Abstracts

Analysis and application of new quasi-network characteristics of nonuniform mesh in FDTD simulation

Yan Zhang, Ben-Qing Gao, Wu Ren, Zheng-Hui Xue and Wei-Ming Li. "Analysis and application of new quasi-network characteristics of nonuniform mesh in FDTD simulation." 2002 Transactions on Microwave Theory and Techniques 50.11 (Nov. 2002 [T-MTT] (Mini-Special Issue on the 2002 IEEE Radio Frequency Integrated Circuit (RFIC) Symposium)): 2519-2526.

The equation of computing the reflection coefficient between two meshes of different sizes is derived. Using the equation, quasi-network characteristics of nonuniform mesh for the finite-difference time-domain technique is found and analyzed. The so-called mesh network (MN) here is a kind of structure composed of the sections of mesh in cascade. The cell sizes of these sections change regularly. By means of choosing the number of mesh sections, length of each section, and cell sizes, some novel network characteristics are obtained, which can be used to match the reflecting wave of nonuniform mesh or improve the transmitted characteristics for a mesh wave to travel along the nonuniform mesh. Formulas for analyzing the MN are given. The characteristics are realized in both one- and three-dimensional cases. The applications and advantages of the MN are shown by computing three different structures, i.e., microstrip-gap capacitor, parallel-coupling filter, and microstrip slot-line transformer.

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