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Multi-stage ring resonator all-pass filters for dispersion compensation

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Keywords

ring resonator, all-pass filter, group delay, quadratic dispersion

Abstract

This paper describes group delay time property of the multi-stage ring resonator all-pass filters (RRAPF) in either cascading single stages or using lattice architectures. The present analysis is restricted to directional couplers and waveguides characterized by various parameters, and careful design of these parameters can optimize the group delay response. The extra phase shifters of each single stage have been adjusted to yield a broadband group delay. By increasing the number of filter stages, a larger bandwidth over the dispersion can be obtained. This device is able to provide dispersion compensation to systems such as the high speed dense wavelength division multiplexer (DWDM) for the optical fiber communication system.