Abstracts

The Even and Odd Mode Capacitance Parameters for Coupled Lines in Suspended Substrate (1969 [MWSYM])

J.I. Smith. "The Even and Odd Mode Capacitance Parameters for Coupled Lines in Suspended Substrate (1969 [MWSYM])." 1969 G-MTT International Microwave Symposium Digest of Technical Papers 69.1 (1969 [MWSYM]): 324-328.

This paper describes the calculation of fringing capacitances in the suspended substrate transmission medium. In this medium, conductors are photoetched on one side of a dielectric card supported approximately halfway between two parallel ground planes. Usually a large number of thin film circuits are supported on a single card and are therefore coupled. The parameters needed to characterize coupled microwave structures are the surge impedances and phase velocities of the normal modes. For lumped circuits, or combinations of lumped circuits and distributed structures, which are quite common, the parasitic capacitances between adjacent conductors and the capacitances to ground are required. All these parameters can be found from the odd and even mode static capacitances for two parallel coupled lines. The transmission medium is inhomogeneous (the dielectric medium that supports the conductors is suspended in air as seen in Figure 1) so that not only are the system capacitances required with dielectrics present, but also required are these capacitances with all dielectrics removed. From this last, homogeneous, case the line inductance in an assumed TEM mode is found. The methods of calculation outlined here of the even and odd mode capacitances for both homogeneous and inhomogeneous cases are based on a variational approximation and on several conformal transformations. Their use at an interactive time share terminal has proven very valuable in the design of low loss, high performance microwave circuits.

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