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t-Extensions of Linear Codes

For $n \geq k$, an $(n, k, d)_q$-*code* C is a collection of q^k n-tuples (or *codewords*) over an alphabet $\mathcal{A}$ of size q such that the minimum (Hamming) distance between any two codewords of C is d. For such a code, the Singleton bound $\left(|C| \leq |\mathcal{A}|^{n-d+1}\right)$ gives $d \leq n - k + 1$. The *Singleton defect of* C, $S(C)$, is defined by $S(C) = n - k + 1 - d$. A code C' obtained by deleting some fixed t coordinates from each codeword of C is called a t-punctured code of C. In the case that $S(C') = S(C)$, C is said to be a t-extension of C', equivalently, C' is said to be *extendable* to the code C. A code is *maximal* if it admits no extensions.

In this talk I shall discuss the question of non-linear t-extendability of linear codes, and describe some recent progress obtained by utilizing the Alderson-Bruen-Silverman (ABS) model of linear codes. Some open problems will also be presented.