ANFIS MODELS FOR SYNTHESIS OF OPEN SUPPORTED COPLANAR WAVEGUIDES

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Abstract: Simple and accurate models based on adaptive-network-based fuzzy inference system (ANFIS) to compute the physical dimensions of open supported coplanar waveguides are presented. The ANFIS is a class of adaptive networks which are functionally equivalent to fuzzy inference systems. Four optimization algorithms, hybrid learning, simulated annealing, least-squares, and genetic, are used to determine optimally the design parameters of the ANFIS. When the performances of ANFIS models are compared with each other, the best results are obtained from the ANFIS models trained by the hybrid learning algorithm. The results of ANFIS are compared with the results of the conformal mapping technique, the rigorous spectral-domain hybrid mode analysis, the improved spectral domain approach, the synthesis formulas, a full-wave electromagnetic simulator IE3D, and experimental works realized in this study.

Key words: *Supported coplanar waveguides, adaptive-network-based fuzzy inference system, synthesis, experiment*

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1. Introduction

Coplanar waveguides (CPWs) have the advantages such as low dispersion, high flexibility in the design of characteristic impedance, and easy connection to the shunt lumped elements, or devices without using via holes [1-14]. CPWs and supported CPWs have received great attention due to their attractive features over the conventional microstrip lines in designing and manufacturing microwave integrated circuits (MICs) [1-14].

CPWs are often considered to have free space above and below the dielectric substrate. This configuration has not been found suitable for monolithic MICs

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