ABSTRACT

Fiber optics is one of the transmission medium that has the ability to distribute information with a large capacity and high speed. However, distortion and dispersion effects on the propagation of optical pulses can cause the difference between the information received with the information submitted.

Soliton pulse can be a solution to overcome the effects of such distortion and dispersion. This is because the soliton pulse is known as a pulse that has a finite total energy, not spread, and is stable when propagating on a transmission media, especially fiber optics.

Soliton pulses amplitude decreased during the propagation process due to the attenuation effect. Attenuation will cause the propagation distance is limited. Raman Optical Amplifier (ROA) can be a solution to the stability of the Soliton pulse and to obtain a longer range and wider bandwidth.

The purpose of this final task is to simulate and analyze the attenuation influence on the Soliton pulse. From the simulation can be known how much the decreasing of intensity. So gain and the number of ROA can be known.

From the simulation conducted in this Final Project, the attenuation on Soliton pulse does not cause the widening of pulse period during the transmission. With attenuation 0.1 dB / Km, Soliton pulse lasted only as far as 5 km. In order to score the intensity = 1, gain of 5.25 dB and 0.4601 mW pump power is required. As for the attenuation of 0.2 dB / Km, Soliton pulse lasted only 3 Km far. In order to score the intensity = 1, gain of 6.77 dB and 1.0004 mW pump power is required. To reach a distance of 100 km with attenuation 0.1 dB / km, the amount required ROA is 20, and if the attenuation of 0.2 dB / km, the amount required ROA is as much as 33. From the simulations get the greater the input power amplifier the greater the noise figure, and the greater the pump power, the smaller the noise figure. This simulation was using Matlab 7.6.0 software.

Keywords: Soliton pulse, Attenuation, Raman Optical Amplifier (ROA), Gain, Matlab 7.6.0