

Construction of Convolutional Codes with a Designed Parameters from Linear System Viewpoint

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Resumen

Coding theory is natural partitioned into the study of block and convolutional codes. Convolutional codes generalize the class of block codes in a natural way. However, the algebraic theory of convolutional codes is not as advanced as the algebraic theory of block codes. In fact, more of the implemented convolutional codes were found by exhaustive computer searches. Some of the few algebraic construction have extended construction for block codes to convolutional codes. Another procedures consist to construct new convolutional codes from old ones. Two of these techniques are the coding concatenation, that allow us the use of multiple encoding stages to obtain long codes with only a linear increase in decoding complexity, and the punctured process, thus a low rate encoder can be used to generate many high-rate codes. Both techniques are treated in the literature from the generator matrix viewpoint. In this work, we present new convolutional codes with a fixed rate and degree using the concatenation and punctured techniques from linear system viewpoint. We also establish lower bound over the free distance of the obtained convolutional codes.