Characterization of Discontinuities in Multilayered Cylindrical Microstrip Lines

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ABSTRACT

In this thesis, a full-wave spectral-domain analysis is used tocharacterize the asymmetric gap discontinuities in cylindricallylayered media. The two microstrip lines, possibly of different widths,are embedded wither in the inside of the outside of a conductingcylinder. Also, they may be located at cylindrical surfaces withdifferent radii. It is hoped that these characterizations can beapplicable in the design and modeling of microwave integrated circuits. The electric field integral equations governing the gapdiscontinuity structures are expressed in terms of the surface electriccurrents and the dyadic Green''s functions that is derived byenforcing all the boundary conditions. This approach takes into account all the physical effects, including the radiation and surfacewaves excited by the gap discontinuity. In numerical computation,the method of moments is employed to convert the integral equationinto a matrix equation, The entire-domain traveling-wave modes, inconjunction with the piece-wise sinusoidal basis functions, are used toapproximate the surface currents on the microstrips. The surfacecurrent distributions can be obtained by solving the matrix equations.The reflection and transmission characteristics, as well as the corresponding equaivalent circuits, of several gap discontinuitystructures are investigated.

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Table of Contents