Abstracts

A Rigorous Analysis of Dielectric Ring Resonators Loaded in Waveguide or Microstrip Line Structure

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A rigorous mode matching technique is used to analyze the dielectric ring resonators loaded in waveguide or microstrip line structure. Variations of the resonant frequencies for several lowest order modes with the structures' parameters are presented. Analysis shows that increasing the inner concentric hole's diameter of a dielectric ring resonator up to 25% of its outside diameter changes the TE/sub 01/ mode resonant frequency by less than 1%, however, increases the spurious mode free region by greater than 80% compared with the dielectric rod resonator. Two-dimensional electric and magnetic field line patterns and three-dimensional field intensity dktributions of the ring resonator are plotted, which provide valuable information on mode excitation, coupling, and suppression. Coupling between two dielectric ring resonators loaded in a metallic cavity are analyzed for application in the filter design. Experimental results are presented and shows excellent agreement with the analysis solutions within 1%.

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