Abstracts

An efficient method to determine Green's functions of a two-dimensional photonic crystal excited by a line source - the phased-array method

C. Caloz, A.K. Skrivervik and F.E. Gardiol. "An efficient method to determine Green's functions of a two-dimensional photonic crystal excited by a line source - the phased-array method." 2002 Transactions on Microwave Theory and Techniques 50.5 (May 2002 [T-MTT]): 1380-1391.

A novel and efficient method to determine Green's functions in photonic crystals (PCs), i.e., the phased-array method (PAM), is presented. The PAM is a combination of the plane-wave method and the array-scanning method, which is both more flexible and computationally faster than the eigenmodes expansion method. A complete derivation of the electric- and magnetic-field Green's functions associated, respectively, with an infinite electric and magnetic current line exciting a two-dimensional PC is given. Although the developments are presented only for a line source, the PAM can be extended to a dipole source. Thus, the PAM represents a promising method for the analysis of printed-circuit elements or antennas on PC materials. Numerical results for the Green's functions are shown for different positions of the source and a discussion about radiation patterns, asymptotic behaviors, and convergence characteristics is proposed.

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