

A Parametric Formulation of the UTD Diffraction Coefficient for Real-Time Propagation Prediction Modeling

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Abstract:

This letter presents a new solution to the diffracted field for dielectric wedges within the context of the uniform theory of diffraction (UTD). The relationship between the diffraction coefficient and the four characterization factors in its formulation is studied by using the high-frequency solution for impedance-surface wedge diffraction at normal incidence in a UTD-like form in a previous paper. A polynomial curve-fitting procedure is employed through the least square criterion to obtain simplified expressions of the four factors. The result is compared with rigorous and heuristic formulations. Both parallel and perpendicular field polarizations are tested. The new parametric formulation agrees the rigorous solution reasonably well and exhibits significant improvement in accuracy over heuristic methods. This approach enables faster and more accurate evaluation of diffracted field in propagation prediction models for urban and indoor environments for potential use in real-time propagation computations.

Index Terms:

dielectric wedge, diffraction coefficient, propagation prediction, uniform theory of diffraction (UTD)