

ABSTRACT

In the process of transmission, fiber optic experiences the effects of linear and nonlinear effects. Nonlinear effects in the optical fiber are due to the Kerr Effect and Inelastic Scattering. To handle the disruption of linear and nonlinear, the solution is using the optimal modulation formats.

This final project is creating a FTTH link on Optisystem software to determine the effect of Kerr Effect by comparing the performance of fiber optic glass and plastic optical fiber based on modulation formats such as NRZ, RZ, RZ DPSK, RZ DQPSK and CSRZ as input to the Mach Zehnder modulator. In this research, there are two scenarios, where the first, input variables are changed based on format in Mach Zehnder modulator, while in the second scenario, the changed variable is the use of optical fiber, which the materials are optical fiber glass, plastic and hybrid plastic and glass.

The simulation based on the comparison of five modulation formats with linear and nonlinear effects on glass cable results the value of Q factor from biggest are NRZ with a value of 65,51885, RZ with a value of 51,75991714, RZDPSK with a value of 14,2882614, CSRZ with a value of 11,54402293 and RZDQPSK with a value of 9,2267233. While using PMMA cable which results the Q factor above 6 on the simulation is G652D-G652D-PMMA configuration on the modulation format NRZ, RZ, RZDPSK and RZDQPSK. The value of nonlinear refractive index (n_2) greatly affects the performance of the network, the greater the value of nonlinear refractive index then network performance will be decreased. On the glass optical fiber decreases the quality of transmission when given XPM effect, whereas in the plastic optical fiber, transmission quality increased when given XPM effect on CSRZ, RZ, RZDPSK, RZDQPSK, and otherwise to the modulation format NRZ decreases the quality of transmission when given XPM effect.

Keywords: *FTTH, mach-zehnder, modulation formats, nonlinear effects, GOF, POF*