Characteristics of degree of polarization of optical binary phase shift keying signal in optical fiber link with polarization mode dispersion

Ki Ho Han*

* Department of Optical Engineering, Kongju National University, South Korea
Email: khhankr@kongju.ac.kr

Polarization mode dispersion (PMD) may occur in fiber-optic transmission links due to intrinsic and extrinsic factors such as fiber imperfection and environment change, randomly varying over time, which may incur impairments in long-haul coherent optical communication systems using optical phase-shift keying modulation. In this paper, we show by simulation that an optical binary phase-shift keying (BPSK) signal, transferred through a PMD-existing fiber link, can be optically compensated by a PMD compensator, and the characteristics of degree of polarization (DOP) of the BPSK signal is investigated. Figure 1 shows the simulation result of DOP of the 10-GBd BPSK light signal after passing a fiber with PMD and an optical compensator as a function of differential delay time and angle of axis of the compensator when a differential group delay (DGD) of 40 ps and a launch angle of 35 degrees to the polarization mode of the fiber are given. A DOP of unity at a 40-ps delay time and a 180-deg. angle in the figure signifies a complete compensation. We find that the compensator can compensate for large PMD of the transport fiber using DOP as a feedback signal with a conventional dithering algorithm via iterative feedback process.

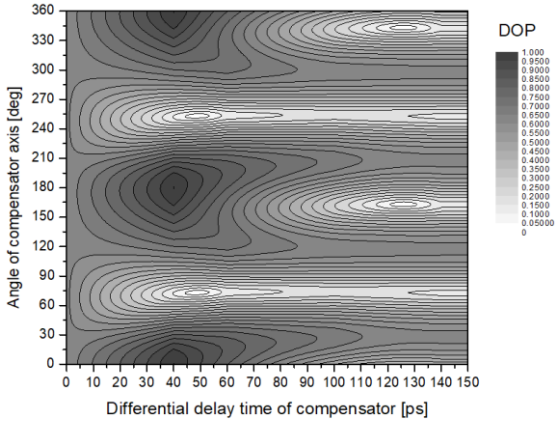

Fig 1. DOP of 10-GBd BPSK optical signal for 40-ps DGD and 35-deg launch angle