Abstracts

Accuracy control in the optimization of microwave devices by finite-element methods

M.M. Gavrilovic and J.P. Webb. "Accuracy control in the optimization of microwave devices by finite-element methods." 2002 Transactions on Microwave Theory and Techniques 50.8 (Aug. 2002 [T-MTT]): 1901-1911.

Automatically optimizing the design of a microwave device can be prohibitively time-consuming when a numerical electromagnetic-field analysis is necessary at each iteration. However, the time taken for the field analysis depends on the accuracy required, and in the early stage of the optimization relatively inaccurate solutions are adequate. This idea is exploited in a scheme that combines a quasi-Newton constrained optimizer with a two-dimensional p-adaptive finite-element method for finding scattering parameters. The scheme has been tested on three H-plane rectangular waveguide devices: a T-junction, a miter bend with a dielectric column, and a two-cavity iris-coupled filter. Time savings of more than an order of magnitude were obtained, compared to the standard approach of requiring equally high accuracy throughout the optimization.

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