Abstracts

Field Description with Spatial Complex Variables and its Application to Scattering and Waveguide Problems

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The field description with spatial complex variables is proposed. The complex variables z, z/spl overbar/ are chosen, where z= x+iy and z/spl overbar/ is the complex conjugate. A contour integral in a complex plane is and the residue theorem is applied. The variables are changed by a transforming (mapping) function. The field description is applied to the boundary-value problems with arbitrary boundary. An approximate method is developed throughout this paper. It is pointed out that the integration can be performed easily and our analytical effort can be reduced. The two-dimensional scattered fields in free space from the perfectly conducting obstacle with arbitrary cross section are solved under assumption of small size. Furthermore the method is applied to the scattered fields in the rectangular waveguide with an inductive post or a capacitive post. The transmission coefficient and the reflection coefficient are obtained in the general forms which involve the boundary parameters indicating the shape of the boundary.

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