Decoding Convolutional Hadamard Codes and Turbo Hadamard Codes using Recurrent Neural Networks

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Abstract

In this paper, a Recurrent Neural Network (RNN) based decoder is proposed for the decoding of convolutional Hadamard codes (CHC) and Turbo Hadamard Codes (THC). Moreover, a long short-term memory (LSTM) network is adopted to realize the RNN decoder, forming the LSTM-CHC decoder and LSTM-THC decoder. Also, the proposed LSTM-THC decoder consists of several serial-concatenated LSTM-CHC decoders, which are pre-trained separately. The end-to-end LSTM-THC decoder is then trained based on the pre-trained weights. Simulations are performed on the LSTM-CHC/LSTM-THC decoders and their error performances are compared with those of the conventional decoders.

Index Terms

convolutional Hadamard code, turbo Hadamard code, Recurrent Neural Networks.

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