Abstracts

A Comprehensive CAD Approach to the Design of MMIC's up to MM-Wave Frequencies

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This paper is an extended and updated contribution based on an unpublished presentation given at the 1986 MTT-S Microwave Symposium, Workshop on Trends in Microwave CAD. The paper discusses the main requirements for the computer-aided design of MMIC's, emphasizing in detail the various physical effects, which are important in the development of monolithic circuit designs. Based on these considerations, a comprehensive CAD approach has been developed, which forms the core of a layout-orientated, process-independent simulator for an MMIC design engineering workstation (EWS). The CAD solutions developed and in progress for this EWS are described. The solutions include a new field-theory-based, high-resolution generator which produces the modal characteristics of complex MMIC microstrip structures. Another portion used as a support tool is a three-dimensional, hybrid-mode-based analysis package for discontinuities, nonelementary rectangular conductor patterns, and the analysis of coupling problems. Thus, the layout-oriented analysis and optimization scheme developed can handle interdigitated and spiral components as well as complex coupling situations. The sophistication and simulation accuracy of the approach described are illustrated by a variety of component examples and a four-stage monolithic traveling wave amplifier.

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