

Characteristics of multiwavelength fiber laser employing semiconductor optical amplifier in nonlinear optical loop mirror with different length polarization maintaining fiber

Abstract

In this paper, we propose and demonstrate generated characteristics of a multiwavelength fiber laser based on semiconductor optical amplifier in a nonlinear optical loop mirror with different length of polarization maintaining fiber. The configuration comprises 3-dB optical coupler, semiconductor optical amplifier and, 2 meters and 10 meters of polarization maintaining fiber. Characteristics of multiwavelength fiber laser are studied through the use of polarization maintaining fiber at different lengths. The experimental results revealed the number of lasing lines increases with the increment of the polarization maintaining fiber length. The polarization maintaining fiber with 10 meters of length has the ability to generate a higher number of lasing lines up to 47 signals with semiconductor optical amplifier injected current at 180mA, respectively. However, in terms of average peak power and average optical signal to noise ratio, the 2 meter of polarization maintaining fiber length has the capability to produce a higher value which is 0.45mW at 250mA of semiconductor optical amplifier driven current and 28.86dB at 170mA of semiconductor optical amplifier driven current, respectively. Furthermore, it is observable that this configuration capable to generate a wider bandwidth which is operating in the conventional (C) band to long (L) band at the room temperature.