Abstracts

Knowledge-based neural models for microwave design

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Neural networks have recently been introduced to the microwave area as a fast and flexible vehicle to microwave modeling, simulation and optimization. In this paper, a novel neural network structure, namely, knowledge-based neural network (KBNN), is proposed where microwave empirical or semi-analytical information is incorporated into the internal structure of neural networks. The microwave knowledge complements the capability of learning and generalization of neural networks by providing additional information which may not be adequately represented in a limited set of training data. Such knowledge becomes even more valuable when the neural model is used to extrapolate beyond training data region. A new training scheme employing gradient based l/sub 2/ optimization technique is developed to train the KBNN model. The proposed technique can be used to model passive and active microwave components with improved accuracy, reduced cost of model development and less need of training data over conventional neural models for microwave design.

❑ Return to main document.