Abstracts

On the Electromagnetic Field in a Cavity Fed by a Tangential Electric Field in an Aperture in its Wall

J.R. Mautz. "On the Electromagnetic Field in a Cavity Fed by a Tangential Electric Field in an Aperture in its Wall." 1995 Transactions on Microwave Theory and Techniques 43.3 (Mar. 1995 [T-MTT]): 620-626.

Heretofore, the electromagnetic field produced by a specified tangential electric field in an aperture in the wall of an arbitrarily shaped cavity has most often been expanded in terms of cavity modes. An alternative approach that of the electric field integral equation is presented. In this approach, the cavity field is expressed as the field of a surface density of tangential electric current, or a surface density of tangential magnetic current or a combination of surface densities of tangential electric and magnetic currents on the boundary of the cavity. Each surface density is characterized by a single tangential vector function which is determined by the integral equation requiring that the part of the electric field tangent to the boundary of the cavity must reduce to the specified tangential electric field in the aperture and zero elsewhere on the boundary of the cavity. The electric field integral equation method is specialized to more easily determine the field inside an arbitrary cylindrical cavity excited by a tangential electric field in an aperture in its lateral wall. The method is further specialized to a circular cavity.

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