Abstracts

Design optimization of interdigital filters using aggressive space mapping and decomposition

J.W. Bandler, R.M. Biernacki, Shao Hua Chen and Ya Fei Huang. "Design optimization of interdigital filters using aggressive space mapping and decomposition." 1997 Transactions on Microwave Theory and Techniques 45.5 (May 1997, Part II [T-MTT]): 761-769.

This paper presents a new electromagnetic (EM) design methodology which combines two powerful techniques in a coherent strategy: space mapping (SM) and decomposition. An accurate but computationally intensive fine-resolution EM model is used sparingly only to calibrate a less accurate, but computationally much more efficient "coarse model." Applying this new approach to interdigital filter design, the authors exploit structural decomposition to construct a highly efficient coarse model using a combination of EM models with a coarse grid and empirical models for the noncritical substructures. The authors employ the aggressive SM optimization technique to obtain a rapidly improved design after each fine-model simulation while the bulk of the computation is carried out using the coarse model. To avoid possible oscillation in the iterative process, a penalty function is introduced. Fast and stable convergence to a desirable interdigital filter design is achieved after only three EM fine-model simulations.

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