Efficient Computation of Periodic, Layered Media Green's Functions

Donald Wilton
Department of Electrical and Computer Engineering
University of Houston

Layered media appear in a wide variety of applications, and the periodic Green's function in such media is especially needed for problems ranging from the analysis of metamaterials to the design of leaky wave antennas. In integral equation formulations for periodic, layered media, the mixed potential approach of Michalski is usually adopted for its good numerical properties. It expresses fields in terms of a superposition of equivalent transmission line solutions in which the characteristic impedances are the wave impedances of TE and TM plane waves supported by the media, and the propagation constants are the longitudinal wave numbers. After a brief review of the Michalski formulation as applied to periodic problems, we focus on the presentation of recent approaches for accelerating the computation of the Green's function, including asymptotic extraction, Ewald summation, and interpolation methods.