# Abstracts

## Finite Element Modeling of Electromagnetic Wave Interactions with Periodic Dielectric Structures

*W.P. Pinello, R. Lee and A.C. Cangellaris. "Finite Element Modeling of Electromagnetic Wave Interactions with Periodic Dielectric Structures." 1994 Transactions on Microwave Theory and Techniques 42.12 (Dec. 1994, Part I [T-MTT]): 2294-2301.*

A finite element formulation is presented for the modeling of electromagnetic wave interactions with dielectric structures which are periodic in one dimension in a cartesian coordinate system. The structures are two-dimensional, in the sense that the geometry and material properties remain invariant in one of the other two dimensions; however, they may vary arbitrarily in the third dimension. Fourier series expansions of the periodic permittivity function and Floquet's theory are used to reduce the problem into a system of coupled ordinary differential equations. The system is solved numerically using an efficient one-dimensional finite element method. Applications of the proposed method include plane wave diffraction by dielectric gratings as well as dispersion analysis of periodically segmented waveguides. Comparisons with results obtained using alternative methods are used to verify the proposed method and demonstrate its accuracy.

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