Abstracts

An Integral Equation Analysis of an Infinite Array of Rectangular Dielectric Waveguides

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An integral equation analysis is applied to the study of the propagation characteristics of an infinite array of dielectric waveguides. The geometry under study is assumed rectangular in shape. To find the Green's function of the structure, the Floquet theorem has been applied such that the mutual coupling between dielectric waveguide elements is effectively included in the analysis. The effect of the coupling on the propagation characteristics of a dielectric waveguide is studied by varying the size of the Floquet cell. The validity of this analysis to simulate the case of an open dielectric waveguide is confirmed by a comparison with previous results, in spite of the fact that the radiation and the leaky wave modes are not accounted for here. The complex modes due to the periodicity of the structure are found and their properties are described. The analysis presented in this paper with minor modification can deal with the problems of dielectric image lines or dielectric-loaded metallic waveguides.

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