Abstract

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Optimum Conditions for a High Bit Rate RZ Soliton Train in EDFA with Nonadiabatic Amplification

In this paper, the optimum conditions to propagate RZ-train of solitons down EDFA amplifier at high bit rate and gain are studied. The suggested model is based on the wave equation of the carrier envelope. The two energy level system is used to study the evolution of train of solitons through the erbium doped fiber amplifier (EDFA). The polarization induced term representing the effect of doping atoms on the propagating electric field is obtained by solving Maxwell-Bloch equations [1]. By adding the induced polarization to the nonlinear Schrödinger equation (NSE), the split-step Fourier method is used to solve NSE in the EDFA. The higher doping level used makes the dopants respond not so fast that the induced polarization follows the optical field nonadiabatically. Trains of different soliton width, time slot and doping level are used to obtain the optimum conditions for maximum bit rate and EDFA gain.