). This gives a map \( f \) from \( GF(2^N) \), by \( V^N \). By defining a suitable distance function we obtain a circulant rank distance code of length N. This code can be used in communication channels with very high error probability or unpredictable error patterns. For a code of length N transmitted can be recovered even if \( N - 2 \) symbols are corrupted.