ABSTRACT

High speed and large capacity in data transmission is very important. To satisfy that needs, fiber optic becomes the preferred choice for its characteristics. However, in its application, fiber optic is still lacking; therefore, a good transmission method is required. The transmission method must be able send information with large capacity and errorless, therefore giving the better service.

The system designed is using *Distributed Feedback* (DFB) Laser as the light emitter and *Mach-Zehnder* as the external modulator. *Forward error correction* (FEC) method is added, with *Convolutional Codes* as one of its branch. The *Convolutional Codes* is used for error-detection and error-correction.

The simulation system in this final project is using *Convolutional Codes* with BPSK (Binary Phase Shift Keying) modulation using MATLAB 7.4. This simulation analyzes the performance of the SNR versus BER with a technique using *Convolutional Codes* which uses different code rates and constraint lengths.

The simulation results give the conclusion that use *Convolutional Codes* in fiber-optic communication systems. *Convolutional Codes* can provide a better performance to achieve a 10^{-9} BER by using smaller code rate and more constraint length. This conclusion can be achieved by looking at the result which by using 1/3 code rate (K = 9, [557_8 663_8 711_8]) gives 45 dB SNR to achieve the 10^{-9} BER; on the other hand, 145 dB SNR is needed to achieve 10^{-9} BER without using *Convolutional Codes*.

Keywords : BER*,* SNR, BPSK, FEC, *Convolutional Codes*