Abstracts

Complex Modes in Shielded Suspended Coupled Microstrip Lines

The existence of complex modes in electrically shielded suspended coupled microstrip lines has been studied extensively, and the results are presented. A rigorous full-wave spectral-domain approach (SDA) with a newly proposed and tested set of basis functions can efficiently and accurately determine the propagation characteristics of the dominant, higher order, and complex modes for planar or quasi-planar transmission lines. These basis functions are validated by comparing the convergence study of field solutions with those obtained by various sets of preconditioned bases and by the unconditioned subdomain ones. Excellent agreement is obtained for the propagation constants and the normalized complex longitudinal and transverse current distributions on conducting strips for the strongly coupled microstrip lines. This suggests that the proposed set of basis functions can be a viable candidate for the SDA in analyses of planar or quasi-planar transmission lines. Under all the particular case studies of this paper, it is shown that the complex modes may exist in all the shielded suspended coupled microstrip lines, even when the substrate dielectric constant is low. Theoretical results for the fundamental, higher order, evanescent, and complex modes are presented for suspended coupled microstrip lines.

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