

Planar Differential Elliptical UWB Antenna Optimization

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Abstract—A recently proposed optimization procedure, based on the time domain characteristics of an antenna, is exploited to design a planar differential elliptical antenna for ultrawideband (UWB) applications. The optimization procedure aims at finding an antenna not only with low VSWR but also one exhibiting low-dispersion characteristics over the relevant frequency band. Furthermore, since in pulse communications systems the input signal is often of a given form, suited to a particular purpose, the optimization procedure also aims at finding the best antenna for the given input signal form. Specifically, the optimized antenna is designed for high temporal correlation between its electric field intensity signal and the given input signal. The optimization technique followed in this work makes use of genetic algorithm (GA) search concepts. The electromagnetic analysis of the antenna is done by means of a finite-difference time-domain method using the commercially available CST Microwave Studio software.

Index Terms—Correlation (fidelity), genetic algorithms (GAs), indoor communication, planar antennas (differential elliptical antennas), time-domain analysis, ultrawideband (UWB) antennas, ultrawideband (UWB) communication.

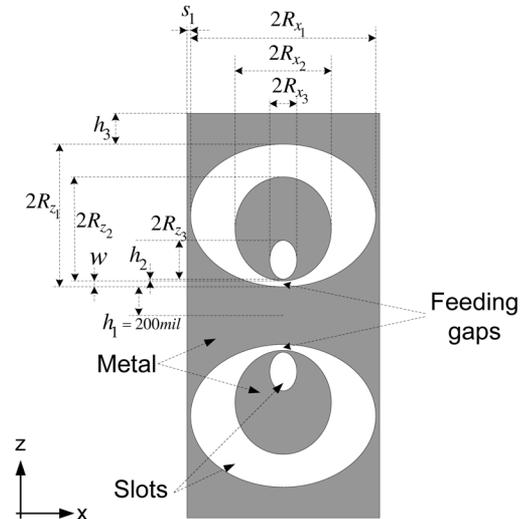


Fig. 1. Sketch of the planar elliptical antenna shown along with the optimization parameters.