

ABSTRACT

Nowadays, data and telecommunication transmission need a system that could process fast and efficiently with high performance and good signal quality until it reached the receiver. But, the component's limit to support the quality and performance often become obstacle to accomplish the expected result. One of the most important components used in data transmission is filter. Until recently, optical fiber like Fiber Bragg-Grating and Mach Zender have weaknesses i.e. it needs facets and gratings, has narrow passband, inflexible cut-off characteristics, has low power when it reached receiver, and high-cost and complex fabrication.

One of the alternative ways to overcome the problems is with using ring resonator. Ring resonator is an integrated optic structure with an optical feedback allowing a variety of functions such as wavelength filtering, optical switching, or optical sensing. In the previous research, ring resonator with SMF (Single Mode Fiber) has been simulated. Ring resonator doesn't need facets and gratings like FBG. Ring resonator also has wider passband and cut-off characteristic and more customizable than Mach-Zender. Besides, the implementation of the varieties of model which been developed now have showed some promising progress in resonator performance such as in transmission power, and narrow linewidth. With the addition of Erbium Doped Fiber, it can enhance the gain in the filter which has been reduced by bending and scattering losses. xAnd using EDFA (Erbium Doped Fiber Amplifier) concept, the gain could be enhanced the gain into terabyte.

In this final project, the performance of single ring resonator with double coupler integrated with Erbium Doped Fiber (EDF) was inspected using Matlab R2010b. The parameters that being measured are Free Spectral Ratio (FSR), Full Width at Half Maximum (FWHM), Finesse. The expected result are to get the better parameter value, and to define which configuration would be work best as a filter when using EDF. The best configuration to be integrated with EDF as filter is DDBC with FWHM = 68 MHz, FSR = 138, Finesse 2,02, and coupling coefficient = 0,1.

Keywords : *Ring Resonator, Erbium Doped Fiber (EDF), FSR, FWHM, Finesse.*