

# Abstract

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## **Details Study of Gain and Noise Figure of Raman Optical Amplifier in the Wavelength range (1560 – 1610 nm)**

We present in this paper, a details study of the gain, noise figure and optical signal to noise ratio (OSNR) of Raman amplifier in the wavelength range (1560 – 1610 nm), which is the L –band. Solving the analytical equation of Raman amplifier for gain, noise figure and optical signal to noise ratio at different input signal powers, different RA lengths and different Raman pump power were considered. From the analysis of the results, We obtained maximum value of gain 13.5 dB and minimum noise figure of 8 dB at 1600nm and -30 dBm input signal power and a flat gain in the signal wavelength (1560 – 1610 nm), which is favorite for wave division multiplexing (WDM). In addition, the results show a strong dependence of gain and noise figure on RA length and Raman pump power. The best values of OSNR were observed at 100 mW pump power of RA. The higher values of OSNR obtained for RA length of 20 km and input signal power 2.6 dBm and the lower values of OSNR obtained for RA length of 45 km and -30 dBm input signal power in the signal wavelength range.