New Design of Optical Filters Based on Single Mode-Multimode-Single Mode Fiber Structure for Optical Fiber Communication Systems

Jassim Kadim Hmood*

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Abstract

In this paper, a design of optical filters based on single mode-multimode-single mode fiber structure (SMS) is demonstrated. The multimode interference effect can be utilized to design wavelength-selective devices with high extinction ratio. The proposed optical filters are realized by using standard optical fibers.

Two optical filters are designed to operate with wave division multiplexing (WDM) communication system in two channels at wavelength of 1310 nm and 1550 nm. First filter has power transmission of -0.253/-35 dBm at wavelengths of 1310/1550 nm respectively, while, second one has power transmission of -32/-1.35 dBm at wavelengths of 1310/1550 nm respectively. In addition, power transmission curves, spectral response curves, and propagation field of SMS structure in two and three dimensions are plotted.

Keywords: Optical filters, Multimode interference, self-imaging, single mode – multimode – single mode structures and WDM-PON.

*Lasers and Optoelectronic Engineering Department, University of Technology/Baghdad