Orthogonal Frequency Division Multiplexing in Fiber Optic Communication

Overview

In optical fiber, dispersion means broadening of pulse width in time scale and it is analogous to multipath wave propagation in free space. When different wave components reach at the detector on different time instants the pulse i. In optical fiber, dispersion means broadening of pulse width in time scale and it is analogous to multipath wave propagation in free space. When different wave components reach at the detector on different time instants the pulse is broadened on time scale and that causes inter symbol interference (ISI). The dispersion may occur because of 1. (a). As optical power travels along the fiber, it gets attenuated with rate dB/km. These losses can be further classified: 1. (a) Absorption loss: It occurs because of impurities in fiber material specially OH ions. 2. (b) Scattering: Mie or Rayleigh scattering occurs because of material imperfection. 3. (c) Bending loss: Core dimension imperfection or. An optical fiber material has an effective refractive index ({tilde{eta }}) and it is dependant on electrical field intensity. It can be written as : (eta (omega)) is the linear part for refractive index of fiber core material, and I is the optical intensity, E is electric field, (tilde{eta _2})is nonlinear-index coefficient. Change i.

Article Content

Jun 29, 2025

Orthogonal Frequency Division Multiplexing

Orthogonal frequency-division multiplexing (OFDM) is defined as a multicarrier modulation technique that transmits data over multiple lower rate subcarriers, offering advantages such as robustness

Sep 05, 2025

Reverse polarity optical Orthogonal frequency Division Multiplexing for ...

In this paper, Reverse Polarity optical orthogonal frequency division multiplexing (RPO-OFDM) is proposed as a new signal format for combining the fast O-OFDM contact signal with the

May 19, 2026

Orthogonal Frequency Division Multiplexing: An Overview

Abstract Orthogonal Frequency Division Multiplexing (OFDM) is a multi-carrier modulation scheme that provides efficient bandwidth utilization and robustness against time dispersive channels. This paper

Jan 14, 2026

Coherent optical communication systems based on or-thogonal

Coherent optical orthogonal frequency division multiplexing (CO-OFDM) is considered as a key solution for long haul optical fiber communication systems thanks to its high spectral efficiency and

Jan 30, 2026

ORTHOGONAL FREQUENCY DIVISION

The first generation of optical fiber communication uses the Wavelength Division Multiplexing (WDM), which has become very popular. In this technique of

Jun 26, 2025

Wavelength Division Multiplexing

Wavelength Division Multiplexing (WDM) is defined as a multiplexing technology used in fiber-optic transmission to maximize transmitted bit rates, enabling long-haul data, video, and voice

Aug 27, 2025

Spectrally efficient optical orthogonal frequency division multiplexing

This paper charts the development of spectrally efficient forms of optical orthogonal frequency division multiplexing (OFDM) that are suited for intensity-modulated direct detection

Nov 18, 2025

Orthogonal Frequency Division Multiplexing

1 Introduction Orthogonal frequency division multiplexing (OFDM) is a popular technique in wideband wireless communication systems because of its high data rate, high spectral efficiency, and high

Jun 21, 2026

Mode and orthogonal frequency division multiplexing using a single

Abstract An arrayed waveguide grating (AWG) configuration can simultaneously perform the optical discrete Fourier transform and multiplex and demultiplex (MUX/DeMUX) two optical

Jul 14, 2025

The Evolution of Optical OFDM

Abstract: Optical Orthogonal Frequency-Division Multiplexing (O-OFDM) is eminently suitable for mitigating the multi-path and chromatic dispersion in both Visible Light Communications (VLC) and

Aug 26, 2025

Enhancing network performance in a long-haul communication

Presents a network optimization study utilizing wavelength division multiplexing (WDM) and coherent optical orthogonal frequency division multiplexing (CD-OOFDM) technologies. The

Feb 24, 2026

Orthogonal Frequency Division Multiplexing

Orthogonal frequency-division multiplexing (OFDM) is a widely used modulation/multiplexing technology in wireless and data communications . OFDM was recently introduced to optical fiber

Aug 31, 2025

Orthogonal frequency-division multiplexing

In telecommunications, orthogonal frequency-division multiplexing (OFDM) is a type of digital transmission used in digital modulation for encoding digital (binary) data

Mar 31, 2026

Optical orthogonal frequency division multiplexing with differential ...

With the development of OWC, optical orthogonal frequency division multiplexing with index modulation (OOFDM-IM) has been simultaneously studied as a novel optical multicarrier

Jul 07, 2025

What is orthogonal frequency-division multiplexing

What is orthogonal frequency-division multiplexing (OFDM)? Orthogonal frequency-division multiplexing is a method of data transmission

May 22, 2026

Orthogonal frequency division multiplexing for high-speed optical ...

Abstract: Optical Orthogonal frequency division multiplexing (OOFDM) is shown to outperform RZ-OOK transmission in high-speed optical communications systems in terms of transmission distance and

Mar 23, 2026

Optical Orthogonal Frequency Division Multiplexing: System

Abstract – The rapid growth of internet traffic and emerging applications are key drivers for high-capacity and cost-effective optical fiber transmission technologies, and they also call for a spectrum-efficient,

Aug 08, 2025

Definition and explanation of Orthogonal Frequency

This blog post provides a clear and concise explanation of Orthogonal Frequency Division Multiplexing (OFDM), an important technology used in modern

Feb 11, 2026

Development to High-Rate Fiber Optic Communication Line with

The main features of the construction of fiber-optic communication lines with multiplexing using orthogonal frequency channel separation for use in optical tran

Jul 04, 2025

Optical orthogonal frequency division multiplexed

Orthogonal frequency division multiplexing (OFDM) can provide spectrally efficient communication channels because it can utilize carrier

Aug 23, 2025

Mode and orthogonal frequency division multiplexing using a single

We use a single AWG-based MUX/DeMUX, inter-mode and intra-optical-subcarrier symbol interleaving to mitigate the mode/subcarrier crosstalk.

Mar 07, 2026

Orthogonal Frequency Division Multiplexing

OFDM stands for the orthogonal frequency division multiplexing where bandwidth is divided into number of subcarriers which are orthogonal to each other. It is implemented by using FFT (Fast Fourier

Jul 22, 2025

Frequency-Division Multiplexing

Orthogonal frequency-division multiplexing (OFDM) is a widely used modulation/multiplexing technology in wireless and data communications . OFDM was recently introduced to optical fiber

Jan 15, 2026

Modeling and spectral analysis of high speed optical fiber ...

The Orthogonal Frequency Division Multiplexing has been placed on-demand in optical communication, it is used in Long haul transmission Format in Direct and Coherent detection.

Contact Us

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