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A study on turbo coded 16-QAM bit allocation in Rice flat fading channel

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Abstract

The study presented in this paper shows that the coding gain between different allocation modalities between turbo encoder and quadrature amplitude modulator with 16 signal points is over 0.6 dB in fading environment. The study presents comparatively the performances obtained with the single binary and double binary turbo codes of memory 4 (with 16 states) used in the LTE and DVB standards. It took into consideration the channel with flat fading, non-selective in frequency, of Ricean type for various degrees of strength. Because of the preferential protection offered by the quadrature amplitude modulation, the various modes of binary allocation between turbo encoding and the quadrature amplitude modulation provide very different bit error rates performances. The hierarchies in performance are strongly influenced by the signal per noise ratio at which work is done. The presented results are a guide for choosing the most adequate binary allocation modality between coding and modulation for specific applications.

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1. Introduction

Quadrature amplitude modulation (QAM) is a handy solution for the efficient use of the transmission channel strip. In the case of Additive White Gaussian Noise (AWGN) channel “very clean”, i.e. with very high signal to noise ratio (SNR), QAM with up to 1024 signal points are usable. These modulations are practically

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