

Performance enhancement of Absolute Polar Duty Cycle Division Multiplexing with Dual-Drive Mach–Zehnder-Modulator in 40 Gbit/s optical fiber communication systems

ABSTRACT

We modeled and analyzed a method to improve receiver sensitivity of the Absolute Polar Duty Cycle Division Multiplexing (AP-DCDM) transmission system by using Dual-Drive Mach–Zehnder-Modulator (DD-MZM). It is found that by optimizing the bias voltage in DD-MZM, the sensitivity of the AP-DCDM can be improved. The optimizations lead towards the larger eye opening. As opposed to the previous work, in terms of receiver sensitivity and dispersion tolerance, similar performance for all channels was achieved. In comparison to the previously reported AP-DCDM system, this work resulted in almost 3.6 dB improvement of the receiver sensitivity, came together with acceptable chromatic dispersion tolerance.

Keyword: Optical fiber communication, Multiplexing technique, Absolute Polar Duty Cycle Division Multiplexing, Mach–Zehnder-Modulator