Abstracts

Efficient Analysis of Planar Microstrip Geometries Using a Closed-Form Asymptotic Representation of the Grounded Dielectric Slab Green's Function

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A newly developed closed-form asymptotic representation of the grounded dielectric slab Green's function can be very efficiently applied to analyze planar microstrip configurations. In this study, such a representation is used in a moment method formulation to calculate the propagation constant of an infinite microstrip transmission line and the input impedance of a finite length, center-fed printed dipole. In these problems, source and field points are laterally rather than vertically separated with respect to the substrate. The conventional Sommerfeld integral and the plane wave spectral integral (PWS) representations of the microstrip Green's function converge very slowly in this case. However, the asymptotic closed-form representation of the Green's function does not have this limitation, and it remains accurate even for very small integral separation between source and observation points. Only for observation points in the immediate vicinity of the source is a modified form of the Sommerfeld integral representation used, while the asymptotic form is employed elsewhere. Some numerical results based on this approach are presented and are shown to compare very well with previous results based on the corresponding exact-integral or PWS forms of the Green's function.

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