

Performance evaluation of an efficient RZ-MQAM modulation scheme in all-optical OFDM transmission systems

ABSTRACT

All optical orthogonal frequency division multiplexing (AO-OFDM) technique is a promising technique and employed in many military applications for data transmission over long distance. But AO-OFDM signals are very sensitive to nonlinear distortion and these systems suffer from nonlinear impairments. This paper describes a novel nonlinear phase noise reduction technique by decreasing interaction time between subcarriers in AO-OFDM transmission systems. This technique mitigates the effects of nonlinearity on all-optical OFDM transmission systems and improves performance of transmission systems. The proposed AO-OFDM transmission system has been successfully simulated and analyzed for estimating phase noise due to cross-phase modulation, self-phase modulation and four-wave mixing. The proposed RZ-8QAM AO-OFDM system with 29 subcarriers is examined and the transmission distance is fixed at 550km.

Keyword: Fiber optic communication; All-optical OFDM; Nonlinear fiber impairment; Nonlinear phase noise