Constructions of Linear and Robust Codes Based on Wavelet Decompositions

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Abstract : The classical approach to the providing noise immunity and integrity of information that process in computing devices and communication channels is to use linear codes. Linear codes have fast and efficient algorithms of encoding and decoding information, but this codes concentrate their detect and correct abilities in certain error configurations. To protect against any configuration of errors at predetermined probability can robust codes. This is accomplished by the use of perfect nonlinear and almost perfect nonlinear functions to calculate the code redundancy. The paper presents the error-correcting coding scheme using biorthogonal wavelet transform. Wavelet transform applied in various fields of science. Some of the wavelet applications are cleaning of signal from noise, data compression, spectral analysis of the signal components. The article suggests methods for constructing linear codes based on wavelet decomposition. For developed constructions we build generator and check matrix that contain the scaling function coefficients of wavelet. Based on linear wavelet codes we develop robust codes that provide uniform protection against all errors. In article we propose two constructions of robust code. The first class of robust code is based on multiplicative inverse in finite field. In the second robust code construction the redundancy part is a cube of information part. Also, this paper investigates the characteristics of proposed robust and linear codes.