Hybrid Galerkin finite element and boundary element method for analyzing TM-polarized plane waves on cylinder optical elements

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Abstract

The article considers the problem of diffraction of a plane electromagnetic TM polarized wave by a two-dimensional (cylindrical) transparent object with the dimensions comparable with the wavelength. A hybrid Galerkin finite element and boundary element method has been developed for an approximate solution of this problem. The boundary element method is applied to the boundary points of the object, and the Galerkin method is applied to the interior and boundary points of the object. The solution is sought in the basis of piecewise linear functions. The field of diffraction by a cylinder with a circular cross section calculated by this method is in good agreement with the diffraction field calculated by the well-known analytical formulas.

Keywords: hybrid Galerkin, TM-polarized wave, optical element, finite element, piecewise linear function.

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