Abstracts

Construction of the absorbing boundary conditions for the FDTD method with transfer functions

J. Zhou and W. Hong. "Construction of the absorbing boundary conditions for the FDTD method with transfer functions." 1998 Transactions on Microwave Theory and Techniques 46.11 (Nov. 1998, Part I [T-MTT]): 1807-1809.

The absorbing boundary conditions (ABCs) are essential to terminate the computational space when the finite-difference time-domain (FDTD) method is applied to analyze electromagnetic (EM) problems. With the ABCs, the fields on the truncated boundaries are evaluated by the interior fields. In this paper, the relationship between the fields on the terminated boundaries and the interior fields is expressed as the transfer functions in the Z-domain. The proper transfer functions are determined from the radiation condition or the transmission condition. Simplifying these transfer functions into rational functions, we obtain different schemes of the ABCs. In this paper, both the transfer functions and coefficients of the final ABCs are derived and expressed as recurrence formulas for the convenience of programming. This method has the property of simplicity and flexibility. The ABCs obtained by this method show good absorbing performance and numerical stability in the practical applications.

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