Simulation of a Novel Photonic Transmission System Using M-Ary Amplitude-Phase Differential Shift Keying Modulation Format

Tran. D.Dung , Huynh. T. Liem, Le. N. Binh, Arthur Lowery

Department of Electrical and Computer Systems Engineering, Monash University, Clayton, Victoria 3168, Australia

Correspondence Email: le.nguyen.binh@ eng.monash.edu.au

We propose a photonic transmission system based on 16-ary multi-level amplitude-differential phase shift keying (MADPSK) format and its generation using a dual-drive interferometric electro-optic modulator. The modulation scheme is bandwidth efficient with an effective transmission bit rate equal to only ¼ of the bit rate. The photonic transmitter structure is very simple as the modulator can be simultaneously operated in both amplitude and phase modulation modes. Simulation models are developed for evaluation of the system transmission performance. The multi-level optical signal spectra, eye diagrams and bit-error-rates are obtained to demonstrate the lightwave-modulated multi-level scheme transmission over the dispersive single optical fibres.