Abstracts

A generalized algorithm for the capacitance extraction of 3D VLSI interconnects

Zhenhai Zhu and Wei Hong. "A generalized algorithm for the capacitance extraction of 3D VLSI interconnects." 1999 Transactions on Microwave Theory and Techniques 47.10 (Oct. 1999 [T-MTT]): 2027-2030.

In this paper, a generalized algorithm based upon the nonoverlapping domain decomposition method (NDDM) is presented for the capacitance extraction of three-dimensional (3-D) VLSI interconnects. The subdomains with conductors are analyzed by the finite-difference method, while the subdomains with pure dielectric layers are analyzed with the eigenmode expansion technique. The central processing unit time and memory size used by the NDDM are unrelated to the thickness of pure dielectric layers. NDDM's computing time grows as O(n) if the number of domain iterations is bounded. Also, benchmarks show that it is approximately 15 times less than those used by Ansoft's Maxwell SpiceLink. In addition, only a two-dimensional mesh is needed to analyze 3-D structures. This greatly reduces the algorithm complexity and makes it easy and straightforward to interface with layout automation software.

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