

Design of IM-DD Optical Communication using Matlab

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Abstract: A modulation scheme where the intensity of an optical source is modulated by the RF or mm-wave signal. Demodulation is achieved through direct detection of the optical carrier and conversion using a photo detector is called IM-DD Systems. In these systems the multi-layer modulation (MLM) is used to design both asymmetric clipped optical OFDM (ACO-OFDM) and dc-biased optical OFDM (DCO-OFDM) as a function. In this systems the DCO OFDM is more spectrally efficient than non-DC biased systems because this have better tradeoff between spectral and power efficiency. In the direct detection system, the detection process is non-linear due to the photo current proportional to absolute square of electric field intensity due to this the signal is slow. The equalizer is comprised of one hidden layer which leads to super-fast of the signal. The channel capacity for this systems can be measured by the transmitting of the signals. This IM/DD is a cost-effective optical communication which finds wide applications in fiber communication, free-space optical communication, and indoor visible light communication. In these systems when the bandwidth of signal exceeds the modulation bandwidth of LED, multi path effect occurs. Therefore, we use ACO-OFDM to avoid this multi path distortions. OFDM is a suitable efficient cost-effective solution for GPON deployment with benefit of use of low-cost laser bandwidth in comparison with DCO-OFDM. At the same BER performance, in comparison with D-C ACO-OFDM at high bit rates transmission, DCO-OFDM promises to deliver higher throughput.

Keywords: Acoofdm, Dcoofdm, imdd, mlm, lpf, sp, da, ofdm

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