Abstracts

Accurate circuit model of interdigital capacitor and its application to design of new quasi-lumped miniaturized filters with suppression of harmonic resonance

Lei Zhu and Ke Wu. "Accurate circuit model of interdigital capacitor and its application to design of new quasi-lumped miniaturized filters with suppression of harmonic resonance." 2000 Transactions on Microwave Theory and Techniques 48.3 (Mar. 2000 [T-MTT]): 347-356.

A general-purpose circuit model of a microstrip interdigital capacitor (IDC) is presented in this paper for use in the design of new quasi-lumped miniaturized filters. This computer-aided-design-oriented model is developed as a versatile admittance /spl pi/-network with the short-open calibration technique that we have recently proposed for accurate parameter extraction of a circuit from its physical layout. This technique is self-contained in our method of moments, which accounts for frequency dispersion and fringing effects. A J-inverter topology is further conceived to explicitly formulate the coupling behavior of three types of IDC's. This model provides a unique way for the IDC-related circuit synthesis and optimization based on the accurate equivalent-circuit network extracted from the field theory algorithm. It is validated theoretically and experimentally through an example of a line resonator connected with two IDC's. The proposed scheme is used in the design and optimization of new low-loss miniaturized quasilumped integrated circuits, namely, two types of three-pole direct-coupled bandpass filters. Our measured and predicted results show interesting features of the proposed filter structure such as size reduction and suppression of harmonic resonance if the line resonator is attached by series-connected equivalent inductance.

❑ Return to main document.