

# Abstract

**Moustafa Hussein Aly**

## **Blind Detection for Serial Relays in Free Space Optical Communication Systems**

Free-space optical (FSO) communication systems have attracted considerable research interest owing to its high transmission rates and its efficient solution for the last mile problem. Atmospheric turbulence degrades the performance of FSO systems. To estimate the received signal, Channel State Information (CSI) blind detection is used. The blind detection estimates the received signal without the need for pilot signals which reduce the throughput and increase the complexity of the signal. In this paper, we have proposed a relay technique which utilizes the blind detection method for FSO communications. This proposed technique would improve the performance of the FSO system compared to the direct link method. It is observed that the proposed method achieves a signal-to-noise ratio (SNR) close to the SNR reported by CSI method maintaining the same average bit error rate, provided that only a small observation window is employed. Moreover, Monte Carlo simulation results are further provided to demonstrate the validity of the derived approximated average bit error rate.