Abstracts

Resonant frequencies and field distributions for the shielded uniaxially anisotropic dielectric resonator by the FD-SIC method

Jenn-Ming Guan and Ching-Chuan Su. "Resonant frequencies and field distributions for the shielded uniaxially anisotropic dielectric resonator by the FD-SIC method." 1997 Transactions on Microwave Theory and Techniques 45.10 (Oct. 1997, Part I [T-MTT]): 1767-1777.

New formulations for resonant modes of a shielded uniaxially anisotropic dielectric resonator (DR), such as sapphire, are proposed. They are solved by the finite-difference and simultaneous iteration with the Chebyshev (FD-SIC) acceleration method. Like an isotropic DR cavity, one azimuthal field is used for azimuthally invariant TM or TE modes and two TM fields are used for azimuthally variant hybrid modes. It is shown that the governing equation for TE modes is the same as that for the isotropic DR case. For TM and hybrid modes, more general /spl psi/(=rH/sub /spl phi//) and H/sub r/-H/sub z/ formulations than those for the isotropic DR are derived, respectively. Cylindrical cavities loaded with a rod or ring DR can be easily modeled and analyzed by the present method. Resonant frequencies and field distributions can be accurately and efficiently obtained. Numerical results of resonant frequencies of rod sapphire DR cavities are compared to those by the mode-matching method in the literature to verify the present approach. The electric- and magnetic-field distributions are also presented for hybrid modes of the uniaxially anisotropic DR cavity.

❑ Return to main document.