Abstracts

A Hybrid Wavelet Expansion and Boundary Element Analysis for Multiconductor Transmission Lines in Multilayered Dielectric Media

G. Wang, G. Pan and B.K. Gilbert. "A Hybrid Wavelet Expansion and Boundary Element Analysis for Multiconductor Transmission Lines in Multilayered Dielectric Media." 1995 Transactions on Microwave Theory and Techniques 43.3 (Mar. 1995 [T-MTT]): 664-675.

In this paper the wavelet expansion method, in conjunction with the boundary element method (BEM), is applied for the evaluation of the capacitance and inductance matrices of multiconductor transmission lines in multilayered dielectric media. The integral equations obtained by using a Green's function above a ground plane are solved by Galerkin's method, with the unknown total charge expanded in terms of orthogonal wavelets in L^2 ([0, 1]). The difficulty of using wavelets on the real line to expand unknown functions defined in finite intervals is overcome by the utilization of wavelets in L^2 ([0, 1]). The adoption of the geometric representation of the BEM converts the two-dimensional problem into a one-dimensional problem, and provides a versatile and accurate treatment of curved conductor surfaces and dielectric interfaces. A sparse matrix equation is developed from the set of integral equations, which is extremely valuable, in particular when a large system of equations must be solved. Finally, we compare our numerical results with previously published data, and demonstrate good agreement between the two sets of results.

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