Abstracts

Strongly Convergent Green's Function Expansions for Rectangularly Shielded Microstrip Lines

J.G. Fikioris, J.L. Tsalamengas and G.J. Fikioris. "Strongly Convergent Green's Function Expansions for Rectangularly Shielded Microstrip Lines." 1988 Transactions on Microwave Theory and Techniques 36.10 (Oct. 1988 [T-MTT]): 1386-1396.

The exact analytical treatment of the quasi-TEM mode in various cross-sectional configurations of microstrip lines may be based on Carleman-type singular integral equations (SIE's). Their kernel is a Laplacian Green's function G with source point limited on the interface separating the dielectric media. Strongly convergent expansions for G, particularly suited for the subsequent solution of the SIE and for exact field-point evaluations in rectangularly shielded microstrip configurations, are developed. Extraction of the singular logarithmic term leads to rapidly converging series expansions for the nonsingular part. The convergence of certain of these series is further improved when the field point lies also on the interface or when the source point approaches the shielding boundaries. In the first case, occurring typically in the kernel of integral equations, the Watson transformation provides alternative and exponentially convergent expansions for series converging slowly in the original G expression; in the second case, image source terms are further extracted out of G, leading to improved expansions for its remaining part. Numerical evaluations and comparisons illuminating these points are included.

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