Abstracts

Electromagnetic Optimization Exploiting Aggressive Space Mapping

J.W. Bandler, R.M. Biernacki, S.H. Chen, R.H. Hemmers and K. Madsen. "Electromagnetic Optimization Exploiting Aggressive Space Mapping." 1995 Transactions on Microwave Theory and Techniques 43.12 (Dec. 1995, Part II [T-MTT] (1995 Symposium Issue)): 2873-2881.

We propose a significantly improved space mapping (SM) strategy for electromagnetic (EM) optimization. Instead of waiting for upfront EM analyses at several base points, our new approach aggressively exploits every available EM analysis, producing dramatic results right from the first step. We establish a relationship between the novel SM optimization and the quasi-Newton iteration for solving a system of nonlinear equations. Approximations to the matrix of first-order derivatives are updated by the classic Broyden formula. A high-temperature superconducting microstrip filter design solution emerges after only six EM simulations with sparse frequency sweeps. Furthermore, less CPU effort is required to optimize the filter than is required by one single detailed frequency sweep. We also extend the SM concept to the parameter extraction phase, overcoming severely misaligned responses induced by inadequate empirical models. This novel concept should have a significant impact on parameter extraction of devices.

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