Abstracts

An Iterative Extended Boundary Condition Method for Solving the Absorption Characteristics of Lossy Dielectric Objects of Large Aspect Ratios

A. Lakhtakia, M.F. Iskander and C.H. Durney. "An Iterative Extended Boundary Condition Method for Solving the Absorption Characteristics of Lossy Dielectric Objects of Large Aspect Ratios." 1983 Transactions on Microwave Theory and Techniques 31.8 (Aug. 1983 [T-MTT]): 640-647.

The recently developed iterative extended boundary condition method (IEBCM) has been used to compute the internal fields induced in homogeneous, axisymmetric, lossy dielectric objects of large aspect ratios when exposed to incident planewave radiation. Calculations were made for both the E- and k-polarization cases. The computed results for a prolate spheroidal model of an average man are found to be accurate for frequencies up to 300 MHz, while the use of the popular EBCM was found to be essentially restricted to frequencies less than 70 MHz for these models and exposure conditions. The applicability of the IEBCM to composite bodies has also been examined by studying the irradiation of a capped cylindrical object. This composite object was first partitioned into several overlapping spherical subregions, and, alternatively, into two spherical subregions overlapping with a central cylindrical subregion. Spherical harmonics were used to represent the internal fields in the spherical subregions, while cylindrical expansions were utilized in the cylindrical subregions. It is shown that the second partitioning scheme is more computationally efficient and thereby suggests that the basis functions used to represent the subregional fields should be compatible with the subregional geometry. The new IEBCM, therefore, is a very valuable procedure which provides the opportunity of using the mixed basis functions in the solution.

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