Abstracts

A novel algorithm based on the domain-decomposition method for the full-wave analysis of 3-D electromagnetic problems

Lei Yin, Jie Wang and Wei Hong. "A novel algorithm based on the domain-decomposition method for the full-wave analysis of 3-D electromagnetic problems." 2002 Transactions on Microwave Theory and Techniques 50.8 (Aug. 2002 [T-MTT]): 2011-2017.

A novel technique based on the domain-decomposition method and frequency-domain finite-difference method is presented for the full-wave analysis of three-dimensional electromagnetic problems. In this method, the original domain is decomposed into sub-domains, Maxwell's equations are then solved in each sub-domain independently, and the global solution is achieved finally by an iterative procedure. It greatly reduces the computational complexity and the memory requirement compared with the conventional finite-difference method and method of moments, etc. To reduce CPU time, some techniques, such as the relaxation iterative algorithm, overlapped domain decomposition, and multimesh resolution are also investigated and adopted to accelerate the algorithm. The validity of this algorithm is verified by numerical examples, including the analysis of a multilayered aperture-coupled patch antenna, the scattering characteristic analysis of conducting pillars, and the S-parameters extraction of the air-bridge discontinuity.

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