Abstracts

An Accurate Design Approach for TM Mode Dielectric Resonator Filters in Circular Waveguide Below Cutoff

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A CAD procedure is described for designing bandpass filters realized with circular cylindrical dielectric resonators placed in circular waveguide below cutoff. The dielectric resonators operate on TM/sub 01delta/ mode, in order to allow both low loss achievement and reduced spurious passbands. The described CAD procedure employs a monomodal equivalent circuit of the filter structure in order to allow a synthesis approach for designing small or moderate percentage bandwidth filters; however the computation of equivalent circuit parameters is based on an accurate multimodal characterization of the discontinuity between the empty circular waveguide and the dielectric loaded waveguide, which makes use of mode matching. The CAD procedure requires a preliminary choice of some geometrical parameters of the structure. Guidelines for this choice are also given, in order to show how different design targets may be achieved, such as low losses, miniaturization of the structure, and a sufficiently large frequency range free from spurious passbands. To verify the procedure, some numerical simulations, performed employing the generalized scattering matrix techniques, are also presented and compared with measurements on a prototype filter designed through said procedure and actually fabricated.

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