Abstracts

Macro-elements for efficient FEM simulation of small geometric features in waveguide components (Dec. 2000 [T-MTT])

Yu Zhu and A.C. Cangellaris. "Macro-elements for efficient FEM simulation of small geometric features in waveguide components (Dec. 2000 [T-MTT])." 2000 Transactions on Microwave Theory and Techniques 48.12 (Dec. 2000 [T-MTT] (Special Issue on 2000 International Microwave Symposium)): 2254-2260.

This paper introduces a novel class of specially constructed elements aimed at the expedient finite-element modeling of waveguide components containing fine geometric/material features such as dielectric and conducting posts. Instead of utilizing a very fine grid to resolve such fine features, special elements are constructed that capture accurately the electromagnetic properties of the fine features. Since the size of these macro-elements Is commensurate with the size of the elements of the grid used to discretize the volume in which the fine features are embedded, their use results in significant reduction in the number of unknowns in the finite-element approximation of the electromagnetic problem without sacrificing solution accuracy. The numerical implementation and effectiveness of the proposed macro-elements are demonstrated through several numerical experiments.

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