

Abstract

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Compensation of Bragg Wavelength Shift under a Sea Level Using a Nonlinear FBG

The compensation of the wavelength shift in nonlinear fiber Bragg gratings (FBGs) is modeled and investigated. Trials are done to obtain a zero shift in the Bragg wavelength which enables fiber cables to be accurately used in wavelength division multiplexing (WDM) systems. Firstly, the coupled mode equations are solved for the forward and backward signals using the fourth order Runge-Kutta method. The electric field of these signals is calculated giving new values of the Bragg refractive index. Effects of temperature, hydrostatic pressure and strain under the sea level are studied together with the effect of fiber nonlinearity. Temperature and pressure are collected in one parameter the ocean depth. Finally, the shift occurring due to ocean depth and strain is compensated by the fiber nonlinearity resulting in a zero shift in the Selected wavelength range improving the FBG performance.