Effect of self phase modulation on three level code division multiplexing technique

ABSTRACT

Recently, fibre optics has become the core of telecommunications and data networking infrastructures. The impairments factors in optical fibre communication systems which is divided into two categories: dispersion and nonlinear effects. For multiplexing technique, nonlinear effects are crucial particularly at bit rates and moderate powers. Nonlinear effects limit the maximum amount of power that can be launched into fibre span. Additionally, scattering phenomena and changes in the refractive index with the optical power are responsible for nonlinear effects in optical fibers. Self-phase modulation (SPM), Cross phase modulation (XPM), Four wave mixing (FWM), Stimulated Raman Scattering (SRS), Stimulated Brillion Scattering (SBS) are some of nonlinear effects in optical fiber communication system. In this research, effect of SPM on 40 Gb/s, Three Level Code Division Multiplexing (3LCDM), is investigated for optical fiber communication systems over 80 km. The highest SPM threshold is observed in post compensation method, which is around 10.7 dBm.

Keyword: Three level code division multiplexing; Self-phase modulation; Dispersion; Optical communication; Multiplexing technique