Abstracts

A Wiener-Hopf-type analysis of uniaxial substrate-superstrate microstrip structures

G.A. Kyriacou and J.N. Sahalos. "A Wiener-Hopf-type analysis of uniaxial substrate-superstrate microstrip structures." 1997 Transactions on Microwave Theory and Techniques 45.5 (May 1997, Part I [T-MTT]): 616-629.

A Wiener-Hopf-type technique in conjunction with the hybrid-mode analysis and a space-domain Fourier transform pair was employed for the solution of the canonical problem of a TEM wave obliquely incident upon the edge and defined by a semi-infinite plate conductor lying at the interface of two uniaxial dielectrics, forming an otherwise grounded double-layer geometry. The single-cover layer and double-layer surface-wave modes' characteristic equations are examined and their cutoff conditions, along with safe conditions avoiding longitudinal-section magnetic (LSM) modes are given. The scattered field components and the TEM-wave reflection coefficient are given analytically in the form of Sommerfeld-type integrals. A thin layers approximation and a numerical integration scheme were adopted for the evaluation of the reflection coefficient. Its expression can be directly used for the analysis of wide microstrip lines and patch antennas printed in a substrate/superstrate geometry. The whole analysis gives a clear physical insight into the problem. Furthermore, a twofold theoretical verification was adopted by either forcing the absence of the superstrate or considering both layers to be isotropic. Numerical parametric Investigations show the effects of either the presence of the superstrate or both layers' dielectric anisotropy.

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