SCATTERING FROM THE PEC FLAT STRIP BY USING THE METHOD OF MOMENTS WITH SINC TYPE BASIS FUNCTIONS

Scope: (B3)

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ABSTRACT

Using sinc methods is a very powerful technique in physics and mathematics. The main reasons for using sinc functions are their implementation ease, good accuracies and their ability to handle singularities in the problems.
The Method of Moments (MoM) is used to transform linear operator equations to linear algebraic equations such as matrix equations. It is mostly used in simulation of printed antenna configurations and for the characterization of radiation and coupling phenomena in printed circuit discontinuities and some other problems.
In this study, Galerkin's procedure is applied in the MoM. Sinc type basis functions are chosen. In the final step integral equation is tested with sinc functions. Then the convolution property of the sinc functions is used. So the integral of the sinc function with an analytical function can be approximated with an error criteria. Using this method provides an easily computationally matrix equation and saves cpu time.
The geometry of the problem is a p.e.c flat strip with a width L. It is located on a Cartesian coordinate system and it is illuminated by an electromagnetic plane wave with an incident angle θ^{inc}. The problem may be TE_z or TM_z depending on the excitation.
The first step of the MoM formulation is to write an integral equation (IE) describing the electromagnetic problem, which could be the MPIE, MFIE or EFIE. It is written depending on the boundary conditions and electromagnetic theory by using Maxwell equations.
Then the boundary conditions are enforced in average sense thorough the weighting procedure. In this procedure, the convolution of the sinc functions is used.
Integral equation is then transformed into a matrix equation, whose entries integrals. Then current distribution is obtained.
This method's results are compared with previously known MoM results. And these two get very close behavior in the plots.