Abstracts

Microstrip Filter Design Using Direct EM Field Simulation

J.W. Bandler, R.M. Biernacki, S.H. Chen, D.G. Swanson, Jr. and S. Ye. "Microstrip Filter Design Using Direct EM Field Simulation." 1994 Transactions on Microwave Theory and Techniques 42.7 (Jul. 1994, Part II [T-MTT] (Special Issue on Filters and Multiplexers)): 1353-1359.

For the first time, we present minimax filter design with electromagnetic (EM) simulations driven directly by a gradient-based optimizer. Challenges of efficiency, discretization of geometrical dimensions, and continuity of optimization variables are overcome by a three-stage attack: 1) efficient on-line response interpolation with respect to geometrical dimensions of microstrip structures simulated with fixed grid sizes; 2) smooth and accurate gradient evaluation for use in conjunction with the proposed interpolation; and 3) storing the results of expensive EM simulations in a dynamically updated database. Simulation of a lowpass microstrip filter illustrates the conventional use of EM simulation for design validation. Design optimization of a double folded stub bandstop filter and of a millimeter-wave 26-40 GHz interdigital capacitor bandpass microstrip filter illustrates the new technique.

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