Abstracts

Feasible adjoint sensitivity technique for EM design optimization (Dec. 2002 [T-MTT])

An adjoint-variable approach to frequency-domain design sensitivity analysis is proposed for the optimization of high-frequency structures with full-wave electromagnetic solvers. We investigate sensitivity estimations based on a feasible perturbation technique which is versatile and requires only minor modifications of existing analysis algorithms. It extends the feasible adjoint-sensitivity technique previously applied in nonlinear microwave circuits to full-wave electromagnetic analysis. The solution to the adjoint problem is obtained with very little overhead once the original problem is solved. The gradient of the objective function is consequently computed through a single analysis regardless of the number of the design parameters. The concept is illustrated through the sensitivity analysis and the design of a Yagi-Uda array and a rectangular patch antenna using suitable method of moments simulators.

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