

ABSTRACT

Owing to the rapid growth of capacity requirement for long-haul communication links, system engineering is focused on maximizing the system capacity and minimizing the performance degradation caused by transmission impairments. To maximize the capacity of the optical transmission link, should consider some parameters. One of the most important is the signal modulation format is the main key in determining the quality of transmission and spectrum efficiency.

Optical modulator is used to modulate the information signals in the form of light pulses into a carrier signal to be transmitted to the destination. Modulator which is now often used is modulator Mach-Zehnder. In this final project there are three scenarios, with the first scenario input variable that changed is modulation format. In the second scenario, variable that changed is the number of bit rate link. In the third scenario, the changed variable is the input power to get the value of transmitting power that optimally on each modulation format.

The simulation results show that modulation format with the best performance is NRZ with the lowest BER (10^{-39}) and the highest Q factor (12.88), and requires a relatively low input power is 0 dBm. While the RZ DQPSK modulation format shows the worst performance with the highest BER (10^{-3}) and the lowest Q factor (2.519), where does not qualify for optical transmission. Whereas when the bit rate is changed, the highest Q factor (22.206) produced from the optical link with the NRZ modulation format at bit rate 20 Gbps. As for the lowest Q factor (0) generated by an optical link with the RZ DQPSK modulation format at bit rate 40 Gbps. While the pulse shape changes in the frequency domain seen that the higher the bit rate and pulse width narrower. In DWDM also FWM effect appears, which transmit 16 wavelengths appear 52 wavelengths.

Keyword : Soliton, Mach Zehnder Modulator, Modulation Format, Q factor, BER