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Green's function expansions in dyadic root functions for shielded layered waveguides

Hanson G., Nosich A., Kartchevski E.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Dyadic Green's functions for inhomogeneous parallel-plate waveguides are considered. The usual residue series form of the Green's function is examined in the case of modal degeneracies, where second-order poles are encountered. The corresponding second-order residue contributions are properly interpreted as representing "associated functions" of the structure by constructing a new dyadic root function representation of the Hertzian potential Green's dyadic. The dyadic root functions include both eigenfunctions (corresponding to first-order residues) and associated functions, analogous to the idea of Jordan chains in finite-dimensional spaces. Numerical results are presented for the case of a two-layer parallel-plate waveguide.

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