Orthogonal Frequency Division Multiplexing in Fiber Optic Communication

Article Overview

Optical OFDM (O-OFDM) enables high-speed, spectrally efficient data transmission over fiber by modulating multiple orthogonal subcarriers with optical signals.

Overview of OFDM

Orthogonal Frequency Division Multiplexing (OFDM) is a digital modulation technique where a data stream is split into multiple parallel substreams, each transmitted on closely spaced orthogonal subcarriers. This approach allows high data rates while mitigating channel impairments such as frequency-selective fading and inter-symbol interference. Demodulation is typically performed using fast Fourier transform (FFT) algorithms, simplifying channel equalization compared to single-carrier systems .

Optical OFDM Adaptation

In fiber optic communication, OFDM is adapted to handle the intensity-modulated direct detection (IM-DD) systems used in optical fibers. Unlike electrical signals, optical intensity cannot be negative, so a DC bias is often added to ensure all signal values are positive. However, this DC component does not carry information, leading to energy inefficiency. To address this, asymmetrically clipped optical OFDM (ACO-OFDM) removes negative-going peaks, though this introduces second-order distortion and intermodulation, reducing usable subcarriers and halving spectral efficiency ....

Article Content

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An analogous technique called wavelength division multiplexing is used in fiber-optic communication, in which multiple channels of

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A great deal of attention is being paid to OFDM modulation in visible light communication systems and it because of its advantages

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H. Sanjoh, E. Yamada, Y. Yoshikuni, Optical orthogonal frequency division multiplexing using frequency/time domain

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ABSTRACT pectral efficiency and maximum power efficiency in optical systems has generated renewed interest in the optimization

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While traditional Frequency Division Multiplexing has been around for over 100 years, OFDM was first introduced by

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Abstract: The main features of the construction of fiber-optic communication lines with multiplexing using orthogonal frequency

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This Chapter is review and literature survey about the development and possibilities for OFDM in optical fiber

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Orthogonal Frequency Division Multiplexing

Orthogonal frequency-division multiplexing (OFDM) is a widely used modulation/multiplexing technology in wireless and data

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Orthogonal frequency-division multiplexing (OFDM) is defined as a multicarrier modulation technique that transmits data over

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OFDM stands for the orthogonal frequency division multiplexing where bandwidth is divided into number of subcarriers which are

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OFDM for Optical Communications

OFDM for Optical Communications Abstract: Orthogonal frequency division multiplexing (OFDM) is a modulation technique which is

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Performance analysis of optical communication networks utilizing ...

This document provides an examination of research, on combining orthogonal frequency division multiplexing

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Enhancing network performance in a long-haul communication

Presents a network optimization study utilizing wavelength division multiplexing (WDM) and coherent optical

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Orthogonal Frequency Division Multiplexing

1 Introduction Orthogonal frequency division multiplexing (OFDM) is a popular technique in wideband wireless communication

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