Performance analysis on transmission of multilevel optical pulses using absolute polar duty cycle division multiplexing

ABSTRACT

In order to explore the potential of optical multilevel signaling for high speed optical fiber networks, an absolute polar duty cycle division multiplexing (AP-DCDM) is demonstrated. Three users, each with the data rate of 10 Gb/s were successfully multiplexed and transmitted over a single WDM channel, which can offer a possible transmission rate of 30 Gb/s per WDM channel. The performance of AP-DCDM technique is examined, with comparison to 30 Gb/s Time Division Multiplexing (TDM). Back-to-back receiver sensitivity of -29.2 dBm with OSNR of 22.5 dB was achieved for the worst user, together with the chromatic dispersion tolerance ranging from 207 ps/nm to 276 ps/nm. A comparison with conventional TDM technique shows a clear advantage of the proposed AP-DCDM technique.