

Abstract

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Performance Analysis of Multiple NLOS UV Communication Cooperative Relay over Turbulent Channels

Abstract: Ultraviolet (UV) communication overcomes pointing and tracking errors and is superior to other modern optical wireless communication technologies at short range. Using effective wavelengths from 200 to 280 nm, enables the non-line-of-sight (NLOS) outdoor UV communication in the presence of strong molecular and aerosol scattering. Because of these characteristics, solar blind NLOS UV communications offers broad coverage and high security. In this paper, NLOS UV communication is considered with decode and forward (DF) relays in the presence of log-normal (LN) channels using the best relay Selection technique according to the channel state information (CSI). Then the outage probability of the multi-relay UV system is discussed for the proposed model. Simulation results verify the effectiveness of our employed analytical model. The outage probability for both serial and cooperative relays is compared with a different number of relays. Numerical simulations are further presented for many factors influencing the functioning of the system such as elevation angle, atmospheric scattering parameters and receiver field of view (FOV) angles. The obtained results demonstrate that increasing the number of UV NLOS cooperative relays does not necessarily improve the system performance, but there are other factors that must be considered such as the value of the elevation angle and the number of relays.