Abstracts

A practical large-signal global modeling simulation of a microwave amplifier using artificial neural network

S. Goasguen and S.M. El-Ghazaly. "A practical large-signal global modeling simulation of a microwave amplifier using artificial neural network." 2000 Microwave and Guided Wave Letters 10.7 (Jul. 2000 [MGWL]): 273-275.

We present a new technique to obtain large-signal global modeling simulation of a MMIC amplifier. The active device is modeled with a neural network trained with data obtained from a full hydrodynamic model. This neural network describes the nonlinearities of the equivalent circuit parameters of a MESFET implemented in an extended Finite Difference Time Domain (FDTD) mesh. We successfully represented the transistor characteristics with a one-hidden-layer neural network whose inputs are the gate voltage V/sub gs/, and the drain voltage V/sub ds/. Small-signal simulation is performed and validated by comparison with HP-Libra. Then, the large signal behavior is obtained, which demonstrates the successful use of artificial neural network (ANN) in the FDTD marching time algorithm.

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