Abstracts

A trust region aggressive space mapping algorithm for EM optimization (Dec. 1998, Part II [T-MTT])

M.H. Bakr, J.W. Bandler, R.M. Biernacki, Shao Hua Chen and K. Madsen. "A trust region aggressive space mapping algorithm for EM optimization (Dec. 1998, Part II [T-MTT])." 1998 Transactions on Microwave Theory and Techniques 46.12 (Dec. 1998, Part II [T-MTT] (1998 Symposium Issue)): 2412-2425.

A robust new algorithm for electromagnetic (EM) optimization of microwave circuits is presented. The algorithm (TRASM) integrates a trust region methodology with the aggressive space mapping (ASM). The trust region ensures that each iteration results in improved alignment between the coarse and fine models needed to execute ASM. The parameter extraction step is a crucial part of the ASM technique. The nonuniqueness of this step may result in the divergence of the technique. To improve the uniqueness of the extraction phase, we developed a recursive multipoint parameter extraction. This suggested step exploits all the available EM simulations for improving the uniqueness of parameter extraction. The new algorithm was successfully used to design a number of microwave circuits. Examples include the EM optimization of a double-folded stub filter and of a high-temperature superconducting (HTS) filter using Sonnet's em. The proposed algorithm was also used to design two-section, three-section, and seven-section waveguide transformers exploiting Maxwell Eminence. The design of a three-section waveguide transformer with rounded corners was carried out using HP HFSS. We show how the mapping can be used to carry out Monte Carlo analysis using only coarse model simulations.

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