Abstracts

Equivalent-circuit representation and explanation of attenuation poles of a dual-mode dielectric-resonator bandpass filter

I. Awai, A.C. Kundu and T. Yamashita. "Equivalent-circuit representation and explanation of attenuation poles of a dual-mode dielectric-resonator bandpass filter." 1998 Transactions on Microwave Theory and Techniques 46.12 (Dec. 1998, Part I [T-MTT]): 2159-2163.

A /spl lambda//4 rectangular-waveguide resonator of square cross section filled with high-permittivity ceramics has two degenerate lowest modes. A dual-mode bandpass filter based on this structure is studied, focusing on the attenuation poles at both sides of the passband. It is described how to achieve capacitive and inductive coupling between dominant modes of a resonator of square cross section. An equivalent-circuit model is proposed, including mode coupling, excitation from the external circuit, and direct coupling between input/output (I/O) electrodes. Equivalent-circuit parameters are measured and their validity is verified using simulated results. Appearance and annihilation of the attenuation poles are successfully explained by the proposed model, and attenuation pole frequencies are controlled by shifting the I/O electrode transversely.

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