

Abstract

This dissertation explores using a novel means of accelerating the Electric Field Integral Equation called the Field Extrapolation Method, to predict radio coverage in a rural environment. The method reduces computation time by grouping points into flat plates, onto and from whose centres scattering occurs. The accuracy trade-off is shown to be acceptable versus the computation time reduction, and the Forward-Backward method is shown to increase accuracy in limited circumstances. Whether an accuracy gain affords actual improvements in computation speed over single forward scattering passes by permitting larger group sizes is a question left open, along with the exact implementation of the Field Extrapolation Method's calculation of K , which represents the aggregation effect of non-central points in plate centres.

Urban terrain profiles are shown to be unsuitable for every permutation of method tested, and the orientation of the plate doesn't improve accuracy, but greatly diminishes computation time; both points are in keeping with the literature that states the Electric Field Integral Equation and Forward-Backward Method (hence their combination and derivatives thereof) are unsuitable for terrains with greater-than small grazing incidence angles, where back scattering and other fast fading effects are significant.