Abstracts

A new 2-D image reconstruction algorithm based on FDTD and design sensitivity analysis (Dec. 2002 [T-MTT])

No-Weon Kang, Young-Seek Chung, Changyul Cheon and Hyun-Kyo Jung. "A new 2-D image reconstruction algorithm based on FDTD and design sensitivity analysis (Dec. 2002 [T-MTT])." 2002 Transactions on Microwave Theory and Techniques 50.12 (Dec. 2002 [T-MTT] (Special Issue on 2002 International Microwave Symposium)): 2734-2740.

This paper proposes a numerical algorithm that reconstructs the complex permittivity profile of unknown scatterers by the design sensitivity analysis (DSA) and topology optimization technique. By introducing the DSA and adjoint-variable method, the derivatives of the error function with respect to the complex permittivity variables can be calculated, and the material property in each cell can be changed simultaneously using sensitivity information. The steepest descent method is used as an optimization technique. The proposed method is validated by applying it to reconstructions of unknown two-dimensional scatterers that are illuminated by TM/sup z/ with a Gaussian-pulsed plane wave.

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