Abstracts

A hierarchical neural network approach to the development of a library of neural models for microwave design

Neural networks recently gained attention as a fast and flexible vehicle for microwave modeling, simulation, and optimization. This paper addresses a new task in this area, namely, the development of libraries of neural models for passive and active components, a task, with a potential significance to many microwave simulators. However, developing libraries of neural models is very costly due to massive data generation and repeated neural network training. A new hierarchical neural network approach is presented in this paper, allowing both microwave functional knowledge and library inherent structural knowledge to be incorporated into neural models. The library models are developed through a set of base neural models, which capture the basic characteristics common to the entire library, and high-level neural modules which map the information from base models to the library model outputs. The proposed method substantially reduces the cost of library development through reduced need for data collection and shortened time of training. The technique is demonstrated through transmission line and FET library examples.

❑ Return to main document.

Click on title for a complete paper.