Abstracts

Analysis of coplanar-waveguide discontinuities with finite-metallization thickness and nonrectangular edge profile

Fang-Lih Lin and Ruey-Beei Wu. "Analysis of coplanar-waveguide discontinuities with finite-metallization thickness and nonrectangular edge profile." 1997 Transactions on Microwave Theory and Techniques 45.12 (Dec. 1997, Part I [T-MTT]): 2131-2138.

In this paper, the hybrid finite-element method (FEM) is proposed to analyze the coplanar-waveguide (CPW) discontinuities with finite-metallization thickness. A variational formula for the electric field in the slot region between upper and lower half-space is derived by applying the variational-reaction theory and solved by the FEM. In the limiting case of zero metallization thickness, this finite-element analysis is reduced to a moment-method analysis using Galerkin's approach with rooftop basis functions. The edge profile effects of a trapezoidal slot cross resulting from the etching or sputtering process can also be easily considered by this approach. Some numerical results are presented for short- and open-ended CPW discontinuities for different conductor thicknesses. It has been shown that not only the metallization thickness, but also the conductor-edge profile, can produce noticeable effects on circuit performance and should be taken into account for accurately modeling the CPW discontinuities.

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