Abstracts

An Accurate Determination of Dielectric Loss Effect in Monolithic Microwave Integrated Circuits Including Microstrip and Coupled Microstrip Lines (Short Papers)

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For the first time, by a rigorous analysis, the performance of MIC planar transmission lines with lossy substrates can be studied accurately. The general structural shape chosen for the analysis includes infinitely thin metallic strips embedded within the layers of homogeneous dielectric substrates. The rigor of the analysis was guaranteed by the assumption of the propagation of an electromagnetic hybrid wave (i.e., TE+TM) along the planar transmission lines. An efficient computation was, however, achieved by implementing the spectral domain approach as the basis for the analysis. To test the analysis, phase constants, characteristic impedances, and attenuations, due to dielectric losses, were computed for microstrip and coupled microstrip lines. The results obtained were compared with those given previously by the spectral domain analysis in which dielectric losses were not included directly. The comparison showed an excellent agreement between the two theories for low-loss substrates. However, for lossy substrates the present method is more accurate.

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