

## Optimization Techniques for Microwave Structures

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**Abstract :** A new and efficient method is presented for the analysis of arbitrarily shaped discontinuities. The discontinuities is characterized using a hybrid spectral/numerical technique. This structure presents an arbitrary number of ports, each one with different orientation and dimensions. This article presents a hybrid method based on multimode contour integral and mode matching techniques. The process is based on segmentation and dividing the structure into key building blocks. We use the multimode contour integral method to analyze the blocks including irregular shape discontinuities. Finally, the multimode scattering matrix of the whole structure can be found by cascading the blocks. Therefore, the new method is suitable for analysis of a wide range of waveguide problems. Therefore, the present approach can be applied easily to the analysis of any multiport junctions and cascade blocks. The accuracy of the method is validated comparing with results for several complex problems found in the literature. CPU times are also included to show the efficiency of the new method proposed.

**Keywords :** segmentation, s parameters, simulation, optimization

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