Abstract

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Carrier-to-noise ratio for Distributed Raman Amplifiers with Different Pumping Configurations

Distributed Raman amplifiers (DRAs) achieve higher bit rate, low noise figure, a decreased nonlinear penalty, long-haul transmission, small channel spacing and operation near zero dispersion wavelength. In this paper, a model is derived for the DRA carrier-to-noise ratio (CNR) caused by amplified spontaneous emission (ASE) at different pump configurations: co-pumping, counter-pumping and bidirectional pumping. The bit error rate (BER) is evaluated in the S-band from optical signal to noise ratio (OSNR). The simulation results show that, the CNR reaches its minimum value of 40, 41 and 42 dB at L=100 km, in counter-pumping, bidirectional pumping and co-pumping, respectively. Moreover, the co-pumping provides the lowest BER in contrast to the counter-pumping which provides the highest BER among the three pumping schemes.