Implementation of Electric Field Integration Equation in Parallel Mode for A Terrain Profile

Abstract

The study is based on parallel methods for computations of electric field magnitudes in a terrain profile. The Electric Field Integration Equation is one of the numerous approaches used to predict how communication signals will propagate, along with ray tracing and integral methods (EFIE). It was able to compute the electric field E that an electric current J creates because the EFIE established a relationship. There is a terrain profile and the formula established is E=ZJ. In light of this, the objective of this project is to find workable solutions that will hasten the graphic determination of the signal coverage for each terrain profile. The parallelization approach, which is a more effective method of doing this, is hereby presented. This method uses split terrain groups and segments for computation. Up to 700 meters from the transmitter, calculations are performed. Groups and n-arbitrary segments are further split into the terrain profile. Both propagation and dispersion occur between each segment and the transmitter. The electric field is simultaneously and calculated in parallel. This method is found to be at least 2000 times faster than the traditional EFIE method.