Abstracts

Regular Boundary Integral Formulation for the Analysis of Open Dielectric/Optical Waveguides

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Regular boundary element method is employed for the variational formulation of Hehnholtz equation that governs the waveguiding problems. The problems are defined on the boundary as usual, but like in the charge simulation method, the source points associated with the fundamental solutions are allocated outside the domain so that the singular integrals which occur in the standard boundary element procedure can be avoided. First, the formulation is developed for the two-dimensional (2D) scalar Helmholtz problem solving for the axial components of either electric or magnetic fields. Then the formulation is extended for the analysis of dielectric waveguides of open type incorporating axial components of both electric and magnetic fields, for the solution of the propagating modes which are generally of hybrid types. Very close agreements have been found when the solutions obtained by the present formulation are compared with the ones obtained by different methods. One merit of the extended formulation is that it has been fixed to suppress the spurious solutions.

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