Abstracts

A new macromodeling approach for nonlinear microwave circuits based on recurrent neural networks (Dec. 2000 [T-MTT])

Yonghua Fang, M.C.E. Yagoub, Fang Wang and Qi-Jun Zhang. "A new macromodeling approach for nonlinear microwave circuits based on recurrent neural networks (Dec. 2000 [T-MTT])." 2000 Transactions on Microwave Theory and Techniques 48.12 (Dec. 2000 [T-MTT] (Special Issue on 2000 International Microwave Symposium)): 2335-2344.

A new macromodeling approach is developed in which a recurrent neural network (RNN) is trained to learn the dynamic responses of nonlinear microwave circuits. Input and output waveforms of the original circuit are used as training data. A training algorithm based on backpropagation through time is developed. Once trained, the RNN macromodel provides fast prediction of the full analog behavior of the original circuit, which can be useful for high-level simulation and optimization. Three practical examples of macromodeling a power amplifier, mixer, and MOSFET are used to demonstrate the validity of the proposed macromodeling approach.

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