

Abstract

Orthogonal frequency division multiplexing (OFDM) schemes are widely employed for digital transmission in several wireline and wireless communication systems. Their main drawback is the high envelope fluctuations of the transmitted signals, which leads to amplification difficulties and inefficiencies that are especially important in satellite communications.

Constant envelope OFDM (CE-OFDM) techniques appear as a solution to those amplification problems since they are compatible with low-cost and highly efficient strongly nonlinear amplifiers. The basic idea behind CE-OFDM is to use the OFDM signal to modulate the phase of a given carrier. However, CE-OFDM is a nonlinear modulation and receivers based on phase demodulation can be far from optimum. In this paper we study analytically the optimum asymptotic performance of CE-OFDM schemes. It is shown that the optimum performance of CE-OFDM can be substantially better than the performance of ideal linear OFDM schemes, especially for frequency-selective channels.

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