Abstracts

Short-open calibration technique for field theory-based parameter extraction of lumped elements of planar integrated circuits

Lei Zhu and Ke Wu. "Short-open calibration technique for field theory-based parameter extraction of lumped elements of planar integrated circuits." 2002 Transactions on Microwave Theory and Techniques 50.8 (Aug. 2002 [T-MTT]): 1861-1869.

A generalized short-open calibration (SOC) technique is developed toward complete field theory-based deembedding and lumped-element extraction of equivalent-circuit models for planar integrated circuits from admittance-type method of moments (MoM) simulations. With reference to the modal expansion modeling of a rectangular waveguide discontinuity, our investigation at first is to show the physical reason why there exist two aspects of numerical error in a deterministic MoM regarding a microstrip step discontinuity as the showcase in this study. In this SOC scheme, the identified two error sources are put together as a single error term or box for each feed line and then characterized by defining and evaluating two self-consistent calibration standards in the MoM, namely, short and open elements. As such, the core circuit model of the step discontinuity is effectively extracted by removing out two error terms. Subsequently, geometry- and frequency-dependent characteristics of the SOC technique are studied and discussed to demonstrate its effectiveness and accurateness as compared with the conventional transmission-line deembedding technique. After a series of validations by static analysis and measured results, the SOC scheme is used to model symmetrical and asymmetrical microstrip step discontinuities in terms of their equivalent dynamic circuit model over a wide frequency range.

❑ Return to main document.