

Abstract

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Gaussian Beam Scintillation Index for Slant Path in Weak Turbulence: Closed Form Expressions

In this work, the efficient restoration of a dissipated signal over a 300 km long-haul optical fiber is investigated. A hybrid system is proposed including a dispersion compensation fiber (DCF) and a fiber Bragg grating (FBG). Two 150 km standard single mode fibers with a chromatic dispersion of 17 ps/nm km are used in the simulation. Sufficient optical amplification power is supplied using an erbium-doped fiber amplifier to overcome the signal attenuation down the link, yet the signal is totally distorted. The only major reason left interpreting the total data loss would be the chromatic dispersion (CD). A DCF and a-tanh-apodized-linearly-chirped fiber Bragg grating (ACFBG) are implemented individually in a symmetric a distributed setting in an attempt to compensate for the CD that led mainly to the signal degradation. The proposed hybrid scheme is then tested in a pre, post, symmetric and distributed installations. Several lengths of DCFs and ACFBGs at various parameters are examined. A comparison between the mentioned schemes is performed, seeking the most remarkable, resilient, and cost-effective technique.