Abstracts

The Even- and Odd-Mode Capacitance Parameters for Coupled Lines in Suspended Substrate (May 1971 [T-MTT])

J.I. Smith. "The Even- and Odd-Mode Capacitance Parameters for Coupled Lines in Suspended Substrate (May 1971 [T-MTT])." 1971 Transactions on Microwave Theory and Techniques 19.5 (May 1971 [T-MTT]): 424-431.

Static capacitance characterizations are derived for coupled thin-film conductors in the suspended substrate geometry, which includes shielded microstrip as a special case. In particular, a satisfactory treatment of closely coupled and narrow lines is obtained where, because of the dominance of the edge singularity, "mesh point" analyses are inadequate. The present work was carried through to meet the need in interactive design procedures for characterization of a general transmission geometry. For these procedures, algorithms are required that take little storage and are suitable for very rapid calculations. Capacitance formulas are derived from variational series based on conformal transformations, and these series are converted to easily evaluated finite forms. Calculation of the even- and odd-mode fringing capacitances for coupled limes is made for finite line widths assuming a periodic array of lines. The applicability of these capacitances to a single pair of lines and to finite filter arrays has been checked experimentally. Routines for lower bound values of fringing capacitances are given. Upper bound formulations validate the accuracy of the lower bound calculations.

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