

English Abstract

Narrow band filters are important elements of integrated optical circuit. Resonant cavities imbedded between two identical parallel waveguides result in compact narrow band Add/Drop filter. In this thesis work, such add/drop filters are analyzed using the Method of Lines (MOL). Add/drop filter with square, circular and elliptical cavities are investigated. The spectral response of the four port filter and the power loss spectrum are obtained. The MOL using the Layer by Layer Algorithm is applied to model the add/drop filters. In addition, the MOL with improved features is presented in this work. This included improved implementation of the transverse second derivative operator and the incorporation of a Perfectly Matched Layer (PML). Calculated results show that the Add/drop filter with an embedded circular cavity give much better spectral response when compared to the square and elliptical cavities. Almost complete optical power drop from the bus to one of the receiver ports can be achieved in the circular cavity case.