

Design of Dielectric Waveguide Bandpass Filters Using Parallel-Coupled Gratings

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Techniques for the design of narrow-band (of the order of a percent or so), bandpass filters using dielectric waveguide gratings are presented. These filters use both single, uncoupled gratings and parallel-coupled configurations of gratings to form multiresonator bandpass filter structures. Transmission-line equivalent circuits are used to model the dielectric waveguide gratings. Using this model, it is then shown how direct-coupled-resonator theory can be applied to such filter structures to synthesize a prescribed passband having Chebyshev or maximally flat characteristic. On the other hand, the parallel-coupled gratings give these filters broad and strong, absorptive stopbands, as is explained. Experimental results are presented which show good agreement between theoretical and measured results.

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