

Vasin Suktalordcheep 2013: Inner Coding Systems for Concatenated Codes with Vector Symbol Outer Decoder for Mobile Channels. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Associate Professor Usana Tuntoolavest, Ph.D. 92 pages.

The purpose of this research is to design the concatenated coding systems with Vector Symbol Decoder (VSD) for outer convolutional codes with large symbol size in mobile channels. The focus is on the inner coding part, which includes the development of list and soft decision Viterbi Algorithm (VA) for block codes and the use of a nonbinary block code instead of a binary code as an inner code. Three concatenated coding systems have been considered as follows: (1) a BCH inner code with list soft VA inner decoder and VSD with 2 alternative choices and 26-bit outer symbols, (2) a BCH inner code with soft VA and VSD with no alternative choice and 102-bit outer symbols and (3) a Reed-Solomon (RS) inner code with Algebraic hard decision decoding and VSD with no alternative choice and 104-bit outer symbols.. The result shows that the soft list VA for block codes can be achieved. For the performance of VSD only with no inner codes, the 128-bit symbol is better than the 64-bit symbol for the selected mobile channel. In addition, the system with RS inner code is better than the one with BCH inner code for the selected mobile channels.

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