

Abstracts

A New Boundary Integral Approach to the Determination of the Resonant Modes of Arbitrarily Shaped Cavities

P. Arcioni, M. Bressan and L. Perregrini. "A New Boundary Integral Approach to the Determination of the Resonant Modes of Arbitrarily Shaped Cavities." 1995 Transactions on Microwave Theory and Techniques 43.8 (Aug. 1995 [T-MTT]): 1848-1856.

We present an efficient algorithm to determine the resonant frequencies and the normalized modal fields of arbitrarily shaped cavity resonators filled with a lossless, isotropic, and homogeneous medium. The algorithm is based on the boundary integral method (BIM). The unknown current flowing on the cavity wall is considered inside a spherical resonator, rather than in free-space, as it is usual in the standard BIM. The electric field is expressed using the Green's function of the spherical resonator, approximated by a real rational function of the frequency. Consequently, the discretized problem can be cast into the form of a real matrix linear eigenvalue problem, whose eigenvalues and eigenvectors yield the resonant frequencies and the associated modal currents. Since the algorithm does not require any frequency-by-frequency recalculation of the system matrices, computing time is much shorter than in the standard BIM, especially when many resonances must be found.

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