

# **Abstract**

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## **Improvement of Transmission Propagation of Multimode Optical Fibers using CDMA Techniques**

Multimode fibers are characterized by multipath propagation of optical signals which leads to severe Inter Symbol Interference (ISI) at the output of the fiber. In this work, approaches based on the spread spectrum (SS) techniques are proposed to overcome this drawback. An optimization algorithm is developed and appropriate software is employed to apply the proposed methodology on a specific multimode fiber. Extensive simulation results are produced and are presented herein. The numerical results have shown that the order of magnitude of the maximum data rate,  $R$ , supported at different CDMA gains, in order to achieve a bit error rate (BER) value smaller equal to a convergent point, is related to the length of the multimode fiber,  $L$ , and the CDMA technique used. The Hybrid CDMA type direct sequence/frequency hopping (DS/FH) is applied to eliminate the disadvantage of DS which is the near-far effect (different power levels of users at optical fiber input).