Accepted Manuscript

Title: Diffraction of Electromagnetic Waves by a Wedge with Perfectly Absorbing and Impedance Faces

Author: Yusuf Ziya Umul

Please cite this article as: Umul YZ, Diffraction of Electromagnetic Waves by a Wedge with Perfectly Absorbing and Impedance Faces, *Optik* (2018), https://doi.org/10.1016/j.ijleo.2018.08.088

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Diffraction of Electromagnetic Waves by a Wedge with Perfectly Absorbing and Impedance Faces

Yusuf Ziya Umul

Electronic and Communication Department, Cankaya University, Eskisehir yolu 29. km, Etimesgut, Ankara 06790, Turkiye

yziya@cankaya.edu.tr

Abstract: The scattering process of electromagnetic waves by a wedge with perfectly absorbing and impedance faces is investigated. The scattered geometric optics waves are obtained for two cases, namely the illumination of single and double faces. The geometric optic field is expressed as a sum of two fields, which represent two wedges with different boundary conditions. The diffracted waves are determined for both of the wedge configurations. The behaviours of the total, total geometric optics and diffracted fields are studied numerically.

Key words: *diffraction theory; impedance surfaces; perfectly absorbing surfaces*

1. Introduction

The diffraction phenomenon of electromagnetic waves by a wedge is an important canonical problem in radar applications. Parts of the targets, forming complex scatterers, can be modelled by half-planes or wedges, like the F-117 Nighthawk [1]. The rough surface of ocean can be exemplified by Bragg scattering under some angles of incidence and the wedge diffraction model is used to determine the scattered waves in this case [2]. The diffracted waves by a wedge are also