3609-03

Fibre Gratings for Dispersion Compensation in a 10 Gbit/s IM-DD Semiconductor Laser System

J.D. Ania-Castañón, P. García-Fernández, A. Sánchez-Díaz and J.M. Soto-Crespo (Instituto de Estructura de la Materia , CSIC, Serrano 123, 28006, Madrid, Spain) (JMS, Instituto de Óptica, CSIC, Serrano 121, 28006, Madrid, Spain)

Chromatic dispersion is one of the ultimate transmission limitations in systems operating at 1550 nm, and much effort has been invested in obtaining dispersion compensation schemes for standard fibres already installed. Various different fibre Bragg grating dispersion compensation schemes are studied for a system composed of a directly modulated 1550 nm single-mode semiconductor laser signal propagating through a standard nonlinear fibre link. The laser diode is simulated by its stochastic rate equations, while the nonlinear Schrödinger equation is used to simulate the propagation. The characteristics of the different apodized chirped fibre Bragg gratings are obtained by numerical resolution of their coupled-mode equations. The optimal grating length for dispersion compensation after transmission through 100 km standard single-mode fibre is obtained by means of minimizing the eye opening penalty of the signal. Pre and post-compensation cases are analysed separately, and differences between both cases are discussed in detail. Different optimal grating lengths arise for each case, and better results are obtained in general in post-compensation, though good results are also achieved in pre-compensation. Pulses with a FWHM of the order of 65 ps with various laser chirp parameters are reconstructed using a 5.75 cm chirped grating with a 16th-order Gaussian apodization function.