SCATTERING AT SKEW INCIDENCE BY AN IMPERFECT RIGHT-ANGLED WEDGE

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A case of particular interest in edge diffraction is an imperfectly conducting wedge of non-zero included angle illuminated by a plane wave at skew incidence, i.e., not in a plane perpendicular to the edge. A method has recently been developed based on the use of Maliuzhinets' technique (Sov. Phys. Dokl. 3, 752-755, 1959) in conjunction with a modified form of the impedance boundary conditions that makes possible the solution for a class of wedge geometries. One such geometry is a right-angled wedge with its upper face imperfectly conducting and the other perfectly conducting, and this is the problem considered.

When Maliuzhinets' technique is applied, it is found that the difference equations for the spectra appearing in the Sommerfeld integral representation for the axial field components can be decoupled by introducing subsidiary spectra. The expressions for these spectra involve three constants which must be chosen to eliminate certain poles whose contribution would otherwise violate the radiation condition. These constants are determined and their dependence on the angle of incidence and the impedance are displayed. The optics components and the edge-diffracted field are then obtained, and the nature of any surface wave contribution that may exist is also discussed. As a final step, the total field is expressed in a uniform form according to the UAT ansatz.

Computed patterns are presented to show the dependence of the diffracted and total fields on the angles of incidence and scattering. The dependence on the surface impedance, complex as well as real, is also examined.

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