

ANALYSIS OF THE IMPACT OF TOLERANCES ON DIELECTRIC SUBSTRATE ON THE SCATTERING PROPERTIES OF INFINITE ARRAY OF RECTANGULAR PATCHES

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Abstract

The scattering properties of an array of microstrip patches depend by different factors: geometrical factors as the shape and the dimensions of the patches, the lattice of the array and the thickness and the electrical properties of the substrate.

The goal of this project is the exhaustive study of the behavior of the scattering and total reflection matrix of an infinite array of rectangular patches when tolerances arise on the thickness and on the electrical properties of the substrate of the array.

At the beginning, a study of the quantities and the functions depending by the substrate properties is needed in order to determine quantitatively the impact of the tolerances on the scattering behavior of the array. After that an initial step considers the computation of the scattering and the total reflection matrix for different values of thickness and electrical properties of the substrate lying in a given interval of values, using the method of moment (MoM) procedure described in literature. The information resulting from such a set of simulations will be useful to understand the possible application of the Interval Analysis (IA) to determine in an effective way the impact of tolerances on the dielectric substrate. If this approach will be applicable to deal with the problem in hand, a set of simulations will be considered in order to provide reliable bounds for the terms of the scattering and reflection matrix by means of IA.

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