

Contributions to Analysis of Microwave Integrated Circuits

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PhD Thesis Summary

This thesis presents the author's contributions to analysis of microwave integrated circuits (MIC), focusing on the analysis of new structures and the improvement of microwave numerical methods. The thesis is structured in two parts:

A. The current status of knowledge - including Introduction and chapters I-V

B. Own contributions - chapters VI-VIII and Conclusions.

With the exception of Chapters I and II, all other chapters contain author's personal contributions in Part A as classical methods' applications, Part B of the thesis containing strictly original contributions.

The thesis aims to investigate and improve some of the methods of analysis of MIC. Three computational methods are investigated: Method of Moments (MoM), Transmission-line matrix (TLM) and Fast Wave Concept Iterative Process (FWCIP).

The Method of Moments is introduced in Chapter III, "Numerical simulation with MoM". Chapter VI, "The Analysis of a Periodic Structure by MoM (Galerkin)", carries out the detailed analysis, of a periodical structure based on via-holes.

The TLM method is introduced in Chapter IV, "Numerical simulation with TLM" and Chapter VII, "Improved Spectral Estimation for TLM " proposes and deals in detail with an original method of estimating spectral peaks.

FWCIP is introduced in Chapter V, "Numerical simulation with Wave Concept Iterative Process". Chapter VIII, "Microwave Circuit Analysis by the iterative method", presents an original and effective method to improve the convergence of FWCIP and an original redefinition of waves based on edge-effect investigation.

The conclusion reviews the original contributions of the author, presents the three simulation software developed in Visual Basic and C ++ by the author and lists the eight papers published by the author during the PhD stage.