

Abstract

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Irradiance Scintillation Index on Slant Atmospheric Turbulence

The Turbulence plays an important role in investigating the irradiance scintillation index (SI) for a free space optical wave propagating through atmospheric turbulence. The Hufnagel-Vally (H-V) model is used in most studies, where the SI of the slant path is obtained using numerical analysis. In this paper, a polynomial is proposed for the refractive index structure parameter, on which a closed form is derived for the irradiance SI of aspherical optical waves propagating on through a slant atmospheric turbulence. This is used to study signal to noise ratio (SNR) and bit error rate (BER) for system performance evaluation. The obtained results demonstrate the simplicity of using the derived closed form of SI compared to rather than the statistical methods. The derived expression takes less computational time for SI which reflects positively on and consequently the system performance, which is an essential issue in vehicular mobile applications, in particular like vehicles.