ABSTRACT

Fiber optics is a transmission medium that has a wide bandwidth. Utilization of bandwidth in optical fiber can be optimized using multiplexing techniques such as DWDM. According to ITU-T Recommendation G.692, DWDM uses 100 GHz channel spacing or 0,8 nm in the wavelength range 1528,77 nm to 1560,61 nm. The keys of DWDM is the separation process in the wavelength demultiplexer (demux). In DWDM demux there is an optical filter that serves to separate the wavelength that is passed by.

One of the filters which can be used to separate the wavelength is FBG. Basic step in FBG optical filter design is understanding the spectrum characteristic of FBG. Wavelength propagation analysis with the *coupled mode* theory and matrix transfer mode is used to get FBG spectrum. FBG filter works in transmission mode so in filter modeling will need some FBG in a filter to reflect unseparated channel. To get the optimal result, filter parameter setting is done including the parameter of modulating the refractive index, period, grating period amount, and phase between FBG in a filter. In the filter design, besides it is done by analyzing formula which utilizes the coupled mode theory and method of transfer matrix, also done by simulating uses the Matlab software R2007a.

In this final project, demux input channel is modelled in the form of four Gaussian pulse with central wavelength channels based on ITU-T Recommendation G.692 and spectral width of 0,08 nm respectively and the maximum power of 4 mw per channel. Based on simulation results of the four channels, it can be separated with the optimal result uses filter parameters by modulating the refractive index of 0,0004, the grating period amount of 10000, and each FBG period adjusted for the channel which will be separated and inter-FBG phase of $\varphi = 0$ for separate channel at a central wavelength of maximum and minimum while the other channel with phase $\varphi = \pi/2$.