

264. Title: Circuit-based method for synthesizing of coupled-resonators bandpass photonic crystal filters

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Abstract: A method for synthesizing bandpass photonic crystal filters for wavelength division multiplexing (WDM) systems is presented. The proposed method permits the calculation of the physical dimensions of the crystalline structures given the desired frequency response of the filter in terms of bandwidth, in-band ripple, minimum out-of-band attenuation, and central frequency. The method, explained in detail for Chebyshev frequency responses, is equivalent circuit based. The resulting devices are very compact, have a high out-of-band attenuation, and are suitable for high density photonic integrated circuits. The validity of the proposed method is confirmed through contrasting the simulation concluded from the finite-difference time-domain (FDTD) method by the design of a third-order Chebyshev filter having a center frequency of 1THz, a flat bandwidth of 4GHz, and ripples of 0.5 dB in the passband.