

# Abstract

**Moustafa Hussein Aly**

## **Error Performance of Free Space Optical MIMO Systems in Weak, Moderate, and Severe Atmospheric Turbulence Channels**

Atmospheric turbulence causes degradation in the performance of free space optical (FSO) transmission. This turbulence is referred to as scintillation. To mitigate this effect, a multiple input multiple output (MIMO) system is employed. This paper investigates and compares the performance of FSO MIMO systems in different atmospheric turbulence conditions such as weak, moderate, and severe when binary pulse position modulation (BPPM) is employed. In particular, single input multiple output (SIMO) system using BPPM technique is investigated with equal gain combining (EGC), Selection combining (SC), and maximal ratio combining (MRC) diversity schemes. Moreover, the probability of error performance is evaluated using Monte Carlo simulations assuming different atmospheric turbulence channels.