

# Combining FEC and Optimal Soft-Input Source Decoding for the Reliable Transmission of Correlated Variable-Length Encoded Signals

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## ABSTRACT

In this paper we utilize both the implicit residual source correlation and the explicit redundancy from a forward-error-correction (FEC) scheme for the error protection of packetized variable-length encoded source indices. The implicit source correlation is exploited in a novel symbol-based soft-input a-posteriori probability (APP) decoder, which leads to an optimal decoding process in combination with a mean-squares or maximum a-posteriori probability estimation of the reconstructed source signal. When additionally the variable-length encoded source data is protected by channel codes, an iterative source-channel decoder can be obtained in the same way as for serially concatenated codes, where the outer constituent decoder is replaced by the proposed APP source decoder. Simulation results show that by additionally considering the correlations between the variable-length encoded source indices the error-correction performance can be highly increased.