Abstracts

An efficient algorithm for analyzing large-scale microstrip structures using adaptive integral method combined with discrete complex-image method

Feng Ling, Chao-Fu Wang and Jian-Ming Jin. "An efficient algorithm for analyzing large-scale microstrip structures using adaptive integral method combined with discrete complex-image method." 2000 Transactions on Microwave Theory and Techniques 48.5 (May 2000 [T-MTT]): 832-839.

An efficient algorithm combining the adaptive integral method and the discrete complex-image method (DCIM) is presented in this paper for analyzing large-scale microstrip structures. The arbitrarily shaped microstrips are discretized using triangular elements with Rao-Wilton-Glisson basis functions. These basis functions are then projected onto a rectangular grid, which enables the calculation of the resultant matrix-vector product using the fast Fourier transform. The method retains the advantages of the well-known conjugate-gradient fast-Fourier-transform method, as well as the excellent modeling capability offered by triangular elements. The resulting algorithm has the memory requirement proportional to O(N) and the operation count for the matrix-vector multiplication proportional to O(N log N), where N denotes the number of unknowns. The required spatial Green's functions are computed efficiently using the DCIM, which further speeds up the algorithm. Numerical results for some microstrip circuits and a microstrip antenna array are presented to demonstrate the efficiency and accuracy of this method.

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