



Research Article



A Statistical MIMO FSO Channel Model for the Analysis of Outage Probability versus Signal-to-Noise Ratio

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ABSTRACT

A novel statistical channel model for multiple-input multiple-output (MIMO) free-space optical (FSO) communication systems impaired by atmospheric and misalignment fading is developed. A slow-fading channel model is considered and the outage probability is derived as a performance measure. The diversity gain defined as the signal-to-noise ratio (SNR) exponent at high SNR is analyzed. Interestingly in the presence of misalignment fading the diversity gain depends only on the misalignment variance and is independent of the number of transmitters M and receivers N . Increasing the number of transmitters and receivers only results in a lower probability of outage for given SNR, however, the rate of change is unaffected. Contrary to this, the diversity gain of MIMO FSO systems in the presence of atmospheric fading and no misalignment is shown to be proportional to the number of transmitters and receivers, particularly the product M and N .

Keywords: LS, FSO, MIMO, SNR.

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