Abstracts

Theory of microstrip lines on artificial periodic substrates

Hung-Yu David Yang. "Theory of microstrip lines on artificial periodic substrates." 1999 Transactions on Microwave Theory and Techniques 47.5 (May 1999 [T-MTT]): 629-635.

This paper presents the theory of a microstrip line on artificial periodic substrates. A two-stage moment method in conjunction with an array-scanning scheme is proposed for the microstrip characterization. The analytic and numerical methods dealing with the interaction of microstrip components (continuous plane-wave spectrum) with artificial periodic materials (discrete plane-wave spectrum, Floquet modes) are discussed. The method of solution involves two stages of vector integral equations and moment methods. The first integral-equation formulation is to find the Green's function for a planar periodic structure. A spectral-domain moment method is applied to the second vector integral equation to determine the fields or currents on the circuit components and the associated parameters of interest. Guided-wave characteristics of a microstrip line on artificial periodic substrates, including the propagation constant and the characteristic impedance, are investigated. Propagation bandgap of a microstrip line due to periodic elements is characterized. Experiment on a three-layer microstrip-line structure with a periodic mid-layer is conducted to validate the theory.

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