Turkish Journal

of

Electrical Engineering & Computer Sciences

Keywords
Authors

elektrik@tubitak.gov.tr

Scientific Journals Home Page

Turkish Journal of Electrical Engineering & Computer Sciences

A Time Domain Uniform Geometrical Theory of Slope Diffraction for a Curved Wedge

Paul R. ROUSSEAU
The Aerospace Corporation., El Segundo, California, USA
Prabhakar PATHAK
The Ohio State Univ., Dept. of Electrical Enngineering, Columbus, Ohio, USA
e-mail: pathak.2@osu.edu

Abstract: A time domain version of the uniform geometrical theory of diffraction (TD-UTD) is developed to describe, in essentially closed form, the field which is produced via slope diffraction at a perfectly conducting, arbitrarily curved wedge excited by a time impulsive wave that exhibits a rapid spatial variation near the edge of the wedge. This TD-UTD slope diffracted field for a curved wedge is obtained by a Fourier inversion of the corresponding frequency domain UTD expression. An analytical signal representation of the transient fields is used since it is convenient, and because it circumvents some of the difficulties, which especially arise when inverting into time domain the frequency domain UTD fields associated with rays that have traversed caustics. The TD-UTD slope diffraction solution is obtained in a manner analogous to that utilized to develop an earlier TD-UTD solution, presented by the authors, for the case when the incident field does not exhibit a rapid spatial variation at the edge [1]. This TD-UTD slope diffraction solution for a time impulsive incident field can also be used for dealing with relatively general pulsed excitations via an efficient convolution procedure similar to that in [1]. Numerical results are presented to illustrate the accuracy of the TD-UTD solution by comparing it to the exact solution for a straight wedge with pulsed excitation, which was obtained earlier by Felsen [13].

Key Words: time domain uniform geometrical theory of diffraction, slope diffraction, perfectly conducting curved wedge, analytical signal representation

---

Turk. J. Elec. Eng. & Comp. Sci., **10**, (2002), 385-398.
Full text: pdf
Other articles published in the same issue: Turk. J. Elec. Eng. & Comp. Sci.,vol.10,iss.2.