Abstracts

Computation of Fields in an Arbitrarily Shaped Heterogeneous Dielectric or Biological Body by an Iterative Conjugate Gradient Method

J.J.H. Wang and J.R. Dubberley. "Computation of Fields in an Arbitrarily Shaped Heterogeneous Dielectric or Biological Body by an Iterative Conjugate Gradient Method." 1989 Transactions on Microwave Theory and Techniques 37.7 (Jul. 1989 [T-MTT]): 1119-1125.

Electromagnetic (EM) fields in a three-dimensional, arbitrarily shaped heterogeneous dielectric or biological body illuminated by a plane wave are computed by an iterative conjugate gradient method. The method is a generalized method of moments applied to the volume integral equation. Because no matrix is explicitly involved or stored, the present iterative method is capable of computing EM fields in objects an order of magnitude larger than those that can be handled by the conventional method of moments. Excellent numerical convergence is achieved. Perfect convergence to the result of the conventional moment method using the same basis and weighted with delta functions is consistently achieved in all the cases computed, indicating that these two algorithms (direct and iterative) are equivalent.

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