Contents

Preface

Computerized Circuit Analysis Using SPICE Programs was written to assist in teaching application of computer-aids to the circuit design process. Although it is primarily intended for students of electronics, the introductory material is also suitable for basic circuits courses. The in-depth discussion of the capability of SPICE and its semiconductor device models will also be highly useful to graduate students involved in analog and digital VLSI design.

Chapter 1 provides an overview and introduction to SPICE that facilitate a "quick start" with SPICE circuit simulation. The first chapter covers the basic SPICE language and analysis capabilities. Chapter 2 follows with an extensive set of examples that explore the wide range of analysis modes available in SPICE. The sections in Chapter 2 are keyed to follow the chapter sequence in the text Microelectronic Circuit Design by Jaeger. Chapter 3 presents a brief overview of some of the numerical analysis methods used internally in SPICE programs including the modified nodal analysis formulation as well as techniques for iterative problem solution that can be used on calculators or personal computers.

A unique feature of this text is its documentation of the similarities and differences among the most widely used implementations of SPICE: SPICE2, SPICE3 and PSPICE. Chapters 4 and 5 detail the Declarations, Command Statements and Circuit Element descriptions as well as their limitations as found in the various versions of SPICE. Because of this material, our book should be a valuable reference source for even the most experienced SPICE user.

In order to effectively apply the wide range of semiconductor models that are found in SPICE, one must understand both the model equations and the details of the multitude of user-specified parameters for each model. Chapter 6 documents the model equations and parameter sets for the most commonly employed models of the semiconductor devices and again provides important reference material for SPICE users at all levels.

Bogdan M. Wilamowski
Richard C. Jaeger
March 15, 1997