Abstracts

Demonstration and suppression of numerical divergence errors in FDTD analysis of practical microwave problems

M. Celuch-Marcysiak. "Demonstration and suppression of numerical divergence errors in FDTD analysis of practical microwave problems." 2002 MTT-S International Microwave Symposium Digest 02.2 (2002 Vol. II [MWSYM]): 751-754 vol.2.

Field divergence emulation in FDTD is revisited, and new theoretical aspects as well as problems of practical importance are revealed and resolved. Various choices of divergence definition are discussed in terms of their predictive power. It is shown that total FDTD solutions inevitably violate Gauss law in dipole radiation or eigenvalue analysis. The theory of S- and P-eigenmodes is applied to understand these problems and to restore their physical solutions. Recipes for extracting correct radiation efficiency, radiation resistance, Q-factors and modal field patterns in the presence of P-modes are proposed.

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