# Abstracts

## EM-ANN Models for Microstrip Vias and Interconnects in Dataset Circuits

*P.M. Watson and K.C. Gupta. "EM-ANN Models for Microstrip Vias and Interconnects in Dataset Circuits." 1996 Transactions on Microwave Theory and Techniques 44.12 (Dec. 1996, Part II [T-MTT] (1996 Symposium Issue)): 2495-2503.*

A novel approach for accurate and efficient modeling of monolithic microwave/millimeter wave integrated circuit (MMIC) components by using electromagnetically trained artificial neural network (EM-ANN) software modules is presented. Full-wave EM analysis is employed to characterize MMIC components. Structures for simulation are chosen using design of experiments (DOE) methodology. EM-ANN models are then trained using physical parameters as inputs and S-parameters as outputs. Once trained, the EM-ANN models are inserted into a commercial microwave circuit simulator where they provide results approaching the accuracy of the EM simulation tool used for characterization of the MMIC components without increasing the analysis time significantly. The proposed technique is capable of providing simulation models for MMIC components where models do not exist or are not accurate over the desired region of operation. The approach has been verified by developing models for microstrip vias and interconnects in dataset circuits. A new hybrid (AS) modeling approach which makes use of existing approximate models for components is introduced and shown to be a more efficient method for developing EM-ANN models. An example of using EM-ANN models to optimize the component geometry is included.

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